APPENDIX 4.8

Transportation Impact Study

El Dorado Hills Town Center Apartments

Transportation Impact Analysis
Revised Draft

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1.0 INTRODUCTION

1.1 REPORT OVERVIEW

This report presents the results of a transportation impact study (TIS) completed for the El Dorado Hills Town Center Apartments (project) in El Dorado Hills, California, which is an unincorporated area of El Dorado County (County).

The purpose of this impact analysis is to identify potential environmental impacts to transportation facilities as required by the California Environmental Quality Act (CEQA) (Sections 1-8) and El Dorado County Initiative Measure E (Section 9). This study was performed in accordance with the *El Dorado County Transportation Impact study Guidelines* and the scope of work developed in collaboration with County staff and Caltrans.

The remaining sections of this report document the proposed project, analysis methodologies, CEQA impacts and mitigation measures, and Measure E compliance.

1.2 PROJECT DESCRIPTION

The proposed project includes the development of a 214-unit apartment complex in the Town Center East Planned Development (Town Center), which is located north of White Rock Road, south of US 50, and east of Latrobe Road. The project also includes a 383 stall parking structure and five spaces of surface parking. As shown on Figure 1, access to the parking structure will be provided from Vine Street and Town Center Boulevard (private roadways). Emergency vehicle access (20 feet wide) will be provided on the west side of the project between the project and the existing path adjacent to the Town Center Lake.

The proposed project will require a General Plan amendment, El Dorado Hills Specific Plan amendment, rezoning of the project site, and revision of the Town Center East Development Plan. Figure 1 shows the proposed project and connections to the Town Center roadways.

1.3 PROJECT SCOPING MEETING

A scoping meeting was held with Caltrans on April 16, 2014, with respect to the project previously proposed for the site, which was similar in scope. The transportation analysis presented in this report is informed by

comments received at this meeting. The following summarizes transportation-related comments received from Caltrans:

- Provide a complete project description. *Note: project description is included.*
- Include EB and WB mainline analysis on US 50 between the US 50/El Dorado Hills Boulevard/Latrobe Road interchange and the US 50/East Bidwell Street/Scott Road interchange in the City of Folsom. *Note: The analysis includes the requested mainline analysis.*
- Include EB on-ramp and WB off-ramp analysis at the US 50/East Bidwell Street/Scott Road interchange. *Note: Based on subsequent coordination between Caltrans and El Dorado County staff, the share of project traffic using US 50 to access areas west of El Dorado County would be provided. (information is included in Section 6.2.2)* .
- Count data used in the analysis should be representative of current conditions and should be collected midweek in the spring or fall (i.e., when school is in session). *Note: The count data used for the analysis were collected midweek when schools were in session.*

Figure 1

Proposed Project

2.0 REGULATORY SETTING

Existing transportation policies, laws, and regulations that would apply to the proposed project are summarized below. This information provides a context for the impact discussion related to the project's consistency with applicable regulatory requirements.

2.1 STATE

2.1.1 CALIFORNIA DEPARTMENT OF TRANSPORTATION

The California Department of Transportation (Caltrans) is responsible for operating and maintaining the State highway system. In the project vicinity, US 50 falls under Caltrans jurisdiction. Caltrans provides administrative support for transportation programming decisions made by the California Transportation Commission (CTC) for state funding programs. The State Transportation Improvement Program (STIP) is a multi-year capital improvement program that sets priorities and funds transportation projects envisioned in long-range transportation plans.

In June 2014, Caltrans approved a *Transportation Concept Report (TCR) for Highway 50*. Caltrans prepares a TCR, which is a long-range (20-year) planning document, for each state highway. The purpose of each TCR is to identify existing route conditions and future needs and includes a concept LOS standard. The cover of the TCR states that the *US 50 Corridor System Management Plan* (Caltrans 2009), referred to as the CSMP, now serves as the TCR for Highway 50 from I-80 in West Sacramento to the Cedar Grove exit, which is east of the study area. Caltrans has established LOS E as the 'concept LOS' consistent with a four lane freeway with HOV lanes, auxiliary lanes, and intelligent transportation systems (ITS). Since LOS E is identified as the concept LOS, no further degradation of service from existing "E" is acceptable. The concept LOS is a generalized LOS for large study segments used by Caltrans that reflects the minimum level of service or quality of operations acceptable for the route segment.

According to the *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2002), the existing LOS should be maintained if a freeway facility is currently operating at an unacceptable LOS (e.g., LOS F). A project impact is said to occur if the project degrades LOS from an acceptable to unacceptable level. A project impact may also occur when the addition of project trips exacerbates existing LOS F conditions and leads to a perceptible increase in density on freeway mainline segments or ramp junctions, or a perceptible increase in service volumes in a weaving area. In addition, a project impact is said to occur when the addition of project trips causes a queue on the off-ramp approach to a ramp terminal intersection to extend beyond its storage area and onto the freeway mainline.

2.2 LOCAL

2.2.1 SACRAMENTO AREA COUNCIL OF GOVERNMENTS

The Sacramento Area Council of Governments (SACOG) is an association of local governments in the six-county Sacramento Region. Its members include the counties of Sacramento, El Dorado, Placer, Sutter, Yolo, and Yuba, as well as 22 cities. SACOG provides transportation planning and funding for the region, and serves as a forum for the study and resolution of regional issues. In addition to preparing the region's long-range transportation plan, SACOG assists in planning for transit, bicycle networks, clean air, and airport land uses.

The *Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS) *for 2036* (SACOG 2016) is a federally mandated long-range fiscally constrained transportation plan for the six-county area. Most of this area is designated a federal non-attainment area for ozone, indicating that the transportation system is required to meet stringent air quality emissions budgets to reduce pollutant levels that contribute to ozone formation. To receive federal funding, transportation projects nominated by cities, counties, and agencies must be consistent with the MTP/SCS.

The *2017-2020 MTIP: Metropolitan Transportation Improvement Program* (MTIP) (SACOG 2016) is a list of transportation projects and programs to be funded and implemented over the next 3 years. SACOG submits this document to Caltrans and amends the program on a quarterly cycle. Only projects listed in the MTP/SCS may be included in the MTIP.

2.2.2 EL DORADO COUNTY TRANSPORTATION COMMISSION (EDCTC)

The EDCTC is the Regional Transportation Planning Agency (RTPA) for El Dorado County, except for the portion of the County within the Tahoe Basin, which is under the jurisdiction of the Tahoe Regional Planning Agency (TRPA).

One of the fundamental responsibilities which results from RTPA designation is the preparation of the County's Regional Transportation Plan. The *El Dorado County Regional Transportation Plan 2015 – 2035 (RTP)* is designed to be a blueprint for the systematic development of a balanced, comprehensive, multi-modal transportation system. The EDCTC submits the RTP to SACOG for inclusion in the MTP/SCS process.

The *El Dorado County Bicycle Transportation Plan - 2010 Update* provides a blueprint for the development of a bicycle transportation system on the western slope of El Dorado County. The plan updates the currently adopted El Dorado County Bicycle Master Plan, which was adopted in January 2005.

In May 2013, the EDCTC completed the *El Dorado Hills Community Transit Needs Assessment and US 50 Corridor Operations Plan*, which explores how the recent growth and projected development impact the need for transit services, and identifies the most appropriate type and level of service needed given the demand. The Plan represents a recommendation from the Western El Dorado County 2008 Short-Range Transit Plan to study and consider improved transit service in the El Dorado Hills area.

In April 2015, the EDCTC adopted the *Coordinated Public Transit – Human Services Transportation Plan*, which is intended to improve mobility of individuals who are disabled, elderly, or of low-income status. The plan focuses on identifying needs specific to those population groups and identifying strategies to meet their needs.

2.2.3 COUNTY OF EL DORADO

The County of El Dorado provides for the mobility of people and goods within El Dorado Hills, which is an unincorporated area of the County.

The Transportation and Circulation Element of the El Dorado County General Plan (Amended December 2016) outlines goals and policies that coordinate the transportation and circulation system with planned land uses. The following goals and their associated policies are relevant to the project.

- GOAL TC-1: To plan for and provide a unified, coordinated, and cost-efficient countywide road and highway system that ensures the safe, orderly, and efficient movement of people and goods.
- GOAL TC-X: To coordinate planning and implementation of roadway improvements with new development to maintain adequate levels of service on County roads. (The LOS policy specific to this project is described in Section 3.2.)
- GOAL TC-2: To promote a safe and efficient transit system that provides service to all residents, including senior citizens, youths, the disabled, and those without access to automobiles that also helps to reduce congestion, and improves the environment.
- GOAL TC-3: To reduce travel demand on the County's road system and maximize the operating efficiency of transportation facilities, thereby reducing the quantity of motor vehicle emissions and the amount of investment required in new or expanded facilities.
- GOAL TC-4: To provide a safe, continuous, and easily accessible non-motorized transportation system that facilitates the use of the viable alternative transportation modes.
- GOAL TC-5: To provide safe, continuous, and accessible sidewalks and pedestrian facilities as a viable alternative transportation mode.

The El Dorado County Community Development Agency's (CDA) *Transportation Impact Study Guidelines* (2014) set forth the protocols and procedures for conducting transportation analysis in the County,

including the identification of the study area (TIS Guidelines). All of the study intersections for the proposed project are within the County's jurisdiction. This traffic analysis is consistent with the TIS Guidelines.

2.2.4 EL DORADO COUNTY TRANSIT AUTHORITY

El Dorado County Transit Authority (EDCTA) operates El Dorado Transit, which provides public transit service within the project area. El Dorado Hills is currently served by El Dorado Transit Dial-A-Ride services, Commuter Service, and the Iron Point Connector Route.

El Dorado County Transit Authority (El Dorado Transit) provides public transit service within the study area. El Dorado Hills is currently served by El Dorado Transit Dial-A-Ride services, the Sacramento Commuter Service, and the 50 Express service. Both the Sacramento Commuter Service and the 50 Express serve the El Dorado Hills Park-and-Ride Lot, but do not circulate within the community. The Sacramento Commuter route also serves the Vine Street and Mercedes Lane Park-and-Ride lot.

The *El Dorado Park-and-Ride Facilities Master Plan* (2007) calls for constructing nine new facilities over 20 years. The Plan calls for EDCTA to assume primary responsibility for existing Park-and-Ride facilities in the county and sets forth an annual program to fund the upkeep and operation. The Plan reiterates that demand exceeds supply at the Park-and-Ride lot, referred to as the El Dorado Hills Multi-Modal Facility, located in the northeast corner of the White Rock Road/Latrobe Road intersection.

3.0 METHODS OF ANALYSIS

3.1 ANALYSIS PROCEDURES

Each study roadway facility was analyzed using the concept of Level of Service (LOS). LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents long delays and a facility that is operating at or near its functional capacity. For basic freeway segments (e.g., US 50 west of El Dorado Hills Boulevard), LOS A represents a vehicle density of up to 11 passenger cars per mile per lane and vehicle speeds (a secondary performance measure) at or above 65 miles per hour, and LOS F represents a vehicle density of greater than 45 passenger cars per mile per lane and vehicle speeds less than 52 miles per hour.

3.1.1 INTERSECTIONS

Traffic operations at the study intersections were analyzed using procedures and methodologies contained in the Highway Capacity Manual (HCM), Transportation Research Board, (2000, 2010), as confirmed with County staff. These methodologies were applied using Synchro or SimTraffic software packages (Version 9), developed by Trafficware. Table 1 displays the delay range associated with each LOS category for signalized and unsignalized intersections based on the HCM.

The micro-simulation analysis software, SimTraffic, was used to analyze operations at the US 50/El Dorado Hills Boulevard interchange (White Rock Road to Saratoga Way) to accurately analyze the effect of closely-spaced intersections. Simulation was requested by El Dorado County staff and Caltrans. The SimTraffic micro-simulation analysis applied the following methodology:

- The simulation was conducted for the entire peak hour (i.e., 60 minutes) using four 15-minute intervals with the peak hour factor applied in the second interval
- The results were based on the average of ten model runs
- Each of the ten simulation runs applied a ten-minute seeding time

The existing conditions SimTraffic model was validated using field measured traffic volumes and observed maximum vehicle queue lengths.

The HCM methodology determines the level of service (LOS) at signalized intersections by comparing the average control delay (i.e., delay resulting from initial deceleration, queue move-up time, time actually

stopped, and final acceleration) per vehicle at the intersection to the established thresholds. The LOS for traffic signal controlled and all-way stop controlled intersections is based on the average control delay for the entire intersection. For side-street stop-controlled intersections, the LOS is evaluated separately for each individual movement with delay reported for the critical (i.e., worst case) turning movement.

The following procedures and assumptions were applied for the analysis of existing and cumulative conditions:

- Roadway geometric data was gathered using aerial photographs and field observations.
- Peak hour traffic volumes were entered according to the peak hour of each intersection, except for the US 50/El Dorado Hills Boulevard interchange and adjacent intersections. For the interchange and adjacent intersections, a consistent peak hour was used so that volumes would balance (a requirement for accurate simulation analysis). Due to volume balancing, some of the turning movement volumes used for analysis will not match existing turning movement traffic counts, since peak hour travel occurs at different times at several of the intersections. The volume balancing was small relative to the traffic through the interchange and within the daily variation of traffic flows. The peak hour of the freeway is based on traffic counts.
- Headway factors were adjusted based on the observed driver behavior. Drivers were observed to be more aggressive and use smaller headway to travel through the intersections near the US 50/El Dorado Hills Boulevard interchange.
- The peak hour factor (PHF) was calculated based on traffic counts and applied by approach, except for the US 50/El Dorado Hills Boulevard interchange and adjacent intersections, which applied the system PHF (a requirement for accurate simulation analysis). Under cumulative conditions, a system PHF of 0.95 was used at the aforementioned interchange and adjacent intersections due to a significant increase in traffic volumes compared to existing conditions. At all other intersections, approach PHFs were increased to 0.92 under cumulative conditions if the PHF was less than 0.92 under existing conditions.
- The counted pedestrian and bicycle volumes were used with a minimum of two pedestrians per approach per peak hour. A minimum of five pedestrians per approach per peak hour were used under cumulative conditions.
- Heavy vehicle percentages were based on traffic counts and applied by movement.
- Signal phasing and timings were based on existing signal timing sheets provided by El Dorado County and field observations at the US 50/El Dorado Hills Boulevard interchange.
- Speeds for the model network were based on the posted speed limit.
- The existing heavy vehicle percentages were maintained for cumulative conditions.
- The existing bicycle volumes were maintained for cumulative conditions.
- As needed, traffic signals were optimized to serve future traffic volumes.

TABLE 1: INTERSECTION LEVEL OF SERVICE CRITERIA			
Level-of-Service	**Average Control Delay (seconds/vehicle)**		**Description**
	Signalized	**Stop Controlled**	
A	< 10.0	< 10.0	Very low delay. At signalized intersections, most vehicles do not stop.
B	10.1 to 20.0	10.1 to 15.0	Generally good progression of vehicles. Slight delays.
C	>20.1 to 35.0	>15.1 to 25.0	Fair progression. At signalized intersections, increased number of stopped vehicles.
D	>35.1 to 55.0	>25.1 to 35.0	Noticeable congestion. At signalized intersections, large portion of vehicles stopped.
E	>55.1 to 80.0	>35.1 to 50.0	Poor progression. High delays and frequent cycle failure.
F	>80.0	>50.0	Oversaturation. Forced flow. Extensive queuing.
Source: Highway Capacity Manual (Transportation Research Board, 2010)			

3.1.2 FREEWAY FACILITIES

The *Highway Capacity Manual* (HCM), includes three different tiers of analysis for freeway facilities, which include planning, design, and operations analysis. The different tiers are intended to provide flexibility to the user in selecting the appropriate analysis level given available resources (e.g., time and availability of analysis inputs) and the desired breadth of analysis coverage (e.g., more locations with less detail vs. fewer locations with more detail). For example, a planning level analysis requires relatively generalized analysis inputs and is regularly used when the breadth of coverage is more important than analysis detail. For example, Caltrans uses planning level analysis for long-range planning efforts like the US 50 Corridor System Management Plan, which groups many freeway facilities into single analysis segments. The project level analysis in this report is based on operations analysis methods and analyzes each freeway facility separately, focusing on analysis detail instead of breadth of coverage. The operations analysis method is consistent with General Plan Policy TC-Xd and Caltrans traffic impact study guidelines.

Freeway operations were analyzed using the procedures and methodologies contained in the HCM. Table 2 describes the HCM LOS criteria for freeway mainline, freeway ramp junctions, and freeway weaving segments. For weaving segments, Caltrans District 3 prefers analysis based on the Leisch Method, which is described in the *Highway Design Manual* (Caltrans, last updated July 1, 2008). For consistency with both the El Dorado County General Plan and Caltrans preference, analysis of freeway weaving segments was conducted using both the HCM and Leisch methods.

TABLE 2: FREEWAY FACILITY LEVEL OF SERVICE CRITERIA		
Level-of-Service	**Density (vehicles/mile/lane)**	
	Mainline	**Ramp Junction / Weaving**
A	≤ 11	≤ 10
B	11 – 18	10 – 20
C	18 – 26	20 – 28
D	26 – 35	28 – 35
E	35 – 45	> 35
F	> 45	Demand exceeds capacity
Source: Transportation Research Board, 2010		

3.2 THRESHOLDS OF SIGNIFICANCE

Under the California Environmental Quality Act (CEQA), the effects of a project are evaluated to determine if they will result in a significant adverse impact on the environment. In accordance with the CEQA Guidelines (Title 14, California Code of Regulations, sections 15000 to 15387), specifically Guidelines section 15064 and Appendix G to the Guidelines, as well as the current practice of the relevant regulatory agencies, the following criteria have been established to determine whether or not the project would have a significant impact on transportation and circulation. For most transportation and circulation impacts, policies from the *2004 El Dorado County General Plan* (Amended December 2016*)* and the El Dorado County CDA's *Transportation Impact Study Guidelines* (El Dorado County, 2014) were used. For freeway system impacts, Caltrans' standards were used.

Implementation of the project would have a potentially significant impact on transportation and circulation if it causes any of the following outcomes:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness (MOEs) for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit. The following specific MOEs, which have been generated by the regulatory agencies, are applicable to this project.

- General Plan Circulation Policy TC-Xd provides Level of Service (LOS) thresholds for County-maintained roads and state highways as follows[1] (these LOS thresholds do not apply to private roadway facilities):
    - Level of Service (LOS) for County-maintained roads and state highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions except as specified in Table TC-2. The volume to capacity ratio of the roadway segments listed in Table TC-2 as applicable shall not exceed the ratio specified in that table. *(Note: None of the study roadways are presented in Table TC-2)*
    - If a project causes the peak hour level of service or volume/capacity ratio on a county road or state highway that would otherwise meet the County standards (without the project) to exceed County LOS thresholds, then the impact shall be considered significant.
    - If any county road or state highway fails to meet the above listed county standards for peak hour LOS or volume/capacity ratios without the proposed project, and the project will worsen conditions on the road or highway, then the impact shall be considered significant. The term worsen is defined for the purpose of this paragraph according to General Plan Policy TC-Xe as follows:
        A. A two (2) percent increase in traffic during the AM peak hour, PM peak hour or daily, OR
        B. The addition of 100 or more daily trips, OR
        C. The addition of 10 or more trips during the AM peak hour or the PM peak hour.
- Caltrans considers the following to be significant impacts:
    - Project traffic added to off-ramps results in vehicle queues that extend into the ramp's deceleration area or onto the freeway (i.e., exceed the available storage capacity);
    - Project traffic increases that cause any ramp's merge/diverge level of service to be worse than the freeway's level of service.
    - Any additional traffic generated by the project is added to a facility already operating at LOS E[2].

[1] *El Dorado County Community Development Agency's Transportation Impact Study Guidelines*
[2] The US 50 Transportation Concept Report and Corridor System Management Plan identifies LOS E as the "Concept LOS" for US 50 from the Sacramento/El Dorado County line to Bass Lake Road.

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.
    - Per County policy, the project may trigger a potentially significant impact if it is in conflict with any of the following:
        - Access to Public Transit Services consistent with General Plan Circulation Element Goal TC-2: "To promote a safe and efficient transit system that provides service to all residents, including senior citizens, youths, the disabled, and those without access to automobiles that also helps to reduce congestion, and improves the environment."
        - Transportation System Management consistent with General Plan Circulation Element Goal TC-3: "To reduce travel demand on the County's road system and maximize the operating efficiency of transportation facilities, thereby reducing the quantity of motor vehicle emissions and the amount of investment required in new or expanded facilities."
        - Non-Motorized Transportation consistent with General Plan Circulation Element Goal TC-4: "To provide a safe, continuous, and easily accessible non-motorized transportation system that facilitates the use of the viable alternative transportation modes."
- Conflict with adopted policies, plans, or programs regarding the delivery of goods and services.

4.0 EXISTING SETTING

4.1 STUDY AREA

Based on coordination with the El Dorado County Community Development Agency (Long Range Planning) staff and Caltrans, the expected distribution of project trips, and review of the *Transportation Impact Study Guidelines*, the following study intersections and freeway facilities were selected for analysis during both the AM and PM peak hours. Figure 2 identifies the study area. As Figure 2 shows, the project site is located south of US 50 between the US 50/El Dorado Hills Boulevard/Latrobe Road and US 50/Silva Valley Parkway interchanges. The following facilities are analyzed.

Existing Intersections:

1. El Dorado Hills Boulevard/Saratoga Way/Park Drive
2. El Dorado Hills Boulevard/US 50 WB Ramps
3. Latrobe Road/US 50 EB Ramps
4. Latrobe Road/Town Center Boulevard
5. Latrobe Road/White Rock Road
6. White Rock Road/Windfield Way
7. White Rock Road/Post Street
8. White Rock Road/Vine Street/Valley View Parkway
9. Town Center Boulevard/Post Street (Private Road Intersection)
10. Silva Valley Parkway/US 50 WB Ramps
11. Silva Valley Parkway/US 50 EB Ramps

Freeway Main Facilities:

- US 50 WB – East of Silva Valley Parkway to County Line
- US 50 EB – County Line to East of Silva Valley Parkway

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Figure 2

Study Area

4.2 ROADWAY NETWORK

The characteristics of the roadway system near the project site are described below. Where applicable, the roadway designation given in the *2004 El Dorado County General Plan* (Amended December 2016) is provided.

US Route 50 (US 50) is an east-west freeway located south of the project site. Generally, US 50 serves the majority of El Dorado County's major population centers and provides regional connections to the west (i.e., Sacramento) and to the east (i.e., State of Nevada). Primary access to the project site from US 50 is provided via the US 50/El Dorado Hills Boulevard/Latrobe Road and US 50/Silva Valley Parkway/White Rock Road interchanges. Near the project site, westbound US 50 has a high-occupancy vehicle (HOV) lane and two general purpose travel lanes, and eastbound US 50 has an HOV lane and three general purpose travel lanes. The General Plan identifies US 50 as an eight lane freeway under future conditions.

Construction of Phase 1 of the new US 50/Silva Valley Parkway/White Rock Road interchange was completed in 2016. Phase 1 constructed a new connection to US 50 with new signalized slip on- and off-ramps westbound and a slip off-ramp and loop on-ramp eastbound. The mainline has an overcrossing for Silva Valley Parkway and was improved to include eastbound and westbound auxiliary lanes between the US 50/El Dorado Hills Boulevard/Latrobe Road interchange and the new US 50/Silva Valley interchange. Phase 2 will construct a westbound loop on-ramp and eastbound slip on-ramp (CIP Project No: 71345). The westbound loop on-ramp will begin the addition of an auxiliary lane that will continue westbound through the El Dorado Hills Boulevard interchange and terminate at the planned US 50/Empire Ranch interchange (CIP Project No: 53120).

The planned reconstruction of the US 50/Bass Lake Road interchange (CIP Project No: 71330 and GP148) will add a westbound auxiliary lane between the Bass Lake Road and Silva Valley Parkway interchanges.

El Dorado Hills Boulevard is a north-south roadway that continues as Salmon Falls Road on the north and Latrobe Road to the south of US 50. The roadway is four lanes with a center median between Park Drive and Governor Drive. Between US 50 and Park Drive, the roadway section widens to six lanes to accommodate vehicle demand near the US 50/El Dorado Hills Boulevard/Latrobe Road interchange. The County's General Plan identifies El Dorado Hills Boulevard as a four lane divided road except near US 50 where the designation changes to a six lane divided road.

Latrobe Road is a north-south roadway and is the continuation of El Dorado Hills Boulevard south of US 50. Latrobe Road is six lanes near the US 50 interchange, narrows to four lanes south of White Rock Road, and eventually narrows to two lanes as it continues south to connect with State Route 16 in Amador County. The General Plan identifies Latrobe Road as a six lane divided roadway near the US 50 interchange transitioning to a four lane divided road, then a two lane major road, and eventually a two lane regional road serving the southwest portion of the County. Latrobe Road serves about 30,000 vehicles per day north of White Rock Road.

Park Drive is a two lane local roadway serving the Raley's shopping center located in the northeast quadrant of the US 50/El Dorado Hills Boulevard interchange. Park Drive intersects El Dorado Hills Boulevard at two locations, opposite the new US 50 westbound loop off-ramp, and Saratoga Way.

Post Street is a two-lane private roadway in the Town Center. Post Street intersects Town Center Boulevard (also a private roadway) at an all-way stop-controlled intersection about 400 feet east of Latrobe Road. The project will have an access on Post Street.

Saratoga Way is currently two lanes and extends west of El Dorado Hills Boulevard to Finders Way. Saratoga Way is planned as a four-lane divided arterial that will connect to Iron Point Road in the City of Folsom.

Silva Valley Parkway is a north-south roadway that generally runs parallel to El Dorado Hills Boulevard north of US 50. Silva Valley Parkway ranges from two lanes to four lanes with a center median within the study area. The General Plan identifies Silva Valley Parkway as a four lane divided road. A new US 50 interchange at Silva Valley/White Rock Road was recently completed and is included in the existing and cumulative conditions transportation analysis. The interchange project provided a realigned Silva Valley Parkway that connects to the old four-lane Silva Valley Parkway to the north and the existing two-lane White Rock Road on the south. A new signalized intersection was installed where the new Silva Valley Parkway intersects old White Rock Road on the south. Silva Valley Parkway serves about 10,300 vehicles per day north of US 50.

Town Center Boulevard is a private east-west roadway that serves as a primary access for the Town Center. Town Center Boulevard is four lanes between Latrobe Road and Post Street and two lanes between Post Street and Vine Street with angled parking. Town Center Boulevard has a traffic signal controlled intersection with Latrobe Road and all-way stop control at the Post Street and Vine Street intersections.

Vine Street is a two-lane private roadway in the Town Center. Vine Street runs parallel to Post Street, providing access to the east section of Town Center. Vine Street intersects with White Rock Road, and changes to Valley View Parkway south of White Rock Road.

White Rock Road is the continuation of Silva Valley Parkway south of US 50. White Rock Road is predominately a two or three lane roadway until west of Monte Verde Drive where the cross section widens to four lanes. The General Plan identifies White Rock Road as a six lane divided road east of Latrobe Road and a four lane divided road west of Latrobe Road. The US 50/Silva Valley Parkway/White Rock Road interchange modified the roadway alignment and introduced a new signalized intersection at the intersection of White Rock Road/Old Silva Valley Parkway/New Silva Valley Parkway. White Rock Road serves about 10,600 vehicles per day west of Latrobe Road.

4.3 EXISTING CONDITIONS PEAK HOUR TRAFFIC VOLUMES

Intersection, roadway segment, and freeway counts were collected to determine the existing traffic operations of study facilities. Weather conditions were generally dry and local schools were in full session, during the traffic count data collection.

For study intersections, AM peak period (7 AM to 9 AM) and PM peak period (4 PM to 6 PM) intersection turning movement counts were collected in December 2016, and February 2017. Field observations conducted during the AM and PM peak periods identified extensive vehicle queuing near the US 50/El Dorado Hills Boulevard interchange, with the longest queues southbound during the AM peak hour and northbound during the PM peak hour. However, all queued vehicles were served during the peak hour, so the traffic counts are representative of peak hour travel demand. As discussed in section 3.1.1, the Latrobe Road/White Rock Road, Latrobe Road/Town Center Boulevard, US 50 EB Ramps/El Dorado Hills Boulevard, US 50 WB Ramps/El Dorado Hills Boulevard, and the Saratoga Way/Park Drive/El Dorado Hills Boulevard intersections were analyzed using SimTraffic micro-simulation with a common analysis hour (a requirement for accurate simulation analysis). All other intersections' individual peak hours within the peak period were used for the analysis. Figure 3 provides peak hour traffic volumes, lane configurations and traffic controls at each of the study intersections.

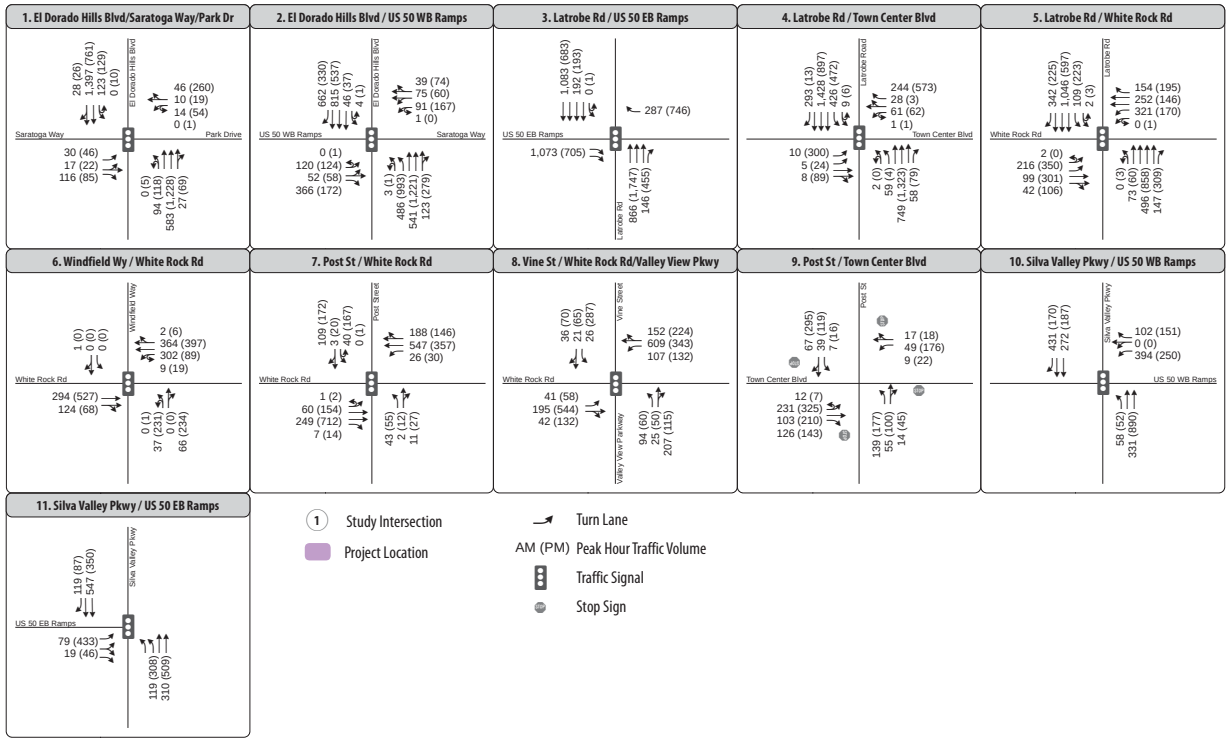

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Figure 3

Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions

4.4 EXISTING CONDITIONS PEAK HOUR VEHICLE LEVEL OF SERVICE

4.4.1 INTERSECTIONS

Table 3 summarizes existing conditions AM and PM peak hour Level of Service (LOS) for the study intersections. The LOS of a facility is a qualitative measure used to describe operating conditions. LOS ranges from A (best), which represents short delays, to LOS F (worst), which represents long delays and a facility that is operating at or near its functional capacity.

As described in Section 3.2, an intersection that is operating at LOS E or better in a Community Region is considered to operate at an acceptable level. Table 3 shows that all study intersections operate at LOS E or better during both peak hours. Detailed LOS analysis sheets are contained in Appendix A. See Section 3.1 and Table 1 for a definition of LOS as it relates to intersection delay.

TABLE 3: PEAK HOUR LEVEL OF SERVICE – EXISTING CONDITIONS (INTERSECTION)

Intersection	Traffic Control	LOS / Delay (seconds)	
		AM Peak Hour	PM Peak Hour
1. El Dorado Hills Boulevard/Park Drive/Saratoga Way	Signal	B / 19	C / 20
2. El Dorado Hills Boulevard/US 50 WB Ramps	Signal	C / 31	C / 33
3. Latrobe Road/US 50 EB Ramps	Signal	C / 33	C / 20
4. Latrobe Road/Town Center Boulevard	Signal	B / 16	D / 50
5. Latrobe Road/White Rock Road	Signal	C / 31	C / 27
6. White Rock Road/Winfield Way	Signal	C / 20	C / 22
7. White Rock Road/Post Street	Signal	B / 18	C / 27
8. White Rock Road/Vine Street/Valley View Drive	Signal	C / 24	D / 46
9. Town Center Boulevard/Post Street[1]	AWSC	B / 13	E / 48
10. Silva Valley Parkway/US 50 WB Ramps	Signal	B / 11	A / 10
11. Silva Valley Parkway/US 50 EB Ramps	Signal	B / 10	B / 13

Notes: AWSC = all-way stop control

[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).

The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For SSSC intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11 were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

Source: Fehr & Peers, 2017

4.4.2 FREEWAY FACILITIES

Freeway facilities in the County are under the jurisdiction of Caltrans. In recent years, US 50 and interchanges within or proximate to the project site have undergone or are undergoing various improvements to enhance traffic operations. These improvements include: High Occupancy Vehicle (HOV) lanes east to Cameron Park Drive, modifications to the US 50/El Dorado Hills Boulevard Latrobe Road interchange westbound ramps, construction of the US 50/Silva Parkway/White Rock Road interchange, and construction of auxiliary lanes between the US 50/Silva Valley Parkway/White Rock Road and US 50/El Dorado Hills Boulevard/Latrobe Road interchanges.

Table 4 summarizes existing peak hour freeway operating conditions. All of the study facilities currently operate acceptably. Detailed LOS analysis sheets are contained in Appendix A. See Section 3.1 and Table 2 for a definition of LOS as it relates to freeway facilities.

TABLE 4: FREEWAY FACILITY PEAK HOUR LEVEL OF SERVICE – EXISTING CONDITIONS

Freeway	Segment	Facility Type	Existing Density[1]/LOS	
			AM	PM
US 50 EB	Latrobe Rd off-ramp	Diverge	22 / C	30 / D
	El Dorado Hills Boulevard off-ramp	Diverge	14 / B	26 / C
	El Dorado Hills Boulevard on-ramp to Silva Valley Parkway off-ramp	Weave	10 / A	23 / C
	Silva Valley Parkway on-ramp (loop)	Merge	11 / B	21 / C
	Silva Valley Parkway to Bass Lake Road	Basic	11 / A	20 / C
US 50 WB	Bass Lake Rd to lane addition	Basic	29 / D	17 / B
	Lane addition to Silva Valley Parkway	Basic	19 / C	12 / B
	Silva Valley Parkway off-ramp	Diverge	13 / B	5 / A
	Silva Valley Parkway on-ramp to El Dorado Hills Boulevard off-ramp	Weave	34 / D	18 / B
	El Dorado Hills Boulevard on-ramp	Merge	34 / D	24 / C

Notes: [1]Density reported as passenger cars per mile per pane. Density is not reported for LOS F operations.
Source: Fehr & Peers, 2017

4.5 PEDESTRIAN CIRCULATION

Pedestrian facilities in Town Center include attached sidewalks on Town Center Boulevard, Post Street, Vine Street, Mercedes Lane, and an off-street path around the Town Center lake. Sidewalks on Town Center Boulevard connect to Latrobe Road, which has sidewalks north of Town Center Boulevard on the east side of Latrobe Road. Continuous sidewalks are not provided on the west side of Latrobe Road or on the east side of Latrobe Road between Town Center Boulevard and White Rock Road. On White Rock Road, sidewalks are generally provided on improved frontages. All study intersections provide controlled pedestrian crossings with marked crosswalks.

4.6 BICYCLE CIRCULATION

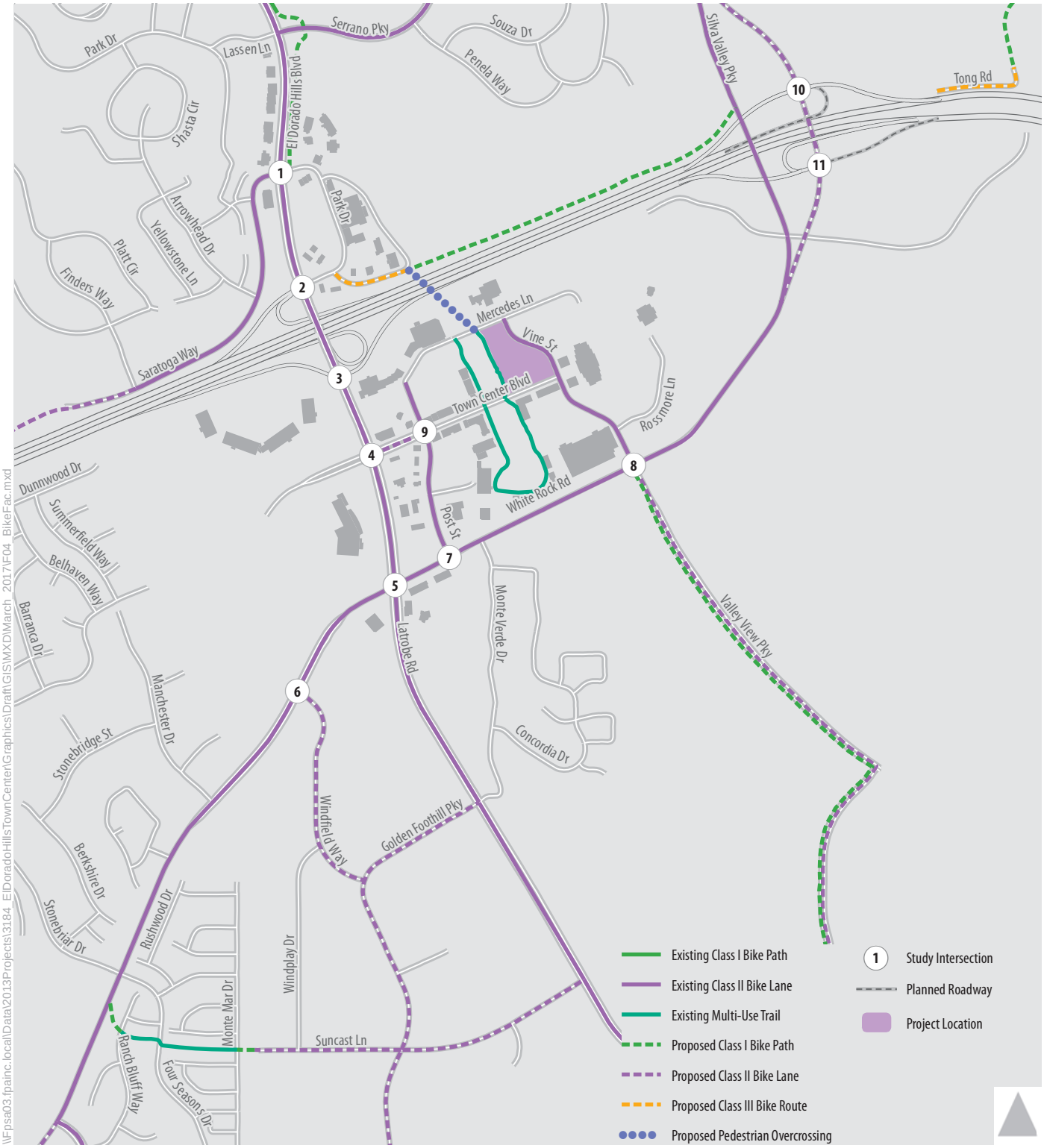
Existing and planned bicycle facilities within the study area are displayed in Figure 4. Bicycle facilities are classified into three categories:

- Class I Bicycle Path– Off-street bike paths within exclusive right-of-way; usually shared with pedestrians
- Class II Bicycle Lane – Striped on-road bike lanes adjacent to the outside travel lane on preferred corridors for biking
- Class III Bicycle Route – Shared on-road facility, usually delineated by signage and pavement markings

According to the *El Dorado Bicycle Transportation Plan, 2010 Update (El Dorado County Transportation Commission)*, mapping information provided by the County, and field observations, the following major bikeway facilities are present within the study area:

- Class II bicycle lanes on Latrobe Road, White Rock Road, El Dorado Hills Drive, and portions of Silva Valley Parkway
- Class I bicycle path, New York Creek Nature Trail, which is adjacent to El Dorado Hills Boulevard on the east side between Serrano Parkway and St Andrews Drive

Figure 4 also identifies planned bikeways presented in the *El Dorado Bicycle Transportation Plan, 2010 Update* and the *Sacramento Area Council of Governments (SACOG) Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) for 2035*.



\\Fpsa03.fpainc.local\Data\2013Projects\3184_ElDoradoHillsTownCenter\Graphics\Draft\GIS\MXD\March_2017\F04_BikeFac.mxd

Figure 4

Existing and Planned Bicycle Facilities

4.7 TRANSIT

El Dorado County Transit Authority (El Dorado Transit) provides public transit service within the study area. El Dorado Hills is currently served by El Dorado Transit Dial-A-Ride services, the Sacramento Commuter Service, and the 50 Express service. Both the Sacramento Commuter Service and the 50 Express serve the El Dorado Hills Park-and-Ride Lot, but do not circulate within the community. The Sacramento Commuter route also serves the Vine Street and Mercedes Lane Park-and-Ride lot.

In May 2013, The EDCTC completed the *El Dorado Hills Community Transit Needs Assessment and U.S. 50 Corridor Operations Plan* (Plan), which explores how the recent growth and projected development impact the need for transit services, and identifies the most appropriate type and level of service needed given the demand. All three services are addressed in the Plan and are described briefly below.

- **Dial-A-Ride** service is a demand response service designed for seniors and disabled passengers, with limited access available for the general public. The service is available on a first-come, first-serve basis Monday through Friday between the hours of 7:30 AM and 5:00 PM, and between 8:00 AM and 5:00 PM on Saturdays and Sundays. El Dorado Hills is one of twelve geographic zone service areas.

- **Sacramento Commuter Service** is offered Monday through Friday between El Dorado County and downtown Sacramento. The Sacramento Commuter provides 11 trips in the morning, 11 return trips in the afternoon, and two reverse commuter trips twice per day. Morning departures from the Town Center Park-and-Ride lots are scheduled from 5:43 AM to 8:30 AM, and afternoon eastbound arrivals occur from 3:46 PM to 7:03 PM. The Vine Street and Mercedes Lane Park-and-Ride lot, located in Town Center is the nearest stop location for the project. According to the Plan, nearly half of commute passengers boarded in Town Center at the Town Center Park-and-Ride lots. The Sacramento Commuter Service has about 138,000 annual boardings, based on the El Dorado Transit Fiscal Year 2015/2016 Administrative Operations Report (November 3, 2016).

- **50 Express** provides direct service from El Dorado County to Folsom with connections to Sacramento Regional Transit light rail on weekdays. This route operates every hour from 6:00 AM until 7:00 PM The El Dorado Hills Park-and-Ride located in Town Center at the White Rock Road/Post Street intersection is the nearest stop location for the project. The 50 Express has about 32,000 annual boardings, based on the El Dorado Transit Fiscal Year 2015/2016 Administrative Operations Report (November 3, 2016).

The El Dorado Hills Park-and-Ride Lot provides 120 parking spaces. The Plan reports that parking demand exceeds supply. Specifically, Table 19 of the Plan reports 108% parking utilization in 2005 based on Sacramento Area Council of Governments and Caltrans data.

5.0 EXISTING PLUS PROJECT CONDITIONS

5.1 TRIP GENERATION

Fehr & Peers prepared trip generation estimates for the project based on methodologies and trip rates presented in Trip Generation, 9th Edition (Institute of Transportation Engineers), with adjustments to account for internal vehicle trips and walking trips given that the project would be located in the Town Center.

This traffic study determined that the combined effects of the project's land use, location, and development scale would contribute to a reduction in off-site average weekday vehicle "trips" (e.g., one vehicle trip is generated when a person drives from their home to shopping, school, or their job. Their return drive home is another trip). This reduction is due largely to the project's proximity to commercial and retail services and connections between the project and these services. That is, most of the reduction in total off-site vehicle trips generated by the project is attributable to those trips beginning on the project site, traveling to adjacent services, and ending on the project site without using off-site roadways or by walking.

Traditionally, traffic engineers and transportation planners have estimated internalization of project trips using one of two methods. First, they would estimate it based on their professional judgment. Alternatively, professionals relied on the Institute of Transportation Engineers' (ITE) internalization methodology presented in the ITE Trip Generation Handbook. Although this has been applied in thousands of studies in California, the methodology was limited as it was based on only six surveys in Florida. Additionally, the ITE internalization methodology only accounts for the land use types on the mixed-use site. Given the limited input information (land use amount and type) and the limited range of data (six surveys), the accuracy of the internalization estimates has recently been found to generally under-estimate internalization of trips from mixed-use projects.

Recognizing the limitations of the simplified methodology applied in the ITE handbook, the United States Environmental Protection Agency (US EPA) commissioned a study to develop a more substantial, statistically superior methodology. This methodology, identified as MXD (or mixed-use development trip generation), begins with ITE rates and develops trip internalization estimates based on a series of factors tied to numerous site attributes. It should also be noted that the MXD model has been developed in cooperation with the US EPA and ITE, and that ITE is currently reviewing the model for potential inclusion in their updated recommended practice for evaluating mixed-use development projects. The MXD methodology is described in greater detail below.

MXD Trip Internalization Methodology

The internal capture percentage reported is not an "assumed" number, but rather is a number that was derived using a best practices trip generation model designed specifically for mixed-use development (MXD) projects and estimates trip generation and internal capture by adjusting trip generation rates to account for the influence of built environment variables. A variety of research studies have demonstrated that these variables influence vehicle trip generation.

The MXD model used was developed based on household travel survey data obtained from 239 existing mixed-use developments in six metropolitan regions throughout the U.S., including developments in Sacramento. The internal capture percentage calculated for the project is reflective of the land uses that would be developed as part of the project and existing land uses near the project, which would reduce the need to travel beyond the project site or surrounding area. A set of 16 independent mixed use sites that were not included in the initial model were tested to help validate the model. Among the validation sites, use of the MXD model produced superior statistical performance when comparing the model results to observed data. Given the statistical robustness of the MXD model, it was deemed the most appropriate approach for estimating internalization of project trips.

MXD Model Inputs and Trip Generation Estimates

To determine the amount of trips that would be internal to the Project site, an MXD trip generation estimate was prepared. The MXD analysis first begins with gross trip rates identified in the ITE's Trip Generation (9th Edition, 2012). It then incorporates the MXD methodology for "matching" trips to estimate the amount of internalization within the project area. Table 5 summarizes project land use, assumed trip rates, calculated trip generation totals, and adjustments to account for trips occurring between the project and other parts of the Town Center.

The project is projected to generate 109 AM peak hour vehicle trips and 133 PM peak hour vehicle trips. About 28 trips in the PM peak hour are expected to remain within the Town Center. These trips will not use County roadways.

TABLE 5: TRIP GENERATION

Land Use	Quantity	ITE Code	Trip Rate		Trips					
			AM	PM	AM			PM		
					In	Out	Total	In	Out	Total
Multifamily Housing (Dwelling Units)	214	220	0.51	0.62	22	87	109	87	46	133
Town Center Trips								18	10	28
Vehicle Trips External to Town Center					22	87	109	69	36	105

Source: Institute of Transportation Engineers' Trip Generation (9th Edition, 2012)

5.2 TRIP DISTRIBUTION AND ASSIGNMENT

The expected distribution of project trips is shown on Figure 5. The distribution was developed using the following sources and analytical techniques:

- Existing travel patterns based on traffic counts
- Traffic assignment using the validated base year El Dorado County travel demand forecasting model
- Project access

As shown on Figure 5, the largest share of project trips (37 percent) will use US 50 to/from the west in the morning and evening with 11 percent traveling on US 50 to/from the east. Travel to/from the north on El Dorado Hills Boulevard represents about eight percent of project travel. Travel to/from the east and west on White Rock Road is fairly balanced at eight percent. About 20 percent of project travel will have an origin/destination south of White Rock Road. Figure 6 shows project trips based on the trip distribution shown in Figure 5. The resulting AM and PM peak hour traffic volumes under existing plus project conditions are presented in Figure 7.

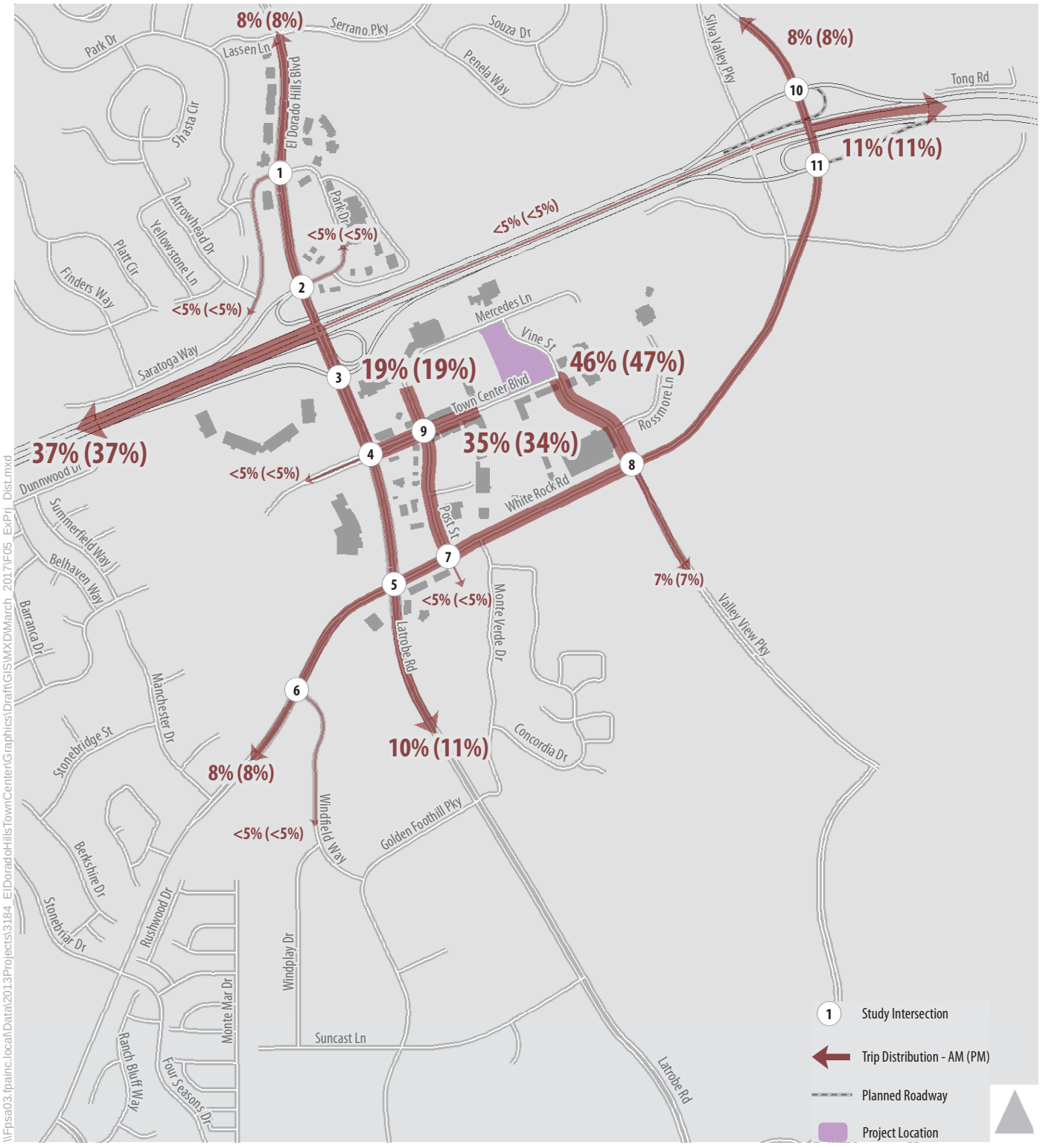


Figure 5

Trip Distribution
Existing Conditions

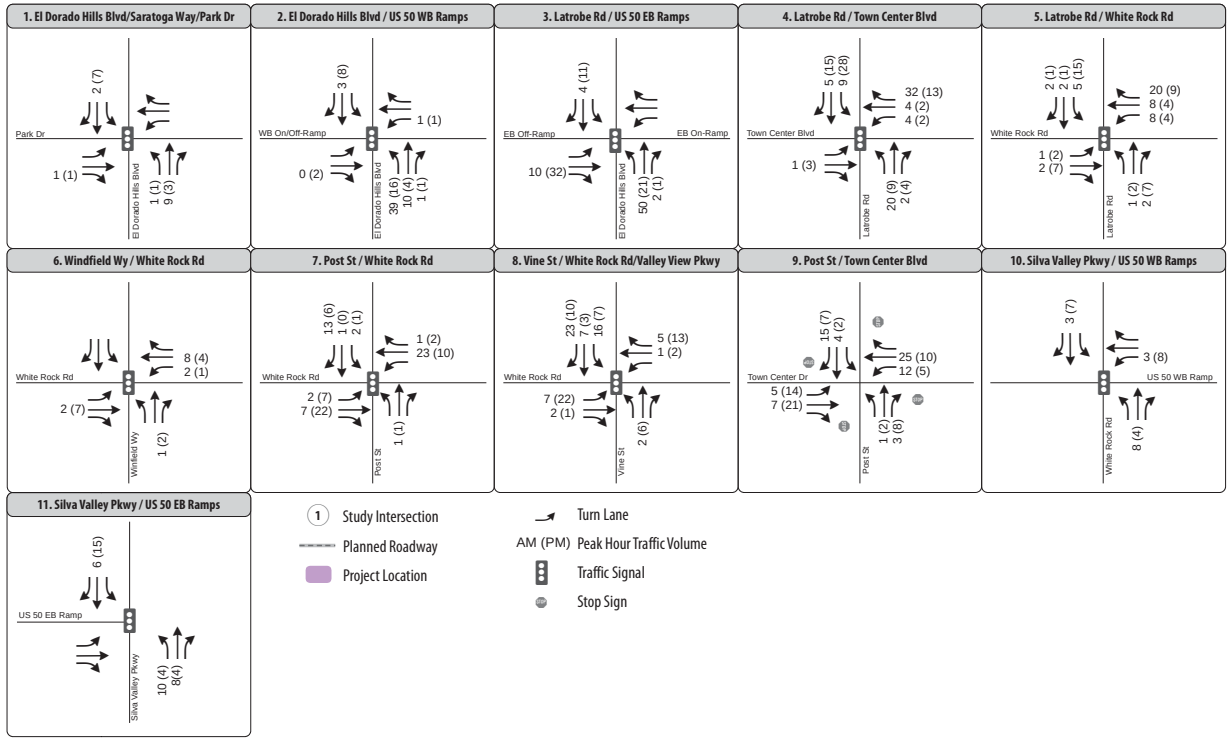


Figure 6

Peak Hour Traffic Volumes -
Project Only Trip Assignment
(Existing Conditions)

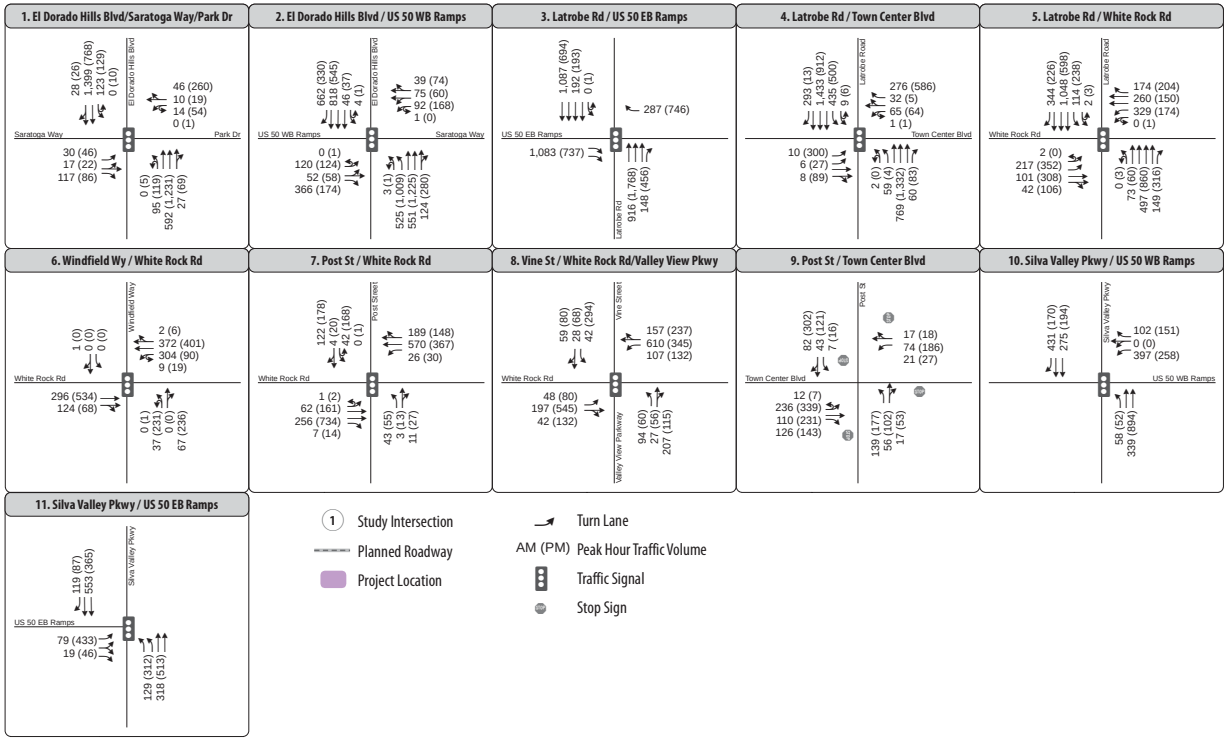


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Figure 7

Peak Hour Traffic Volumes
and Lane Configurations -
Existing Plus Project Conditions

5.3 PEAK HOUR VEHICLE LEVEL OF SERVICE

5.3.1 INTERSECTIONS

Analysis results, which are presented in Table 6, indicate that all study intersections operate at LOS E or better during both the AM and PM peak hours. Consequently, traffic generated by the project will not result in significant impacts at the study intersections, given that all study intersections will operate acceptably under existing conditions with or without the addition of project trips.

TABLE 6: INTERSECTION LOS AND DELAY – EXISTING PLUS PROJECT CONDITIONS

Intersection	Control	Existing Conditions (LOS/Delay)		Existing Plus Project (LOS/Delay)	
		AM	PM	AM	PM
1. El Dorado Hills Boulevard/Saratoga Way/Park Drive	Signal	B / 19	C / 20	B / 20	C / 20
2. El Dorado Hills Boulevard/US 50 WB Ramps	Signal	C / 31	C / 33	C / 32	C / 35
3. Latrobe Rd/US 50 EB Ramps	Signal	C / 33	C / 20	C / 29	C / 21
4. Latrobe Rd/Town Center Boulevard	Signal	B / 16	D / 50	B / 16	D / 53
5. Latrobe Rd/White Rock Rd	Signal	C / 31	C / 27	C / 31	C / 27
6. White Rock Road/Winfield Way	Signal	C / 20	C / 22	C / 20	C / 22
7. White Rock Rd/Post St	Signal	B / 18	C / 27	B / 19	C / 27
8. White Rock Rd/Vine St /Valley View Parkway	Signal	C / 24	D / 46	C / 28	D / 50
9. Town Center Boulevard/Post Street[1]	AWSC	B / 13	E / 48	B / 14	E / 49
10. Silva Valley Parkway/US 50 WB Ramps	Signal	B / 11	A / 10	B / 11	A / 10
11. Silva Valley Parkway/US 50 EB Ramps	Signal	B / 10	B / 13	B / 11	B / 13

Notes: AWSC = all-way stop control

[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).

The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For TWSC intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11, were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

Source: Fehr & Peers, 2017

5.3.2 FREEWAY FACILITIES

Analysis results, which are presented in Table 7, indicate that all study freeway facilities will operate acceptably under existing conditions with or without the addition of project traffic.

TABLE 7: FREEWAY FACILITY PEAK HOUR LEVEL OF SERVICE – EXISTING PLUS PROJECT CONDITIONS

Freeway	Segment	Facility Type	Existing Density[1] / LOS		Existing + Project Density[1] / LOS	
			AM	PM	AM	PM
US 50 EB	Latrobe Rd off-ramp	Diverge	22 / C	30 / D	22 / C	30 / D
	El Dorado Hills Boulevard off-ramp	Diverge	14 / B	26 / C	14 / B	26 / C
	El Dorado Hills Boulevard on-ramp to Silva Valley Parkway off-ramp	Weave (HCM)[2]	10 / A	23 / C	10 / A	23 / C
		Basic	7 / A	15 / B	7 / A	15 / B
	Silva Valley Parkway on-ramp (loop)	Merge	11 / B	21 / C	12 / B	21 / C
	Silva Valley Parkway to Bass Lake Road	Basic	11 / A	20 / C	11 / A	20 / C
US 50 WB	Bass Lake Rd on-ramp to lane addition	Basic	29 / D	17 / B	29 / D	18 / B
	Lane addition to Silva Valley Parkway off-ramp	Basic	19 / C	12 / B	19 / C	12 / B
	Silva Valley Parkway off-ramp	Diverge	13 / B	5 / A	13 / B	5 / A
	Silva Valley Parkway on-ramp to El Dorado Hills Boulevard off-ramp	Weave (HCM)[2]	34 / D	18 / B	34 / D	18 / B
		Basic	19 / C	11 / A	19 / C	11 / A
	El Dorado Hills Boulevard on-ramp	Merge	34 / D	24 / C	34 / D	24 / C

Notes: [1]Density reported as passenger cars per mile per pane. Density is not reported for LOS F operations.
[2] This weave section lies outside the realm of weaving using the Leisch Method. As a result, it is analyzed as a basic segment.
Source: Fehr & Peers, 2017

5.4 PEDESTRIAN AND BICYCLE CIRCULATION

Pedestrian facilities in the Town Center include attached sidewalks on Town Center Boulevard, Post Street, Vine Street, and Mercedes Lane and an off-street path around the Town Center lake. The project will connect to existing bicycle and pedestrian facilities in the Town Center.

5.5 TRANSIT

Based on ridership data presented in the *El Dorado Hills Community Transit Needs Assessment* and *US 50 Corridor Transit Operations Plan Final Report*, 41,760 annual commute trips are made by El Dorado Hills residents using El Dorado Transit Commuter Service. Residents of El Dorado Hills account for about 72 percent of boardings at the El Dorado Hills Park-n-Ride Lot (located in the Town Center), which includes riders that park in the lot and riders that use other means to access the service (i.e., walk, bike, and drop-off).

Based on this information, about one annual commute trip is generated per El Dorado Hills resident, assuming a population of 42,100 (2010 Census) in El Dorado Hills. Therefore, the project's 214 dwelling units could result in demand of about 560 annual commute trips assuming a household population of 2.6 persons(Sacramento Area Council of Governments, SACSIM regional travel demand simulation model), or about 3 commute trips per weekday.

6.0 CUMULATIVE CONDITIONS

This section presents the development and analysis of cumulative conditions.

6.1 TRAVEL DEMAND FORECASTS

For this project, traffic volume forecasts for cumulative conditions with the proposed project were developed using the El Dorado County model.

As is standard practice with large area travel demand models, a thorough model review was completed and the model was refined to ensure that it produced reasonable results in the study area.

The following refinements were implemented in the study area:

- Added roadway network detail
- Updated land use to reflect 2014 conditions
- Refined the traffic analysis zones (TAZs) in order to get more accurate loading of trips in the study area
- Updated network attributes in the study area to reflect existing conditions (e.g., verified roadway network speeds, number of lanes on the roadway, and roadway capacities to reflect existing conditions)
- Updated the future year roadway network in the study area to only reflect the constrained roadway network that is consistent with the County's Capital Improvement Program (CIP)
- Updated the future land use information to reflect approved and reasonably foreseeable projects in the study area
- Added peak hour assignment functionality

Specific information related to the model's performance is described below.

6.1.1 BASE YEAR MODEL VALIDATION

Before any model can be applied used for project application, it must first satisfy specific validation criteria identified by Caltrans, the Federal Highway Administration (FHWA), and the California Transportation Commission (CTC). These criteria were developed to ensure that a model is developed such that it can accurately forecast existing conditions based on land use and roadway network information, which improves the model's ability to accurately forecast future conditions. The state-of-the-practice for developing defensible forecasts for changes in the roadway network and/or changes in proposed land use is to use a valid base year model.

The first step of any model validation is to ensure that the model generally produces similar results to existing counts. Please note that, since the model is being used to generate AM peak hour and PM peak hour forecasts, the model must be validated at the study facilities for both time periods.

Key metrics for model validation guidelines are described below:

- The volume-to-count ratio is computed by dividing the volume assigned by the model and the actual traffic count for individual roadways (or intersections). The volume-to-count ratio should be within +/- 0.10.
- The deviation is the difference between the model volume and the actual count divided by the actual count. Caltrans provides guidance on the maximum allowable deviation by facility type (e.g., lower-volume roadways can have a higher deviation than higher-volume roadways). 75% of the study facilities should be within the maximum allowable deviation.
- The correlation coefficient estimates the correlation between the actual traffic counts and the estimated traffic volumes from the model. The correlation coefficient should be greater than 0.88.
- The percent Root Mean Square Error (RMSE) is the square root of the model volume minus the actual count squared divided by the number of counts. It is a measure similar to standard deviation in that it assesses the accuracy of the entire model. The RMSE should be less than 40%.

The model validation statistics are summarized in Table 8. As shown in Table 8, the model meets or exceeds the identified model validation statistics in the study area. As such, the model is deemed appropriate for use in this assessment.

TABLE 8: TRAVEL DEMAND FORECASTING MODEL SUB AREA VALIDATION		
Metric	**Model Validation**	**Validation Target**
AM Peak Hour – 114 Count Locations		
Model/Count Ratio	1.04	Between 0.90 and 1.10
Percent Within Caltrans Maximum Deviation	85%	> 75%
Percent Root Mean Square Error	24%	< 40%
Correlation Coefficient	0.98	> 0.88
PM Peak Hour – 114 Count Locations		
Model/Count Ratio	1.06	between 0.90 and 1.10
Percent Within Caltrans Maximum Deviation	86%	> 75%
Percent Root Mean Square Error	21%	< 40%
Correlation Coefficient	0.98	> 0.88
Source: Fehr & Peers, 2017		

6.1.2 FUTURE (YEAR 2035) MODELING ASSUMPTIONS

All modifications incorporated into the validated base year model were incorporated into the future year (2035) travel demand forecasting model. Additionally, as previously mentioned, the model was also updated to include only those roadway improvements that are consistent with the County's CIP.

Table 9 describes capacity-enhancing improvements to roadway facilities in the study area that are planned to occur prior to year 2035 and are included in the cumulative analysis. This information is primarily based on El Dorado County's CIP (Section 4.1 – West Slope Road/Bridge Individual Project Summaries). The validated El Dorado County model was used to develop AM and PM peak hour forecasts for the following scenario:

- Cumulative Plus Project – Corresponds to a 2035 cumulative horizon that accounts for planned roadway improvements, land use growth consistent with the 2004 General Plan, and with the Town

Center Apartments project as well as other approved and reasonable foreseeable projects in the study area, including the following:

- Bass Lake Hills Specific Plan
- Cameron Estates
- Carson Creek Specific Plan
- Central El Dorado Hills Specific Plan
- Dixon Ranch
- Lime Rock Valley Specific Plan
- Marble Valley Master Plan
- Promontory
- Rancho Dorado
- Ridgeview
- San Stino Residential Project
- Serrano
- Tilden Park
- Valley View Specific Plan

For the Cumulative Plus Project scenario, intersection turning movement volumes were obtained directly from the model and adjusted. Consistent with state-of-the-practice travel demand forecasting application, model error was corrected using the methodologies identified in the National Cooperative Highway Research Program Report 255 (Transportation Research Board, 1982) using the "difference method," which adds the forecasted growth in traffic volume to existing intersection counts.

TABLE 9: CAPACITY–ENHANCING ROADWAY IMPROVEMENTS (ASSUMED COMPLETION BY 2035)

Project Name	Project Description	Estimated Completion
Country Club Drive – El Dorado Hills Boulevard to Silva Valley Parkway	Construct new 2-lane road Country Club Drive from El Dorado Hills Blvd. to Silva Valley Pkwy. Work includes curb, gutter, and sidewalk on both sides of the roadway. CIP#72377	By 2035
Country Club Drive – Silva Valley Parkway to Tong Road	Construct new 2-lane road Country Club Drive from Silva Valley Parkway to Tong Road. Work includes curb, gutter, and sidewalk on both sides of the roadway. CIP#71362	By 2027
Country Club Drive Extension – Tong Road to Bass Lake Road	Construct 2-lane extension of Country Club Drive from Tong Road to Bass Lake Road, with 8-foot paved shoulder, curb and gutter, and new intersection at Bass Lake Road. CIP#71361	By 2035
Country Club Drive Realignment -Bass Lake Road to Tierra De Dios Drive	Realign Country Club Drive from Bass Lake Road/Old Bass Lake Road to Tierra de Dios Drive. Work includes constructing a 2-lane road with 8-foot paved shoulders, sidewalk, curb and gutter. CIP#71360	By 2019
Green Valley Road Widening - Francisco to Silva Valley Parkway	Widen Green Valley Road from Francisco Dr to Silva Valley Parkway to 4-lanes with curb, gutter, and sidewalk. CIP#GP178	By 2035
Green Valley Road Widening - County Line to Sophia Parkway	Widen Green Valley Rd from County line to Sophia Parkway from 2 to 4 lanes. CIP#72376	By 2018
Latrobe Connection	The project consists of intersection improvements at Golden Foothill Pkwy (south) and Carson Crossing Dr. CIP#66116	By 2027
Saratoga Way Ext - Phase 1	Construct new 4-lane arterial to extend Saratoga Way from Wilson Boulevard to Sacramento County line and a 2-lane arterial from Wilson Boulevard to the current terminus near Finders Way ; includes median, 6-ft shoulders, two-way left-turn pocket from Finders Way to Arrowhead, asphalt path, drainage system, environmental clearance and secure ROW for future 4-lane road from County Line to El Dorado Hills Boulevard CIP#71324 (Phase 2 CIP#GP147 - See ELD19234 in MTP.)	By 2019
Saratoga Way (Phase 2)	Widen 4 lanes from the Wilson Boulevard to El Dorado Hills Boulevard Includes: full curb, gutter, and sidewalk on the north side. (See ELD16010 for Phase 1) CIP#GP147	By 2035
Silva Valley Parkway/Serrano Parkway Traffic Circulation Improvement	Project includes traffic signal modification and lane re-striping at the Silva Valley Parkway/Serrano Parkway intersection, installation of an all-way stop at Serrano Parkway/Village Green intersection, and installation of left-turn prohibition signs at Silva Valley Parkway/Entrada intersection and Oak Meadow School driveway at Silva Valley Parkway. This project will be	Completed

TABLE 9: CAPACITY–ENHANCING ROADWAY IMPROVEMENTS (ASSUMED COMPLETION BY 2035)

Project Name	Project Description	Estimated Completion
	coordinated with the US 50/Silva Valley Parkway Freeway Interchange (CIP#71328). CIP#72141	
Silver Springs Parkway to Bass Lake Road (South Segment)	Realign Bass Lake Road south of Green Valley Road through the proposed Silver Springs subdivision, which is west of the existing Bass Lake Road. The new road is named Silver Springs Parkway. That development is responsible for building Silver Springs Parkway through their development. Silver Springs Parkway will be a 2-lane standard divided roadway with shoulders. CIP#76108	By 2020
US 50 Aux Lane WB - El Dorado Hills Boulevard to Sacramento County Line	Widen U.S. 50 and add auxiliary lane to westbound U.S. 50 from the El Dorado Hills Blvd/Latrobe Road Interchange to the County Line. CIP#53115	By 2035
US 50 50 Auxiliary Lane Westbound - Ponderosa Road to Cameron Park Drive	Widen US 50 and add an auxiliary lane to westbound US 50, connecting Cameron Park Drive Interchange to Ponderosa Road Interchange. CIP#53128	By 2035
US 50 Auxiliary Lane Westbound – Bass Lake Road to Silva Valley Parkway	Widen US 50 to add an auxiliary lane to westbound US 50 connecting the Bass Lake Road Interchange and Silva Valley Parkway Interchange. Timing of construction to be concurrent with or after the Bass Lake Road Interchange improvement. CIP#53117	By 2027
US 50 Auxiliary Lane Westbound – Cambridge Road to Bass Lake Road	Widen US 50 to add an auxiliary lane to westbound US 50 connecting the Cambridge Road Interchange to Bass Lake Road Interchange. Timing of construction to be concurrent with or after the Bass Lake Road Interchange improvement. GP149	By 2035
US 50 Auxiliary Lane Eastbound – Bass Lake Road to Cambridge Road	Widen US 50 and add eastbound auxiliary lane between Bass Lake Road Interchange and Cambridge Road Interchange. Timing of construction to be concurrent with or after the Bass Lake Road Interchange improvements. CIP #GP148	By 2035
US 50 Auxiliary Lane Eastbound – Cambridge Road to Cameron Park Drive	Widen US 50 and add eastbound auxiliary lane between Cambridge Road Interchange and Cameron Park Drive Interchange. Timing of construction to be concurrent with or after the Cambridge Road Interchange improvements. CIP #53126	By 2035
U.S. 50 Auxiliary Lane Eastbound – Cameron Park Drive to Ponderosa Road	Widen U.S. 50 and add eastbound continuous auxiliary lane from Cameron Park Drive Interchange to Ponderosa Road Interchange as determined necessary in the U.S. 50/Cameron Park Drive PSR/PDS dated October 2008. CIP# 53127	By 2035
US 50 Auxiliary Lane Eastbound –	Widen U.S. 50 and add eastbound auxiliary lane from the County Line to U.S. 50 El Dorado Hills Boulevard/Latrobe Road Interchange. Timing of	By 2035

TABLE 9: CAPACITY–ENHANCING ROADWAY IMPROVEMENTS (ASSUMED COMPLETION BY 2035)

Project Name	Project Description	Estimated Completion
Sacramento County Line to El Dorado Hills Boulevard/Latrobe Road Interchange	construction to be concurrent with El Dorado Hills Boulevard Interchange or Empire Ranch Interchange. CIP #53125	
US 50 / Bass Lake Rd Interchange Improvements	Phase 1 of a larger project for the complete reconstruction of the Bass Lake Road interchange. Phase 1 of the project includes a detailed study to determine the complete improvements needed. Phase 1 is assumed to include ramp widenings, road widening, signals, and bridge replacement. CIP#71330	By 2035
US 50 / Cambridge Rd. Interchange Improvements	Phase 1 improvements to Cambridge Road interchange consists of widening the existing EB and WB off-ramps; addition of new WB on-ramp from SB Cambridge Road; reconstruction of the local intersections to provide for additional capacity, both turning and through lanes; and the installation of traffic signals at the EB ramp-terminal intersection. Also preliminary engineering for Phase 2 improvements to the Cambridge Interchange. CIP#71332	By 2035
US 50 / Cameron Park Dr. Interchange Improvements	This project includes detailed study to identify capacity improvement alternatives and selection of preferred alternative; assumes reconstruction of US 50 bridges to widen Cameron Park Dr. to 8 lanes under the overcrossing; road and ramp widening. CIP#72361	By 2035
US 50 / El Dorado Hills Blvd Interchange Improvements – (Phase 2B)	Reconstruct eastbound diagonal on-ramp and eastbound loop off-ramp for the ultimate configuration; add a lane to northbound El Dorado Hills Blvd under the overpass (eliminates merge lane and improves traffic flow from the eastbound loop off-ramp); eastbound diagonal on-ramp will be metered and have an HOV bypass. Project split from ELD15630 (CIP#71323).	By 2028
US 50 / Silva Valley Pkwy Interchange - Phase 1	New Interchange: Phase 1 includes US 50 on-/off-ramps, overcrossing, and US 50 aux lanes. (See ELD19291/CIP#71345 for Phase 2). CIP#71328	Completed
US 50 / Silva Valley Pkwy Interchange - Phase 2 – On-Ramps and Auxiliary Lanes on US 50 (Connector Segment)	Final phase of new interchange: construction of eastbound diagonal and westbound loop on-ramps to US 50. CIP#71345	By 2035
White Rock Rd Widening -Manchester to Sacramento County Line (Connector Segment)	Widen White Rock Rd from 2 to 4 lanes, divided, from Manchester Dr west to Sacramento County Line. CIP#GP137	By 2027
White Rock Rd Widening – Monte Verde to US 50 / Silva	Widen White Rock Rd from 2 lanes undivided to 4 lanes divided, from Monte Verde Dr east to new future US 50/Silva Valley Pkwy Interchange	By 2035

TABLE 9: CAPACITY–ENHANCING ROADWAY IMPROVEMENTS (ASSUMED COMPLETION BY 2035)		
Project Name	**Project Description**	**Estimated Completion**
Valley Parkway Interchange (Connector Segment)	(ELD15610/CIP71328); includes curb, gutter, sidewalk, and Class II bike lanes. CIP#72374	
Source: El Dorado County's Adopted 2016 Capital Improvement Program, December 6, 2016. (Section 4.1 – West Slope Road/Bridge Individual Project Summaries)		

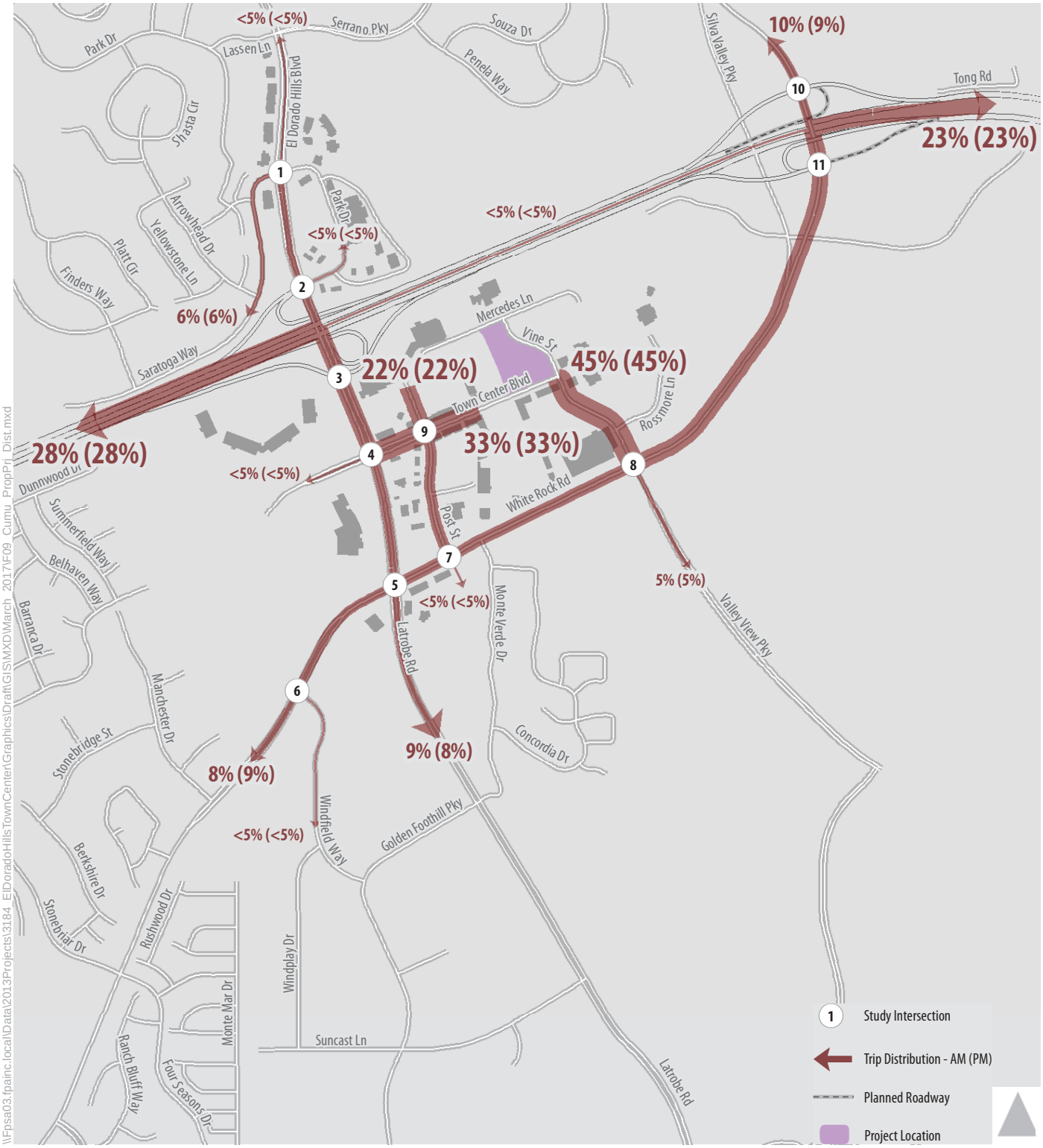
6.1.3 CUMULATIVE DISTRIBUTION AND ASSIGNMENT

Cumulative No Project volumes were developed by subtracting project traffic from the Cumulative Plus Project volume forecasts, using the trip generation presented in Table 5. The expected distribution of project trips is shown in Figure 8. The distribution was developed using the following sources and analytical techniques:

- Traffic assignment using the validated cumulative year El Dorado County travel demand forecasting model, which accounts for planned population and employment growth
- Project access

As shown on Figure 8, the largest share of project trips (28 percent) will use US 50 to/from the west in the morning and evening with 23 percent traveling on US 50 to/from the east. Travel to/from the north on El Dorado Hills Boulevard represents about eight percent of project travel. Travel to/from the west on White Rock Road represents about nine percent and travel to/from the east represents about 33 percent of project travel. About 23 percent of project travel will have an origin/destination south of White Rock Road. Figure 9 shows project trips based on the trip distribution shown on Figure 8.

Figures 10 and 11 present AM and PM peak hour traffic volume forecasts for cumulative conditions without and with the proposed project, respectively.



\\Fpsa03.fpainc.local\Data\2013Projects\3184 ElDoradoHillsTownCenter\Graphics\Draft\GIS\MXD\March 2017\F09 Cumu PropPrj Dist.mxd

Figure 8

Proposed Project Distribution
Cumulative Conditions

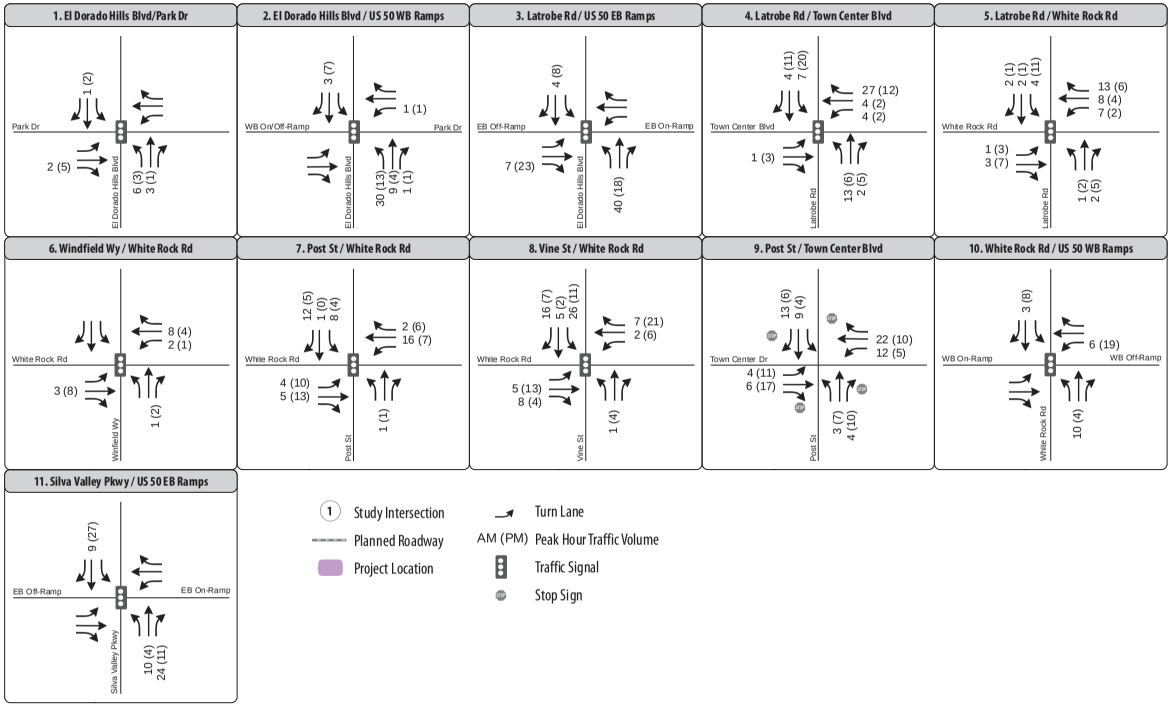


Figure 09

Peak Hour Traffic Volumes - Project Only Trip Assignment (Cumulative Conditions)

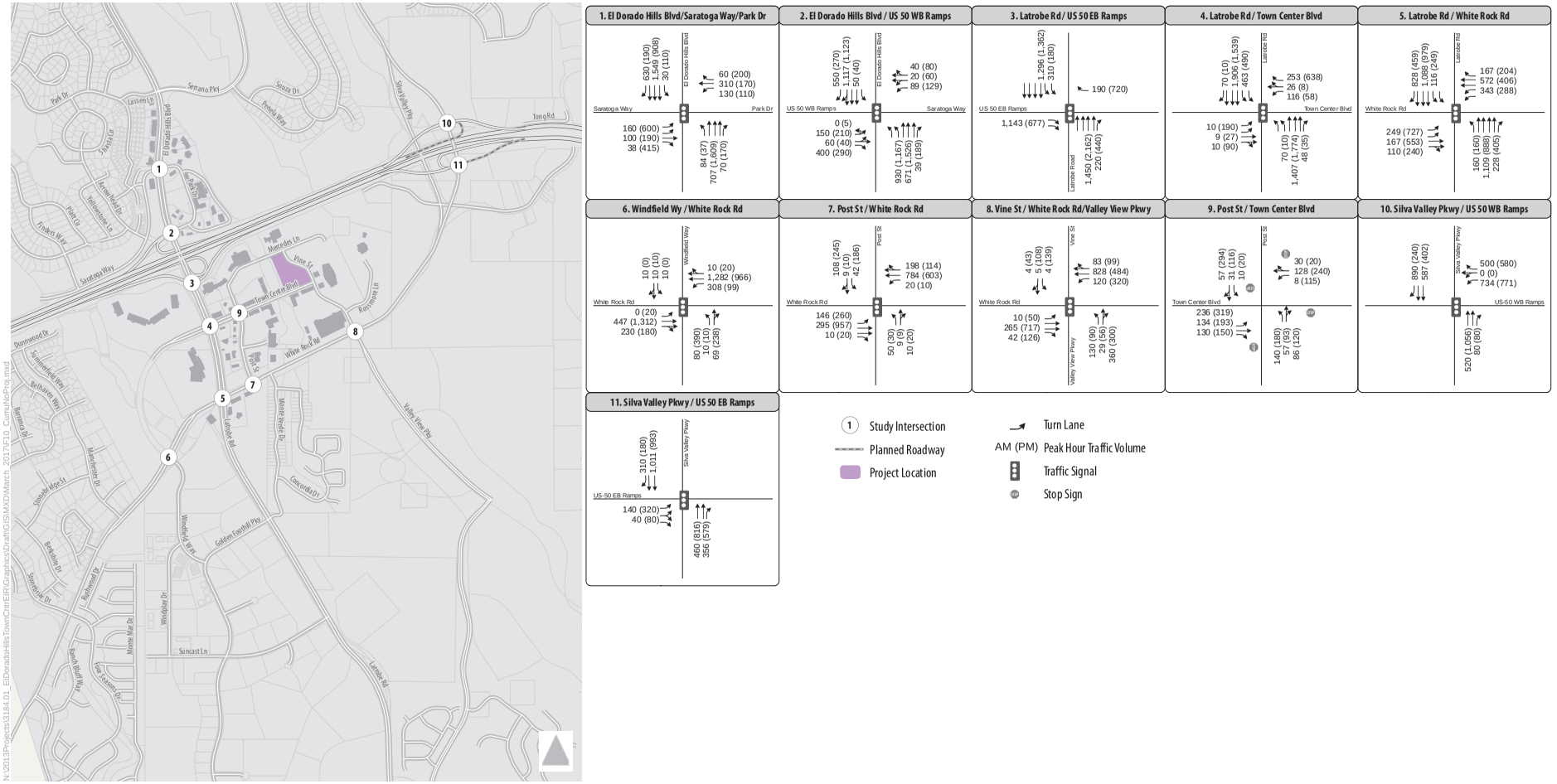


Figure 10

Peak Hour Traffic Volumes and Lane Configurations - Cumulative No Project Conditions

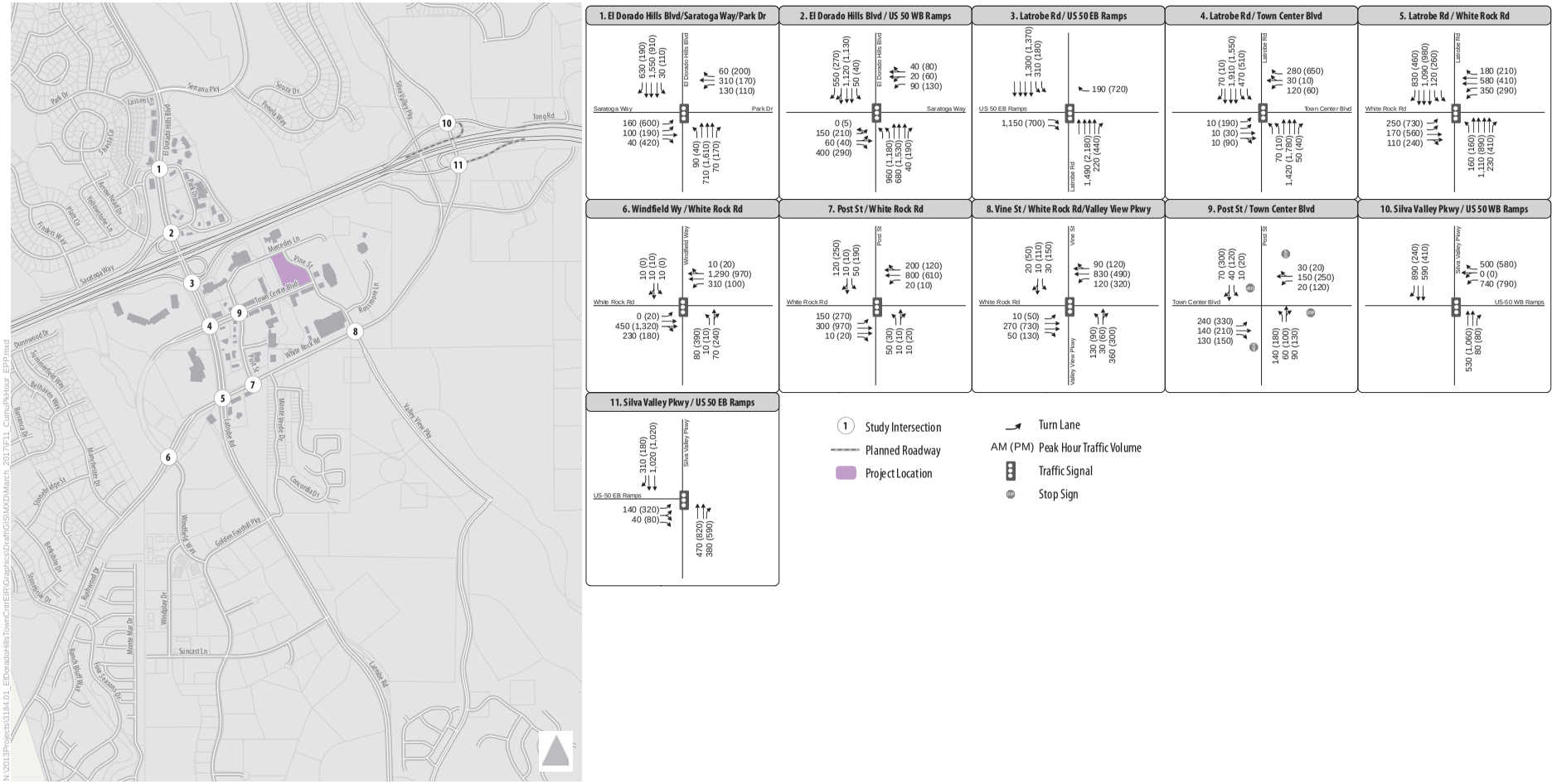


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Figure 11

Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions

6.2 CUMULATIVE PEAK HOUR VEHICLE LEVEL OF SERVICE

6.2.1 INTERSECTIONS

Analysis results, which are presented in Table 10, indicate that all study intersections will operate acceptably under cumulative conditions, except for the following:

- Town Center Boulevard/Post Street (Intersection 9) – This intersection will operate unacceptably at LOS F without or with the proposed project during the PM peak hour. Implementation of the proposed project would add approximately 73 project trips to the intersection during the AM peak hour and 70 trips during the PM peak hour. This is an internal (i.e., private) intersection in the Town Center development. Therefore, as a private facility, it is not subject to the County's roadway thresholds of significance.

As documented in Table 9, the Saratoga Way extension into City of Folsom and the Country Club Drive extension from Silva Valley Parkway to El Dorado Hills Boulevard will be constructed before 2035, the year of the Cumulative scenarios. This extension will parallel US 50 and provide more connectivity from El Dorado Hills to City of Folsom. The construction of the extension will also bring improvements to the El Dorado Hills Boulevard / Saratoga Way / Park Drive intersection. These intersection is assumed to operate with protected left-turns for all approaches, and lane configuration improvements are based on the magnitude of the Cumulative volumes. They are as follows:

- One left-turn lane, three thru lanes, and one right-turn lane for the northbound approach;
- One left-turn lane, three thru lanes, and one right-turn lane for the southbound approach;
- Two left-turn lanes, one thru lane, and one right-turn lane for the eastbound approach;
- One left-turn lane, one thru lane, and one right-turn lane for the westbound approach.

These improvements are assumed to be in place for all Cumulative intersection operations analyses.

TABLE 10: INTERSECTION LOS AND DELAY – CUMULATIVE PLUS PROJECT CONDITIONS

Intersection	Control	Cumulative No Project Conditions (LOS/Delay)		Cumulative Plus Project (LOS/Delay)	
		AM	PM	AM	PM
1. El Dorado Hills Boulevard/Saratoga Way/Park Drive	Signal	D / 37	D / 48	D / 37	D / 50
2. El Dorado Hills Boulevard/US 50 WB Ramps	Signal	C / 34	D / 48	D / 47	D / 49
3. Latrobe Rd/US 50 EB Ramps	Signal	C / 34	C / 22	D / 54	B / 18
4. Latrobe Rd/Town Center Boulevard	Signal	D / 36	E / 66	D / 42	E / 76
5. Latrobe Rd/White Rock Rd	Signal	E / 60	D / 51	E / 67	E / 80
6. White Rock Rd/Winfield Way	Signal	B / 12	D / 35	B / 12	D / 36
7. White Rock Rd/Post St	Signal	B / 15	B / 17	B / 15	B / 18
8. White Rock Rd/Vine St /Valley View Parkway	Signal	B / 20	C / 29	B / 19	C / 31
9. Town Center Boulevard/Post Street[1]	AWSC	B / 13	**F / 73**	B / 14	***F / 82***
10. Silva Valley Parkway/US 50 WB Ramps	Signal	A / 10	C / 20	A / 10	C / 20
11. Silva Valley Parkway/US 50 EB	Signal	A / 3	B / 11	A / 3	B / 11

Notes: AWSC = all-way stop control

Bold text indicates LOS worse than established threshold. *Italic and underlined* text identifies a potential impact.

[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).

The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For SSC intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11 were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

Source: Fehr & Peers, 2017

6.2.2 FREEWAY FACILITIES

Analysis results, which are presented in Table 11, indicate that all study freeway facilities will operate acceptably at LOS E or better under cumulative conditions without and with the project. The capacity-increasing projects from the County's CIP, which are documented in Table 9, include many projects that will add capacity to US 50, increase east/west parallel capacity, and add new interchange connections to US 50. The following lists some of the more significant transportation improvements in the US 50 corridor:

Interchange Projects

- US 50/Silva Valley Parkway Interchange (new connection to US 50)
- US 50/Empire Ranch Road Interchange (new connection to US 50)
- US 50/Bass Lake Road Interchange Upgrade
- US 50/Cambridge Road Interchange Upgrade

Mainline Projects

- Westbound US 50 interchange-to-interchange auxiliary lane (Bass Lake Road to Silva Valley Parkway)
- Westbound and eastbound US 50 auxiliary lane (Silva Valley Parkway to Empire Ranch Road)
- Eastbound US 50 auxiliary lane (Silva Valley Parkway to Empire Ranch Road)
- Westbound US 50 interchange-to-interchange auxiliary lane (Silva Valley Parkway to El Dorado Hills Boulevard)
- Eastbound US 50 interchange-to-interchange auxiliary lane (El Dorado Hills Boulevard to Silva Valley Parkway)
- Westbound US 50 interchange-to-interchange auxiliary lane (Cambridge Drive to Bass Lake Road)
- Eastbound US 50 interchange-to-interchange auxiliary lane (Bass Lake Road to Cambridge Drive)

Arterial Roadway Projects

- Country Club Drive Extension from Bass Lake Road to El Dorado Hills Boulevard
- Saratoga Way Extension from El Dorado Hills Boulevard to Iron Point Road
- Extension of Empire Ranch Road from US 50 to White Rock Road
- Latrobe Road Connector (new roadway between Latrobe Road and White Rock Road)

TABLE 11: PEAK HOUR LEVEL OF SERVICE – CUMULATIVE PLUS PROJECT CONDITIONS (FREEWAY)

Freeway	Segment	Facility Type	Cumulative No Project Density[1] / LOS		Cumulative + Project Density[1] / LOS		Notes
			AM	PM	AM	PM	
US 50 EB	Latrobe Rd off-ramp	Diverge	28 / D	33 / D	28 / D	34 / D	
	El Dorado Hills Boulevard off-ramp	Diverge	21 / C	30 / D	21 / C	30 / D	
	El Dorado Hills Boulevard on-ramp to Silva Valley Pkwy off-ramp	Weave (HCM)	20 / B	29 / D	20 / B	29 / D	
		Weave (Leisch)	-	-	-	-	Outside the realm of weaving section analysis due to combination of weaving volume and segment length; studied as a basic segment.
		Basic	13 / B	19 / C	13 / B	19 / C	
	Silva Valley Pkwy loop on-ramp	Merge	18 / B	24 / C	18 / B	24 / C	
	Silva Valley Pkwy slip-on ramp	Merge	22 / C	30 / D	23 / C	30 / D	
	Silva Valley Pkwy on-ramp to Bass Lake Rd off-ramp	Basic	21 / C	27 / D	21 / C	27 / D	
US 50 WB	Bass Lake on-ramp to Silva Valley Parkway off-ramp	Weave (HCM)	27 / D	24 / C	27 / D	24 / C	
		Weave (Leisch)	-	-	-	-	Outside the realm of weaving section analysis due to combination of weaving volume and segment length; studied as a basic segment.
		Basic	27 / D	24 / C	27 / D	24 / C	
	Silva Valley Pkwy Loop on-ramp	Merge	15 / B	13 / B	15 / B	13 / B	
	Silva Valley slip-on ramp to El Dorado Hills Boulevard off-ramp	Weave (HCM)	33 / D	22 / C	33 / D	22 / C	
		Weave (Leisch)	- / C	-	- / C	-	PM peak hour results are outside the realm of weaving section analysis due to combination of weaving volume and segment length; studied as a basic segment in the PM peak hour.
		Basic	-	14 / B	-	14 / B	
	El Dorado Hills Boulevard on-ramp to Empire Ranch Road off-ramp	Weave (HCM)	41 / E	33 / D	41 / E	33 / D	
		Weave (Leisch)	- / D	- / C	- / D	- / C	
		Basic	-	-	-	-	

Notes: [1]Density reported as passenger cars per mile per pane. Density is not reported for LOS F operations or weave segments. Weave segment's operations are based on the HCM 2010 and Leisch Method. If the weave segment is outside the realm of weaving it is analyzed as a basic segment.

Source: Fehr & Peers, 2017

6.3 PEDESTRIAN AND BICYCLE CIRCULATION

Bicycle network improvements are planned within the study area. Figure 4 identifies planned bikeways presented in the *El Dorado Bicycle Transportation Plan, 2010 Update* and the *Sacramento Area Council of Governments (SACOG) Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) 2016*. The following are planned improvement projects:

- El Dorado Hills Class I bike path - SMUD Corridor: Design and construct a Class I bike path between El Dorado Hills Boulevard and Silva Valley Parkway within the powerline easement operated by the Sacramento Municipal Utility District (SMUD). A portion of this project has been constructed between Silva Valley and New York Creek.
- Latrobe Road Class II bike lanes from Investment Boulevard to Deer Creek/SPTC
- Old Bass Lake Road – El Dorado Hills Boulevard to Bass Lake Road Connection, Phase 1: Use existing roadway as Class I path from Tong Road to Old Bass Lake Road
- Saratoga Way Extension Class II bike lanes included in extension of Saratoga Way from Finders Way to County Line.
- Bass Lake Road Class II bike lanes from Green Valley Road to US 50
- Bike path parallel to US 50 on the north side – El Dorado Hills Boulevard to Bass Lake Road Connection, Phase 2: Connect Silva Valley Road to El Dorado Hills Village Center Shopping Center.
- El Dorado Hills Boulevard bike lanes, Phase 1: Saratoga Way to Governor Drive/St. Andrews
- El Dorado Hills Boulevard bike path, Phase 2: Utilizing an existing golf cart undercrossing of Serrano Parkway, extend the bike path from the current terminus at Serrano Parkway to Raley's Center.
- El Dorado Hills Boulevard Class I Bike Path: Governor Drive to Brittany Place
- El Dorado Hills Boulevard to Bass Lake Connection, Phase 1; Class III bike route on Tong Road, Class III bike route on Old Bass Lake Road.
- Green Valley Road Class II bike lanes from Francisco Drive to Pleasant Grove Middle School
- Harvard Way bike path from Clermont Road to El Dorado Hills Boulevard
- Silva Valley Parkway bike lanes from the new connection with the old Silva Valley Parkway to Green Valley Road
- SPTC/El Dorado Trail Class I bike path from Latrobe Road to County Line

- Class I bike path and US 50 Undercrossing or overcrossing between the El Dorado Hills Town Center and El Dorado Hills Village Center (not fully funded or listed in MTP/SCS).
- Class I bike path within the SMUD power line easement between El Dorado Hills Boulevard and Sophia Parkway (not fully funded or listed in the MTP/SCS)

The project will connect to existing bicycle and pedestrian facilities in the Town Center and will be located near the planned pedestrian overcrossing of US 50 (just east of the El Dorado Hills Interchange).

6.4 TRANSIT

Based on ridership data presented in the *El Dorado Hills Community Transit Needs Assessment* and *US 50 Corridor Transit Operations Plan Final Report*, 41,760 annual commute trips are made by El Dorado Hills residents using El Dorado Transit Commuter Service. Residents of El Dorado Hills account for about 72 percent of boardings at the El Dorado Hills Park-n-Ride Lot (located in Town Center), which includes riders that park in the lot and riders that use other means to access the service (i.e., walk, bike, and drop-off). Based on this information, about one annual commute trip is generated per El Dorado Hills resident, assuming a population of 42,100 (2010 Census) in El Dorado Hills. Therefore, the project's 214 dwelling units could result in demand of about 560 annual commute trips assuming a household population of 2.6 persons(Sacramento Area Council of Governments, SACSIM regional travel demand simulation model), or about 3 commute trips per weekday.

7.0 CEQA IMPACTS AND MITIGATION MEASURES

Project impacts for purposes of CEQA were determined by comparing conditions with the project to conditions without the project (i.e., conditions at the time of TIS preparation) in accordance with the established significance criteria presented in Section 3.2.

7.1 EXISTING PLUS PROJECT

Analysis results indicate that the traffic generated by the proposed project would not significantly worsen unacceptable operations nor result in unacceptable operations at any study intersection or freeway facility. The following discusses these impacts and associated mitigation:

7.1.1 INTERSECTIONS

Impacts

Impact 1 - The proposed project will add traffic to all of the study intersections during the AM and PM peak hours. However, the addition of project trips will not result in unacceptable operations at any of the study intersections. **This is a less than significant impact.**

Mitigation

Mitigation 1 - No mitigation required.

7.1.2 FREEWAY FACILITIES

Impacts

Impact 2 - The proposed project will add traffic to US 50 during the AM and PM peak hours. However, the addition of project trips will not result in unacceptable operations on any of the study freeway facilities. **This is a less than significant impact.**

Mitigation

Mitigation 2 - No mitigation required.

7.2 CUMULATIVE PLUS PROJECT

Analysis results indicate that the traffic generated by the proposed project would neither significantly worsen unacceptable operations nor result in unacceptable operations at any County maintained study intersections or freeway facilities under cumulative conditions. The following discusses the cumulative impacts to County intersections and freeway facilities.

7.2.1 INTERSECTIONS

Impacts

Impact 3 - The proposed project will add traffic to all of the study intersections during the AM and PM peak hours. However, the addition of project trips will not result in unacceptable operations at any of the study intersections. **This is a less than significant impact.**

Mitigation

Mitigation 3 - No mitigation required.

7.2.2 FREEWAY FACILITIES

Impacts

Impact 4 - The proposed project will add traffic to US 50 during the AM and PM peak hours under 2035 cumulative conditions. However, the addition of project trips will not result in unacceptable operations on any of the study freeway facilities. **This is a less than significant impact.**

Mitigation

Mitigation 4 - No mitigation required.

7.2.3 PEDESTRIAN AND BICYCLE FACILITIES

Impact 5 - Implementation of the proposed project will increase demand for pedestrian and bicycle facilities. The project is located in the El Dorado Hills Town Center, which is a mixed-use development. Placing the project near jobs and service will encourage walking and

bicycling for trips that would ordinarily be made by auto if the project were located in a more remote location further from jobs and services. **This is a less than significant impact.**

Mitigation 5 - No mitigation required.

7.2.4 TRANSIT

Impact 6 - Implementation of the proposed project will increase transit demand. As outlined in Section 6.4, the project could result in demand for about 560 annual commute trips (assuming a household population of 2.6 persons), or about 3 commute trips per weekday. This increase represents less than a two percent increase in El Dorado Transit Commuter Service, which is generally in line with historic population growth rates in El Dorado County. Consequently, the growth in these trips would not likely exceed the ability to serve this ridership growth through existing funding sources for transit that are tied to population growth. Project residents accessing the El Dorado Transit Commuter Service would likely walk to the El Dorado Hills Park-n-Ride Lot. Consequently, implementation of the proposed project would not likely increase demand for the El Dorado Hills Park-n-Ride Lot, which operates at capacity. **This is a less than significant impact.**

Mitigation 6 - No mitigation required.

7.2.5 EMERGENCY ACCESS

Impact 7 - The proposed project will provide an emergency vehicle access on the west side of the project adjacent to the Town Center Lake that will extend between Town Center Boulevard and Mercedes Lane. Furthermore, as the proposed project would not alter or close any existing roadways, there would be no impacts on emergency access to existing land uses in the area. **This is a less than significant impact.**

Mitigation 7 - No mitigation required.

8.0 OTHER CONSIDERATIONS

8.1 INTERSECTION VEHICLE QUEUING EVALUATION

Table 12 summarizes estimated vehicle queues for the off ramps at the US 50/El Dorado Hills Boulevard interchange and the US 50/Silva Valley Parkway interchange. As shown, available storage will accommodate estimated vehicle queues. These results indicate that traffic operations on El Dorado Hills Boulevard and Silva Valley Parkway will not cause vehicles to back onto US 50 and impact freeway operations.

TABLE 12: 95TH PERCENTILE FREEWAY OFF-RAMP VEHICLE QUEUES – CUMULATIVE CONDITIONS

Freeway	Available Storage	95th Percentile Queue (feet)[1]			
		Cumulative No Project Conditions		Cumulative + Project Conditions	
		AM	PM	AM	PM
US 50 EB off-ramp at Latrobe Road	1,680 ft	475	475	625	475
US 50 EB off-ramp at El Dorado Hills Boulevard	1,230 ft	–	–	–	–
US 50 WB off-ramp at El Dorado Hills Boulevard	1,300 ft	225	225	250	200
US 50 EB off-ramp at Silva Valley Parkway	1,470 ft	50	100	50	100
US 50 WB off-ramp at Silva Valley Parkway	1,350 ft	200	375	200	375

Notes: [1]95th percentile queue based on output from SimTraffic model. Values rounded to the nearest 25 feet. Greater queue (for either left or right movement) is reported.

Bold and underlined text indicates queue that exceeds available.

" – " No queuing reported for free movements.

Source: Fehr & Peers, 2017

8.2 TOWN CENTER BOULEVARD/POST STREET

Town Center Boulevard/Post Street is located within the El Dorado Hills Town Center and is a private intersection. The intersection will operate at LOS F under cumulative conditions without and with the proposed project. This intersection is not subject to the County's LOS significance thresholds. Operation of this intersection is not anticipated to significantly affect operations of the County-maintained transportation system.

9.0 MEASURE E CUMULATIVE TRAFFIC ANALYSIS

This section presents the development and analysis of near-term (2027) cumulative conditions. The near-term analysis is used by El Dorado County to determine compliance with General Plan Policy TC-Xa(3), which was created by the approval of Measure E by County voters in June 2016. This policy states:

- Policy TC-Xa(3) – All necessary road capacity improvements shall be fully completed to prevent cumulative traffic impacts from new development from reaching Level of Service F during peak hours upon any highways, arterial roads and their intersections during weekday, peak-hour periods in unincorporated areas of the county before any form of discretional approval can be given to a project.

The near-term cumulative analysis, which is not required by CEQA and does not constitute an analysis of transportation impacts for CEQA purposes,[3] represents conditions 10 years beyond the existing baseline (i.e., 2027 conditions). The following summarizes traffic operations for study intersections and freeway facilities under near-term cumulative conditions without and with the addition of trips from the El Dorado Hills Town Center Apartments project.

Although this section includes analysis of the private Town Center Boulevard/Post Street intersection for informational purposes, Policy TC-Xa(3) only applies to "highways, arterial roads and their intersections" and does not apply to private roads and their intersections. For this reason, the Town Center Boulevard/Post Street intersection is not subject to the requirements of this Measure E analysis.

9.1 NEAR-TERM CONDITIONS FORECAST DEVELOPMENT

The El Dorado County travel demand forecasting model was used to develop traffic volume forecasts for near-term cumulative conditions. The following steps, based on coordination with El Dorado County Community Development Agency staff, were taken to develop the land use and roadway network inputs for the Near-Term (2027) analysis scenario forecasting model:

1. Land Use Growth – Used linear interpolation between the base year and future year models to develop 10-year land use growth projections.
2. 10-Year Land Use Forecasts – Added land use growth from Step 1 to the base year model land use inputs.

[3] See Sections 1-8, above, for analysis of transportation impacts for purposes of CEQA.

3. Capital Improvement Program Projects – Identified roadway improvement projects from the adopted 2016 Capital Improvement Program with construction planned by 2027. Table 13 summarizes roadway improvement projects identified in the El Dorado County 2016 Capital Improvement Program that are planned to be under construction by 2027.

   The 2016 Capital Improvement Program includes funding for traffic signal and intersection operational improvements not associated with programmed CIP projects. Construction is based on the County's Intersection Needs Report that is maintained by the Community Development Agency's Long Range Planning Division. Based on this program, a southbound right-turn was assumed at the El Dorado Hills Boulevard/Saratoga Way intersection under Near-Term No Project conditions to address unacceptable operations at this intersection associated with the Phase 1 extension of Saratoga Way (CIP Project Number – 71324).

4. Near-Term Transportation Network – Added roadway improvement projects from Step 3 to the base year model transportation network.

5. Near-Term No Project Forecasts – Developed AM and PM peak hour traffic volume forecasts for study intersections and freeway facilities using the inputs from Steps 1 through 4.

6. Near-Term Plus Project Forecasts – Added project trips (shown on Figure 6) to the Near-Term No Project Forecasts from Step 5 to developed AM and PM peak hour traffic volume forecasts for study intersections and freeway facilities with the proposed project.

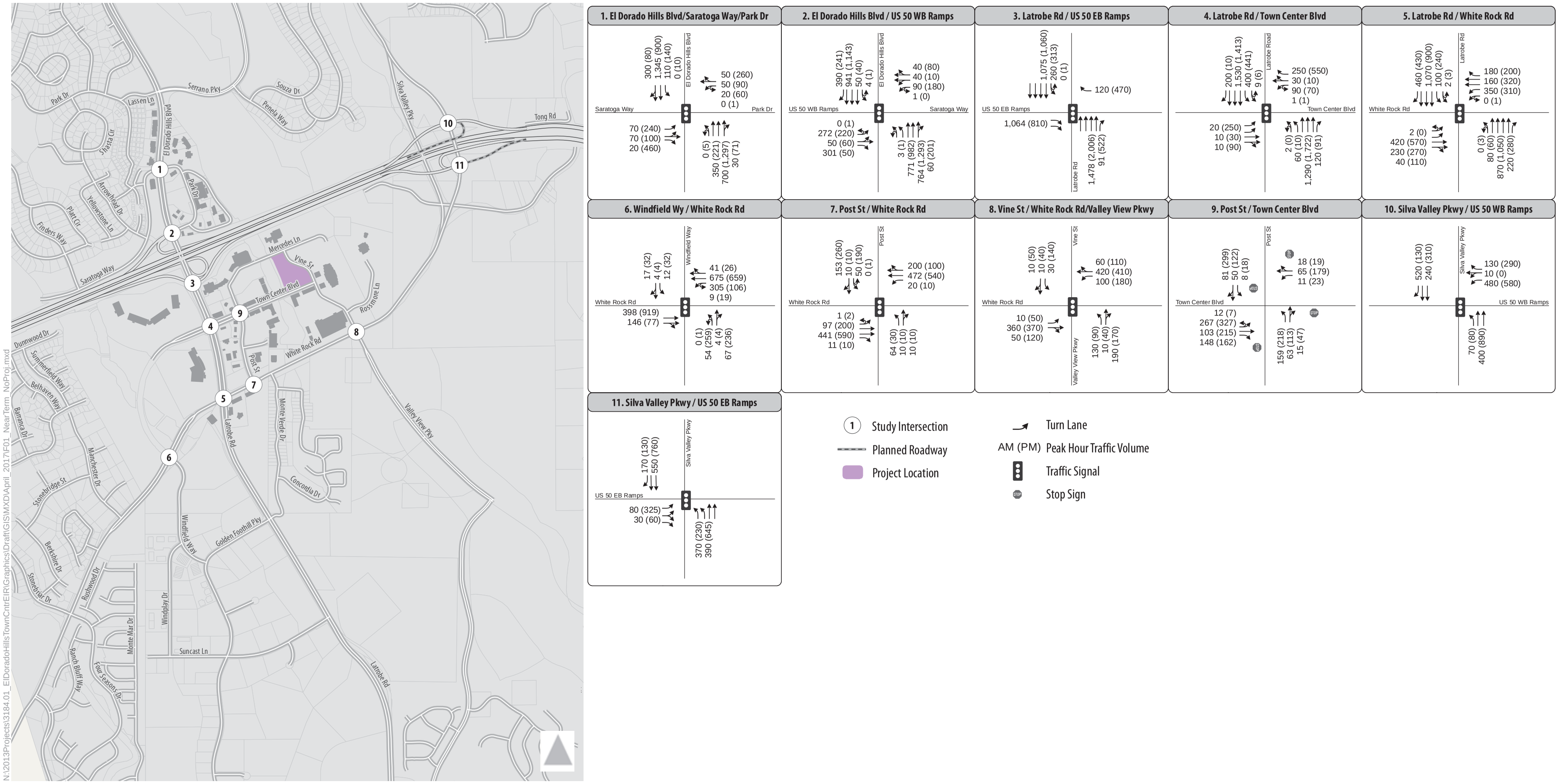
TABLE 13: CAPACITY–ENHANCING ROADWAY IMPROVEMENTS (CONSTRUCTION WITHIN 10 YEARS)

Project Name	Project Description	Begin Construction
Country Club Drive – Silva Valley Parkway to Tong Road	Construct new 2-lane road Country Club Drive from Silva Valley Parkway to Tong Road. Work includes curb, gutter, and sidewalk on both sides of the roadway. CIP#71362	By 2026
Country Club Drive Extension – Tong Road to Bass Lake Road	Construct 2-lane extension of Country Club Drive from Tong Road to Bass Lake Road, with 8-foot paved shoulder, curb and gutter, and new intersection at Bass Lake Road. CIP#71361	By 2026
Country Club Drive Realignment - Bass Lake Road to Tierra De Dios Drive	Realign Country Club Drive from Bass Lake Road/Old Bass Lake Road to Tierra de Dios Drive. Work includes constructing a 2-lane road with 8-foot paved shoulders, sidewalk, curb and gutter. CIP#71360	By 2018
Green Valley Road Widening – County Line to Sophia Parkway	Widen Green Valley Rd from County line to Sophia Parkway from two to four lanes. CIP#72376	By 2017
Saratoga Way Ext - Phase 1	Construct new 2-lane arterial to extend Saratoga Way. from current terminus near Finders Way to Sacramento County Line; includes median, 6-ft shoulders, right-turn pocket onto Finders Way, asphalt path, drainage system, environmental clearance and secure ROW for future 4-lane road from County Line to El Dorado Hills Blvd. CIP#71324	By 2018
Silver Springs Parkway to Bass Lake Road (South Segment)	Realign Bass Lake Road south of Green Valley Road through the proposed Silver Springs subdivision, which is west of the existing Bass Lake Road. The new road is named Silver Springs Parkway. That development is responsible for building Silver Springs Parkway through their development. Silver Springs Parkway will be a 2-lane standard divided roadway with shoulders. CIP#76108	By 2018
US 50 Auxiliary Lane Westbound – Bass Lake Road to Silva Valley Parkway	Widen US 50 to add an auxiliary lane to westbound US 50 connecting the Bass Lake Road Interchange and Silva Valley Parkway Interchange. Timing of construction to be concurrent with or after the Bass Lake Road Interchange improvement. CIP#53117	By 2026
US 50 / El Dorado Hills Blvd Interchange Improvements – (Phase 2B)	Reconstruct eastbound diagonal on-ramp and eastbound loop off-ramp for the ultimate configuration; add a lane to northbound El Dorado Hills Blvd under the overpass (eliminates merge lane and improves traffic flow from the eastbound loop off-ramp); eastbound diagonal on-ramp will be metered and have an HOV bypass. Project split from ELD15630 (CIP#71323).	By 2026
White Rock Rd Widening - Manchester to Sacramento County Line (Connector Segment)	Widen White Rock Rd from 2 to 4 lanes, divided, from Manchester Dr. west to Sacramento County Line. CIP#GP137	By 2026

Source: El Dorado County's Adopted 2016 Capital Improvement Program, December 6, 2016. (Section 4.1 – West Slope Road/Bridge Individual Project Summaries)

The following figures show AM and PM peak hour traffic volume forecasts used for the analysis of Near-Term cumulative conditions:

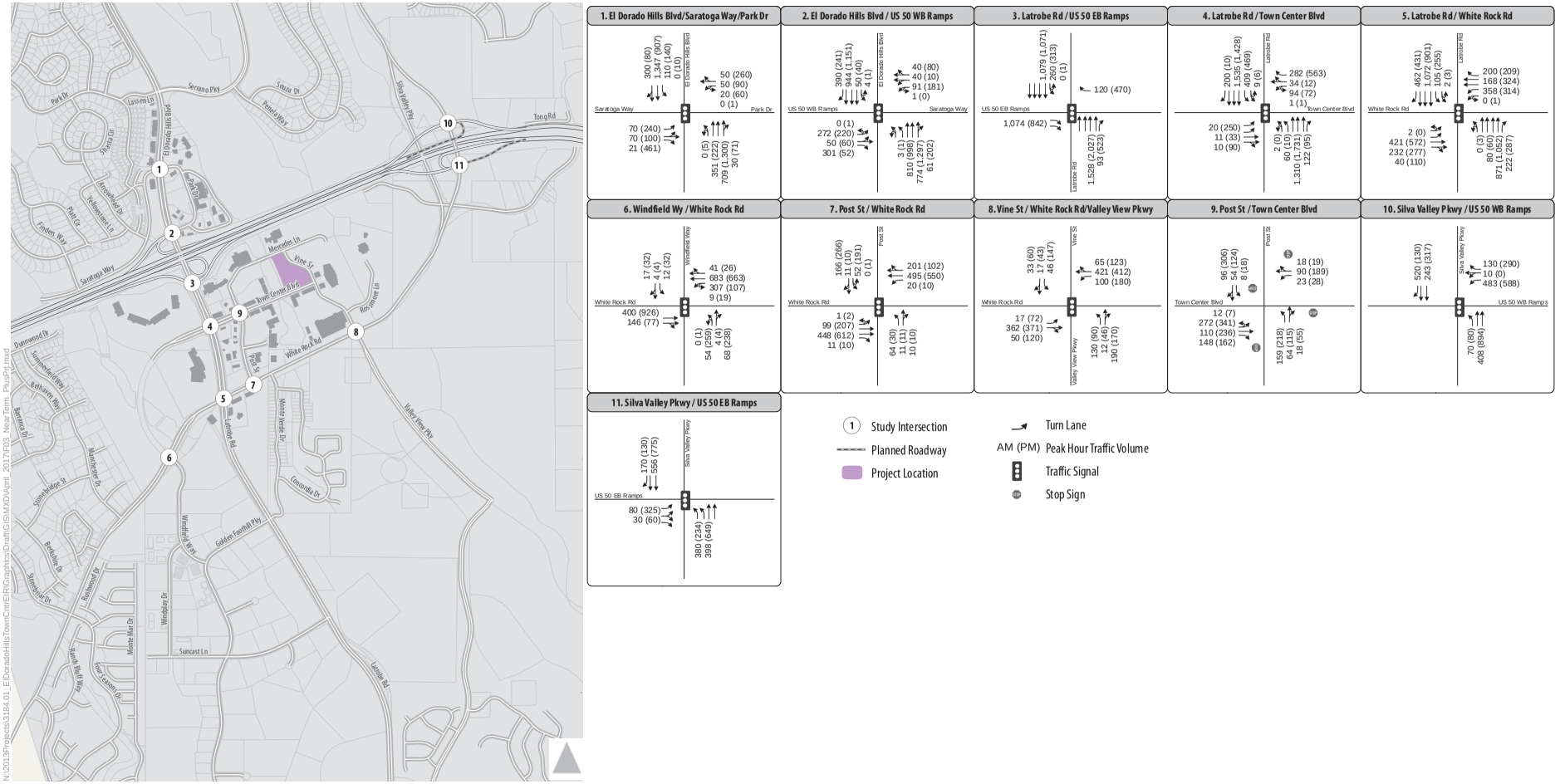
- Figure 12 – Peak Hour Traffic Volumes and Lane Configurations – Near-Term No Project
- Figure 13 – Peak Hour Traffic Volumes and Lane Configurations – Near-Term Plus Project



N:\2013Projects\3184.01_ElDoradoHillsTownCntrEIR\Graphics\Draft\GIS\MXD\April_2017\F01_NearTerm_NoProj.mxd

Figure 12

Peak Hour Traffic Volumes and Lane Configurations - Near-Term No Project Conditions



N:\2013\Projects\3184.01_ElDoradoHillsTownCntrEIR\Graphics\Draft\GIS\MXD\April_2017\F03_NearTerm_PlusPrj.mxd

Figure 13

Peak Hour Traffic Volumes and Lane Configurations - Near-Term Plus Project Conditions

9.2 NEAR-TERM NO PROJECT OPERATIONS

The following summarizes intersection and freeway operations under near-term cumulative conditions.

9.2.1 INTERSECTIONS

Table 14 compares existing AM and PM peak hour intersection operations to near-term cumulative conditions. As shown in Table 14, with the addition of 10 years of land use growth and the capital projects planned to begin construction in 10 years, all study intersections will continue to operate at LOS E or better except for El Dorado Hills Boulevard / Saratoga Way / Park Drive during the AM peak hour and Town Center Boulevard / Post Street during the PM peak hour.

The private Town Center Boulevard / Post Street intersection will operate at LOS F under near-term cumulative without project conditions. However, Policy TC-Xa(3) only applies to "highways, arterial roads and their intersections" and does not apply to private roads and their intersections.

TABLE 14: INTERSECTION LOS AND DELAY – NEAR-TERM CONDITIONS

Intersection	Control	Existing (LOS/Delay)		Near-Term (LOS/Delay)	
		AM	PM	AM	PM
1. El Dorado Hills Boulevard/Saratoga Way/Park Drive	Signal	B / 19	C / 20	**F / 108**	D / 47
2. El Dorado Hills Boulevard/US 50 WB Ramps	Signal	C / 31	C / 33	D / 44	D / 37
3. Latrobe Rd/US 50 EB Ramps	Signal	C / 33	C / 20	B / 20	B / 18
4. Latrobe Rd/Town Center Boulevard	Signal	B / 16	D / 50	C / 20	D / 47
5. Latrobe Rd/White Rock Rd	Signal	C / 31	C / 27	C / 35	C / 33
6. White Rock Road/Winfield Way	Signal	C / 20	C / 22	B / 18	C / 25
7. White Rock Rd/Post St	Signal	B / 18	C / 27	C / 23	C / 30
8. White Rock Rd/Vine St /Valley View Parkway	Signal	C / 24	D / 46	B / 18	C / 27
9. Town Center Boulevard/Post Street[1]	AWSC	B / 13	E / 48	B / 15	F / 50
10. Silva Valley Parkway/US 50 WB Ramps	Signal	B / 11	A / 10	B / 11	B / 12
11. Silva Valley Parkway/US 50 EB Ramps	Signal	B / 10	B / 13	B / 12	B / 13

Notes: AWSC = all-way stop control

[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).

Bold text indicates unacceptable operations.

The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For TWSC intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11, were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

Source: Fehr & Peers, 2017

9.2.2 FREEWAY FACILITIES

Table 15 compares existing AM and PM peak hour freeway operations to near-term cumulative conditions. As shown in Table 15, all freeway facilities will continue to operate at LOS E or better, with the addition of 10 years of land use growth and the capital projects planned to begin construction in 10 years.

TABLE 15: FREEWAY FACILITY PEAK HOUR LEVEL OF SERVICE – NEAR-TERM CONDITIONS

Freeway	Segment	Facility Type	Existing Density[1] / LOS		Near-Term Density[1] / LOS	
			AM	PM	AM	PM
US 50 EB	Latrobe Rd off-ramp	Diverge	22 / C	30 / D	22 / C	27 / C
	El Dorado Hills Boulevard off-ramp	Diverge	14 / B	26 / C	13 / B	23 / C
	El Dorado Hills Boulevard on-ramp to Silva Valley Parkway off-ramp	Weave (HCM)2	10 / A	23 / C	11 / B	23 / C
		Basic	7 / A	15 / B	7 / A	14 / B
	Silva Valley Parkway on-ramp (loop)	Merge	11 / B	21 / C	15 / B	20 / C
	Silva Valley Parkway on-ramp to Bass Lake Road off-ramp	Basic	11 / A	20 / C	14 / B	19 / C
	Bass Lake Road off-ramp	Diverge	15 / B	25 / C	18 / B	25 / C
US 50 WB	Bass Lake Rd on-ramp	Merge	32 / D	21 / C	33 / D	27 / C
	Bass Lake Rd on-ramp to lane addition	Basic	29 / D	17 / B	30 / D	24 / C
	Lane addition to Silva Valley Parkway off-ramp	Basic	19 / C	12 / B	19 / C	16 / B
	Silva Valley Parkway off-ramp	Diverge	13 / B	5 / A	14 / B	11 / B
	Silva Valley Parkway on-ramp to El Dorado Hills Boulevard off-ramp	Weave (HCM)2	34 / D	18 / B	36 / E	21 / C
		Basic	19 / C	11 / A	19 / C	13 / B
	El Dorado Hills Boulevard on-ramp	Merge	34 / D	24 / C	34 / D	24 / C

Notes: [1]Density reported as passenger cars per mile per pane. Density is not reported for LOS F operations.
[2] This weave section lies outside the realm of weaving using the Leisch Method. As a result, it is analyzed as a basic segment.
Source: Fehr & Peers, 2017

9.3 NEAR-TERM PLUS PROJECT OPERATIONS

The following summarizes intersection and freeway operations under near-term cumulative conditions with the addition of project traffic, and demonstrates compliance with General Plan Policy TC-Xa(3) at all relevant intersections and freeway facilities.

9.3.1 INTERSECTIONS

Table 16 compares AM and PM peak hour intersection operations under near-term cumulative conditions without and with the proposed project. As shown in Table 16, with the addition of project trips under near-term cumulative conditions, all relevant study intersections will continue to operate at LOS E or better except for El Dorado Hills Boulevard / Saratoga Way / Park Drive during the AM peak hour, and Town Center Boulevard / Post Street during the PM peak hour.

The private Town Center Boulevard / Post Street intersection will operate at LOS F without or with the proposed project during the PM peak hour. Implementation of the proposed project would add approximately 2 seconds of additional delay per vehicle (from 50 seconds to 52 seconds) during the PM peak hour, due to an additional 70 trips during this hour. However, Policy TC-Xa(3) only applies to "highways, arterial roads and their intersections" and does not apply to private roads and their intersections. For this reason, the Town Center Boulevard/Post Street intersection is not subject to the requirements of this policy.

TABLE 16: INTERSECTION LOS AND DELAY – NEAR-TERM PLUS PROJECT CONDITIONS

Intersection	Control	Near-Term (LOS/Delay)		Near-Term Plus Project (LOS/Delay)	
		AM	PM	AM	PM
1. El Dorado Hills Boulevard/Saratoga Way/Park Drive	Signal	**F / 108**	D / 47	***F / 125***	D / 43
2. El Dorado Hills Boulevard/US 50 WB Ramps	Signal	D / 44	D / 37	D / 48	D / 40
3. Latrobe Rd/US 50 EB Ramps	Signal	B / 20	B / 18	C / 20	B / 15
4. Latrobe Rd/Town Center Boulevard	Signal	C / 20	D / 47	C / 21	D / 51
5. Latrobe Rd/White Rock Rd	Signal	C / 35	C / 33	D / 36	C / 33
6. White Rock Road/Winfield Way	Signal	B / 18	C / 25	B / 18	C / 25
7. White Rock Rd/Post St	Signal	C / 23	C / 30	C / 23	C / 30
8. White Rock Rd/Vine St /Valley View Parkway	Signal	B / 18	C / 27	B / 20	C / 29
9. Town Center Boulevard/Post Street[1]	AWSC	B / 15	F / 50	C / 17	F / 52
10. Silva Valley Parkway/US 50 WB Ramps	Signal	B / 11	B / 12	B / 11	B / 12
11. Silva Valley Parkway/US 50 EB Ramps	Signal	B / 12	B / 13	B / 12	B / 13

Notes: AWSC = all-way stop control

[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).

Bold text indicates unacceptable operations. *Italicized and underlined* text indicates a potential significant impact.

The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For TWSC intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11, were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

Source: Fehr & Peers, 2017

9.3.2 FREEWAY FACILITIES

Table 17 compares AM and PM peak hour freeway operations under near-term cumulative conditions without and with the proposed project. As shown in Table 17, all freeway facilities will continue to operate at LOS E or better, with the addition of project trips.

TABLE 17: FREEWAY FACILITY PEAK HOUR LEVEL OF SERVICE – NEAR-TERM CONDITIONS

Freeway	Segment	Facility Type	Near-Term Density[1] / LOS		Near-Term Plus Project Density[1] / LOS	
			AM	PM	AM	PM
US 50 EB	Latrobe Rd off-ramp	Diverge	22 / C	27 / C	22 / C	27 / C
	El Dorado Hills Boulevard off-ramp	Diverge	13 / B	23 / C	13 / B	23 / C
	El Dorado Hills Boulevard on-ramp to Silva Valley Parkway off-ramp	Weave (HCM)[2]	11 / B	23 / C	11 / B	23 / C
		Basic	7 / A	14 / B	7 / A	14 / B
	Silva Valley Parkway on-ramp (loop)	Merge	15 / B	20 / C	15 / B	20 / B
	Silva Valley Parkway on-ramp to Bass Lake Road off-ramp	Basic	14 / B	19 / C	14 / B	19 / C
	Bass Lake Road off-ramp	Diverge	18 / B	25 / C	18 / B	25 / C
US 50 WB	Bass Lake Rd on-ramp	Merge	33 / D	27 / C	33 / D	27 / C
	Bass Lake Rd on-ramp to lane addition	Basic	30 / D	24 / C	30 / D	24 / C
	Lane addition to Silva Valley Parkway off-ramp	Basic	19 / C	16 / B	19 / C	16 / B
	Silva Valley Parkway off-ramp	Diverge	14 / B	11 / B	14 / B	11 / B
	Silva Valley Parkway on-ramp to El Dorado Hills Boulevard off-ramp	Weave (HCM)[2]	36 / E	21 / C	36 / E	21 / C
		Basic	19 / C	13 / B	19 / C	13 / B
	El Dorado Hills Boulevard on-ramp	Merge	34 / D	24 / C	34 / D	24 / C

Notes: [1]Density reported as passenger cars per mile per pane. Density is not reported for LOS F operations.

[2] This weave section lies outside the realm of weaving using the Leisch Method. As a result, it is analyzed as a basic segment.

Source: Fehr & Peers, 2017

9.3.3 IMPACTS AND MITIGATION MEASURES

Impacts

Impact 8 - The El Dorado Hills Boulevard / Saratoga Way / Park Drive intersection operates unacceptably at LOS F during the AM peak hour under Near Term conditions without the project. According to the established significance criteria, the project is projected to "significantly worsen" conditions, since it would add more than 10 trips to the intersection during the AM peak hour. **This is a potentially significant impact**.

Mitigation

Mitigation 8 - The operations at this intersection can be improved to meet the County LOS standards by adding a southbound right turn lane. This intersection improvement is included in the Saratoga Way Extension Phase 2 project (CIP # GP147), which is a project that is included in the County's CIP. Additionally, the County's annual Intersection Needs Prioritization Process will identify if the intersection triggers a LOS impact prior to 2035. Should the LOS become unacceptable, the potential intersection improvements can be added, by the Board of Supervisors, to the CIP as funding becomes available. Implementation of the following improvements would provide acceptable operation:

- Provide one left-turn lane, two through lanes, and one right-turn lane on the southbound approach.

As the proposed El Dorado Hills Apartment project is not a single-family residential subdivision, the second paragraph under Policy TC-Xf is the guiding policy for mitigation of the project's impact. Therefore, payment of Traffic Impact Mitigation (TIM) fees will satisfy the project's fair share portion of the improvement project. The project applicant will pay TIM fees to the County prior to issuance of building permit(s).

Implementation of this improvement would result in acceptable LOS D operations during the AM and PM peak hours. With this improvement, this impact would be **less than significant**.

TABLE 18: INTERSECTION LOS AND DELAY – NEAR-TERM PLUS PROJECT CONDITIONS

Intersection	Control	Near-Term (LOS/Delay)		Near-Term Plus Project (LOS/Delay)		Near-Term Plus Project (Mitigated) (LOS/Delay)	
		AM	PM	AM	PM	AM	PM
1. El Dorado Hills Boulevard/Saratoga Way/Park Drive	Signal	**F / 108**	D / 47	***F / 125***	D / 43	D / 48	D / 46

Notes:

Bold text indicates unacceptable operations. *Italicized and underlined* text indicates a potential significant impact.

The average delay is measured in seconds per vehicle. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersection was analyzed in SimTraffic.

Source: Fehr & Peers, 2017

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APPENDIX A.1:
TECHNICAL CALCULATIONS
– EXISTING CONDITIONS
COUNT DATA & INTERSECTION LOS

National Data and Surveying Services

City of El Dorado Hills
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 16-7916-005 El Dorado Hills Blvd & Saratoga Way
Date : 12/6/2016

Unshifted Count = All Vehicles & Uturns

	El Dorado Hills Blvd Southbound					Saratoga Way Westbound					El Dorado Hills Blvd Northbound					Saratoga Way Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	15	133	1	0	149	1	0	4	0	5	1	44	2	0	47	2	0	8	0	10	211	0
6:15	11	166	0	0	177	2	2	5	0	9	4	43	2	0	49	0	0	11	0	11	246	0
6:30	19	232	3	0	254	0	0	2	0	2	6	72	1	1	80	2	1	12	0	15	351	1
6:45	18	223	0	0	241	1	1	12	0	14	6	91	4	0	101	2	0	17	0	19	375	0
Total	63	754	4	0	821	4	3	23	0	30	17	250	9	1	277	6	1	48	0	55	1183	1
7:00	25	264	2	0	291	2	0	17	0	19	13	128	4	0	145	9	0	18	0	27	482	0
7:15	29	336	5	0	370	3	2	16	0	21	12	111	2	0	125	6	3	21	0	30	546	0
7:30	19	381	6	0	406	2	3	14	0	19	13	117	5	0	135	5	2	25	0	32	592	0
7:45	38	365	6	0	409	3	3	12	0	18	24	162	8	0	194	5	4	27	0	36	657	0
Total	111	1346	19	0	1476	10	8	59	0	77	62	518	19	0	599	25	9	91	0	125	2277	0
8:00	40	377	9	0	426	3	1	17	0	21	19	122	6	0	147	5	2	27	0	34	628	0
8:15	20	310	9	0	339	3	5	11	0	19	15	160	9	0	184	9	6	28	0	43	585	0
8:30	25	262	4	0	291	4	1	6	0	11	36	132	4	0	172	11	5	27	0	43	517	0
8:45	42	302	8	0	352	6	3	6	0	15	30	139	5	0	174	12	3	34	0	49	590	0
Total	127	1251	30	0	1408	16	10	40	0	66	100	553	24	0	677	37	16	116	0	169	2320	0
16:00	33	193	5	2	233	19	12	52	0	83	19	281	23	0	323	10	5	25	0	40	679	2
16:15	40	189	10	3	242	14	2	61	0	77	50	218	12	1	281	13	9	26	0	48	648	4
16:30	31	191	10	1	233	8	2	70	0	80	21	260	20	1	302	8	1	30	0	39	654	2
16:45	31	194	5	2	232	17	5	73	0	95	28	313	23	2	366	16	8	23	0	47	740	4
Total	135	767	30	8	940	58	21	256	0	335	118	1072	78	4	1272	47	23	104	0	174	2721	12
17:00	37	191	9	4	241	15	6	63	0	84	24	282	11	1	318	11	4	20	0	35	678	5
17:15	27	186	6	2	221	13	4	65	0	82	41	327	20	1	389	13	6	24	0	43	735	3
17:30	34	190	6	2	232	9	4	59	1	73	25	283	15	1	324	6	4	18	0	28	657	4
17:45	35	178	8	1	222	10	4	58	0	72	31	287	17	0	335	9	1	18	0	28	657	1
Total	133	745	29	9	916	47	18	245	1	311	121	1179	63	3	1366	39	15	80	0	134	2727	13
18:00	26	173	8	2	209	11	5	59	0	75	26	255	14	2	297	9	1	19	0	29	610	4
18:15	24	136	5	0	165	5	2	53	0	60	27	257	11	1	296	14	3	12	0	29	550	1
18:30	24	140	4	1	169	9	2	56	0	67	20	229	13	2	264	3	1	7	0	11	511	3
18:45	20	119	7	0	146	16	3	42	0	61	18	186	9	0	213	5	1	15	0	21	441	0
Total	94	568	24	3	689	41	12	210	0	263	91	927	47	5	1070	31	6	53	0	90	2112	8
Grand Total	663	5431	136	20	6250	176	72	833	1	1082	509	4499	240	13	5261	185	70	492	0	747	13340	34
Apprch %	10.6%	86.9%	2.2%	0.3%		16.3%	6.7%	77.0%	0.1%		9.7%	85.5%	4.6%	0.2%		24.8%	9.4%	65.9%	0.0%			
Total %	5.0%	40.7%	1.0%	0.1%	46.9%	1.3%	0.5%	6.2%	0.0%	8.1%	3.8%	33.7%	1.8%	0.1%	39.4%	1.4%	0.5%	3.7%	0.0%	5.6%	100.0%	

National Data and Surveying Services

City of El Dorado Hills
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 16-7916-001 El Dorado Hills Blvd & US 50 WB Ramps/Park Dr
Date : 12/6/2016

Unshifted Count = All Vehicles & Uturns

	El Dorado Hills Blvd Southbound					US 50 WB Ramps/Park Dr Westbound					El Dorado Hills Blvd Northbound					US 50 WB Ramps/Park Dr Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	0	50	81	1	132	4	6	2	0	12	82	33	14	0	129	8	3	27	0	38	311	1
6:15	2	48	112	0	162	7	10	9	0	26	82	24	14	0	120	10	8	28	0	46	354	0
6:30	1	69	155	1	226	9	19	5	0	33	77	51	22	0	150	8	13	34	0	55	464	1
6:45	6	78	142	0	226	13	13	6	0	32	100	74	18	0	192	20	11	55	0	86	536	0
Total	9	245	490	2	746	33	48	22	0	103	341	182	68	0	591	46	35	144	0	225	1665	2
7:00	2	109	154	0	265	16	23	3	0	42	86	109	19	0	214	15	13	45	0	73	594	0
7:15	6	178	165	0	349	13	23	3	0	39	77	92	22	0	191	24	16	67	0	107	686	0
7:30	6	159	178	1	344	23	28	6	0	57	108	93	30	1	232	31	19	69	0	119	752	2
7:45	12	243	196	0	451	22	22	4	0	48	108	122	32	2	264	25	11	104	0	140	903	2
Total	26	689	693	1	1409	74	96	16	0	186	379	416	103	3	901	95	59	285	0	439	2935	4
8:00	19	245	150	0	414	34	19	10	0	63	122	118	21	0	261	29	21	115	0	165	903	0
8:15	3	170	176	4	353	16	18	14	1	49	136	152	39	0	327	34	9	76	0	119	848	5
8:30	12	167	140	0	319	19	16	11	0	46	120	137	31	1	289	32	11	71	0	114	768	1
8:45	14	189	149	0	352	19	23	13	0	55	120	164	36	1	321	29	13	67	0	109	837	1
Total	48	771	615	4	1438	88	76	48	1	213	498	571	127	2	1198	124	54	329	0	507	3356	7
16:00	7	127	79	0	213	48	29	17	0	94	257	244	73	1	575	25	17	29	0	71	953	1
16:15	10	160	83	0	253	35	20	14	0	69	224	293	67	0	584	15	14	37	0	66	972	0
16:30	13	120	74	0	207	37	20	13	0	70	258	274	65	1	598	25	12	34	0	71	946	1
16:45	15	143	90	1	249	57	17	21	0	95	241	257	69	0	567	34	17	50	0	101	1012	1
Total	45	550	326	1	922	177	86	65	0	328	980	1068	274	2	2324	99	60	150	0	309	3883	3
17:00	7	128	68	0	203	48	17	16	0	81	229	343	55	0	627	27	9	28	0	64	975	0
17:15	6	142	84	0	232	27	16	21	0	64	278	292	81	1	652	41	20	44	0	105	1053	1
17:30	9	141	88	0	238	35	10	16	0	61	245	321	74	0	640	22	12	50	1	85	1024	1
17:45	10	136	51	0	197	33	15	21	0	69	150	251	61	0	462	32	18	31	0	81	809	0
Total	32	547	291	0	870	143	58	74	0	275	902	1207	271	1	2381	122	59	153	1	335	3861	2
18:00	7	104	72	0	183	34	19	19	0	72	231	290	69	0	590	25	8	17	0	50	895	0
18:15	9	101	77	1	188	17	10	28	0	55	175	252	57	0	484	18	5	18	0	41	768	1
18:30	6	87	67	0	160	25	23	15	0	63	92	227	41	2	362	15	6	20	1	42	627	3
18:45	5	60	46	0	111	28	12	6	0	46	117	176	38	0	331	19	8	13	0	40	528	0
Total	27	352	262	1	642	104	64	68	0	236	615	945	205	2	1767	77	27	68	1	173	2818	4
Grand Total	187	3154	2677	9	6027	619	428	293	1	1341	3715	4389	1048	10	9162	563	294	1129	2	1988	18518	22
Apprch %	3.1%	52.3%	44.4%	0.1%		46.2%	31.9%	21.8%	0.1%		40.5%	47.9%	11.4%	0.1%		28.3%	14.8%	56.8%	0.1%			
Total %	1.0%	17.0%	14.5%	0.0%	32.5%	3.3%	2.3%	1.6%	0.0%	7.2%	20.1%	23.7%	5.7%	0.1%	49.5%	3.0%	1.6%	6.1%	0.0%	10.7%	100.0%	

National Data and Surveying Services

City of El Dorado Hills
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 16-7916-002 Latrobe Rd & US 50 EB Ramps
Date : 12/6/2016

Unshifted Count = All Vehicles & Uturns

	Latrobe Rd Southbound					US 50 EB Ramps Westbound					Latrobe Rd Northbound					US 50 EB Ramps Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	7	66	0	0	73	0	0	25	0	25	0	116	15	0	131	0	0	93	0	93	322	0
6:15	11	99	0	0	110	0	0	21	0	21	0	124	9	0	133	0	0	123	0	123	387	0
6:30	24	115	0	0	139	0	0	45	0	45	0	145	24	0	169	0	0	179	0	179	532	0
6:45	14	139	0	0	153	0	0	67	0	67	0	119	16	0	135	0	0	278	0	278	633	0
Total	56	419	0	0	475	0	0	158	0	158	0	504	64	0	568	0	0	673	0	673	1874	0
7:00	28	161	0	0	189	0	0	60	0	60	0	167	20	0	187	0	0	214	0	214	650	0
7:15	37	217	0	0	254	0	0	52	0	52	0	167	31	0	198	0	0	251	0	251	755	0
7:30	67	210	0	1	278	0	0	58	0	58	0	158	44	0	202	0	0	220	0	220	758	1
7:45	63	329	0	0	392	0	0	81	0	81	0	205	34	0	239	0	0	310	0	310	1022	0
Total	195	917	0	1	1113	0	0	251	0	251	0	697	129	0	826	0	0	995	0	995	3185	1
8:00	42	293	0	0	335	0	0	60	0	60	0	210	36	0	246	0	0	246	0	246	887	0
8:15	46	231	0	0	277	0	0	71	0	71	0	229	35	0	264	0	0	272	0	272	884	0
8:30	41	182	0	0	223	0	0	75	0	75	0	230	41	0	271	0	0	245	0	245	814	0
8:45	43	249	0	1	293	0	0	74	0	74	0	231	27	0	258	0	0	250	0	250	875	1
Total	172	955	0	1	1128	0	0	280	0	280	0	900	139	0	1039	0	0	1013	0	1013	3460	1
16:00	57	166	0	0	223	0	0	173	0	173	0	446	98	0	544	0	0	192	0	192	1132	0
16:15	40	164	0	0	204	0	0	133	0	133	0	394	64	0	458	0	0	170	0	170	965	0
16:30	49	201	0	0	250	0	0	95	0	95	0	424	57	0	481	0	0	145	0	145	971	0
16:45	40	160	0	0	200	0	0	185	0	185	0	440	103	0	543	0	0	192	0	192	1120	0
Total	186	691	0	0	877	0	0	586	0	586	0	1704	322	0	2026	0	0	699	0	699	4188	0
17:00	63	150	0	0	213	0	0	177	0	177	0	493	118	0	611	0	0	163	0	163	1164	0
17:15	46	168	0	0	214	0	0	195	0	195	0	472	122	0	594	0	0	161	0	161	1164	0
17:30	44	152	0	1	197	0	0	189	0	189	0	415	112	0	527	0	0	189	0	189	1102	1
17:45	54	161	0	0	215	0	0	171	0	171	0	345	74	0	419	0	0	218	0	218	1023	0
Total	207	631	0	1	839	0	0	732	0	732	0	1725	426	0	2151	0	0	731	0	731	4453	1
18:00	48	121	0	1	170	0	0	174	0	174	0	412	82	0	494	0	0	174	0	174	1012	1
18:15	32	109	0	0	141	0	0	174	0	174	0	272	66	0	338	0	0	167	0	167	820	0
18:30	31	112	0	0	143	0	0	161	0	161	0	255	72	0	327	0	0	148	0	148	779	0
18:45	36	103	0	0	139	0	0	132	0	132	0	196	39	0	235	0	0	140	0	140	646	0
Total	147	445	0	1	593	0	0	641	0	641	0	1135	259	0	1394	0	0	629	0	629	3257	1
Grand Total	963	4058	0	4	5025	0	0	2648	0	2648	0	6665	1339	0	8004	0	0	4740	0	4740	20417	4
Apprch %	19.2%	80.8%	0.0%	0.1%		0.0%	0.0%	100.0%	0.0%		0.0%	83.3%	16.7%	0.0%		0.0%	0.0%	100.0%	0.0%			
Total %	4.7%	19.9%	0.0%	0.0%	24.6%	0.0%	0.0%	13.0%	0.0%	13.0%	0.0%	32.6%	6.6%	0.0%	39.2%	0.0%	0.0%	23.2%	0.0%	23.2%	100.0%	

National Data and Surveying Services

City of El Dorado Hills
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 16-7916-006 Latrobe Rd & Town Center Blvd
Date : 12/6/2016

Unshifted Count = All Vehicles & Uturns

	Latrobe Rd Southbound					Town Center Blvd Westbound					Latrobe Rd Northbound					Town Center Blvd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	49	90	14	1	154	3	5	26	0	34	2	103	10	0	115	2	0	0	0	2	305	1
6:15	52	131	24	1	208	6	2	34	0	42	3	100	6	0	109	2	0	0	0	2	361	1
6:30	59	199	33	1	292	13	0	48	0	61	3	121	5	0	129	5	0	1	0	6	488	1
6:45	69	303	47	0	419	10	3	32	0	45	6	110	7	0	123	2	1	0	0	3	590	0
Total	229	723	118	3	1073	32	10	140	0	182	14	434	28	0	476	11	1	1	0	13	1744	3
7:00	70	249	58	0	377	17	6	43	0	66	8	139	7	0	154	4	2	1	0	7	604	0
7:15	92	285	75	2	454	13	3	47	0	63	11	148	6	0	165	4	2	1	0	7	689	2
7:30	75	273	59	0	407	16	7	42	1	66	13	148	15	0	176	5	1	1	0	7	656	1
7:45	120	436	94	2	652	13	10	58	0	81	13	166	17	0	196	4	4	2	0	10	939	2
Total	357	1243	286	4	1890	59	26	190	1	276	45	601	45	0	691	17	9	5	0	31	2888	5
8:00	118	378	64	2	562	14	7	57	0	78	13	176	9	0	198	2	1	2	0	5	843	2
8:15	103	355	54	1	513	18	3	65	1	87	18	204	10	0	232	2	0	2	0	4	836	2
8:30	85	259	81	4	429	16	8	64	0	88	15	203	22	2	242	2	0	2	0	4	763	6
8:45	134	286	78	1	499	18	10	68	0	96	7	182	15	0	204	7	1	1	0	9	808	1
Total	440	1278	277	8	2003	66	28	254	1	349	53	765	56	2	876	13	2	7	0	22	3250	11
16:00	123	218	3	3	347	17	0	137	2	156	1	318	22	2	343	59	4	16	0	79	925	7
16:15	109	225	4	1	339	18	0	146	0	164	0	324	31	0	355	48	3	17	0	68	926	1
16:30	118	213	10	2	343	14	1	128	0	143	4	327	21	0	352	83	18	36	0	137	975	2
16:45	124	219	6	1	350	23	1	156	0	180	1	302	16	0	319	71	6	23	0	100	949	1
Total	474	875	23	7	1379	72	2	567	2	643	6	1271	90	2	1369	261	31	92	0	384	3775	11
17:00	124	183	3	3	313	16	1	134	0	151	1	363	16	0	380	90	13	30	0	133	977	3
17:15	119	222	1	2	344	11	1	160	1	173	0	343	18	0	361	80	3	25	0	108	986	3
17:30	105	231	3	0	339	12	0	123	0	135	2	327	29	0	358	59	2	11	0	72	904	0
17:45	148	212	8	3	371	12	0	124	0	136	0	252	14	0	266	36	6	11	0	53	826	3
Total	496	848	15	8	1367	51	2	541	1	595	3	1285	77	0	1365	265	24	77	0	366	3693	9
18:00	113	183	1	1	298	13	0	151	0	164	0	298	12	0	310	33	2	5	0	40	812	1
18:15	96	187	3	4	290	8	0	119	0	127	0	178	14	0	192	28	2	4	0	34	643	4
18:30	99	140	2	3	244	13	0	148	1	162	0	144	12	0	156	18	3	4	0	25	587	4
18:45	82	157	0	1	240	8	0	119	0	127	2	119	9	0	130	9	2	1	0	12	509	1
Total	390	667	6	9	1072	42	0	537	1	580	2	739	47	0	788	88	9	14	0	111	2551	10
Grand Total	2386	5634	725	39	8784	322	68	2229	6	2625	123	5095	343	4	5565	655	76	196	0	927	17901	49
Apprch %	27.2%	64.1%	8.3%	0.4%		12.3%	2.6%	84.9%	0.2%		2.2%	91.6%	6.2%	0.1%		70.7%	8.2%	21.1%	0.0%			
Total %	13.3%	31.5%	4.1%	0.2%	49.1%	1.8%	0.4%	12.5%	0.0%	14.7%	0.7%	28.5%	1.9%	0.0%	31.1%	3.7%	0.4%	1.1%	0.0%	5.2%	100.0%	

National Data and Surveying Services

City of El Dorado Hills
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 16-7916-007 Latrobe Rd & White Rock Rd
Date : 12/6/2016

Unshifted Count = All Vehicles & Uturns

	Latrobe Rd Southbound					White Rock Rd Westbound					Latrobe Rd Northbound					White Rock Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	1	88	15	0	104	19	13	15	0	47	1	86	8	0	95	12	4	4	0	20	266	0
6:15	2	101	25	0	128	39	23	20	0	82	5	74	4	0	83	11	7	3	0	21	314	0
6:30	8	162	32	0	202	27	28	23	0	78	10	96	7	0	113	13	9	7	0	29	422	0
6:45	12	253	43	0	308	69	36	19	0	124	8	85	8	0	101	24	15	13	0	52	585	0
Total	23	604	115	0	742	154	100	77	0	331	24	341	27	0	392	60	35	27	0	122	1587	0
7:00	10	214	53	1	278	52	53	17	0	122	20	99	15	0	134	40	15	10	0	65	599	1
7:15	23	223	66	1	313	67	42	28	0	137	21	113	16	0	150	27	24	9	0	60	660	1
7:30	23	208	56	1	288	57	61	32	0	150	25	102	23	0	150	49	37	14	0	100	688	1
7:45	29	307	100	1	437	88	74	29	0	191	19	114	24	0	157	48	23	12	0	83	868	1
Total	85	952	275	4	1316	264	230	106	0	600	85	428	78	0	591	164	99	45	0	308	2815	4
8:00	25	275	110	0	410	86	61	33	0	180	17	121	43	0	181	51	24	15	2	92	863	2
8:15	27	255	80	1	363	92	55	44	0	191	17	130	50	0	197	49	23	9	0	81	832	1
8:30	28	207	52	0	287	55	62	48	0	165	20	131	30	0	181	68	29	6	0	103	736	0
8:45	29	207	55	1	292	55	41	20	0	116	12	112	21	0	145	63	28	5	0	96	649	1
Total	109	944	297	2	1352	288	219	145	0	652	66	494	144	0	704	231	104	35	2	372	3080	4
16:00	47	133	56	3	239	48	31	52	0	131	27	221	92	2	342	73	47	29	0	149	861	5
16:15	48	170	55	2	275	45	34	45	0	124	32	234	65	1	332	85	80	35	0	200	931	3
16:30	67	137	68	3	275	48	43	41	1	133	27	228	108	4	367	68	71	20	1	160	935	9
16:45	48	150	55	2	255	50	36	52	0	138	16	220	67	2	305	66	80	23	0	169	867	4
Total	210	590	234	10	1044	191	144	190	1	526	102	903	332	9	1346	292	278	107	1	678	3594	21
17:00	51	116	56	0	223	38	38	49	0	125	20	248	106	0	374	94	68	22	0	184	906	0
17:15	64	122	65	0	251	47	33	50	1	131	16	194	72	1	283	91	75	26	0	192	857	2
17:30	60	142	49	1	252	35	39	44	0	118	8	196	64	0	268	99	78	35	0	212	850	1
17:45	58	146	38	0	242	45	33	45	0	123	11	157	49	2	219	81	87	20	0	188	772	2
Total	233	526	208	1	968	165	143	188	1	497	55	795	291	3	1144	365	308	103	0	776	3385	5
18:00	44	107	41	1	193	39	31	41	0	111	18	180	49	0	247	75	54	22	0	151	702	1
18:15	45	102	46	0	193	37	25	51	0	113	10	102	30	2	144	47	40	13	1	101	551	3
18:30	34	103	33	1	171	22	23	36	0	81	6	98	21	4	129	29	36	12	0	77	458	5
18:45	43	92	28	0	163	35	22	34	0	91	3	65	21	0	89	29	33	15	0	77	420	0
Total	166	404	148	2	720	133	101	162	0	396	37	445	121	6	609	180	163	62	1	406	2131	9
Grand Total	826	4020	1277	19	6142	1195	937	868	2	3002	369	3406	993	18	4786	1292	987	379	4	2662	16592	43
Apprch %	13.4%	65.5%	20.8%	0.3%		39.8%	31.2%	28.9%	0.1%		7.7%	71.2%	20.7%	0.4%		48.5%	37.1%	14.2%	0.2%			
Total %	5.0%	24.2%	7.7%	0.1%	37.0%	7.2%	5.6%	5.2%	0.0%	18.1%	2.2%	20.5%	6.0%	0.1%	28.8%	7.8%	5.9%	2.3%	0.0%	16.0%	100.0%	

National Data and Surveying Services

City of El Dorado County
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 17-7052-001 Windfield Way & White Rock Rd
Date : 2/14/2017

Unshifted Count = All Vehicles & Uturns

	Windfield Way Southbound					White Rock Rd Westbound					Windfield Way Northbound					White Rock Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	0	0	0	0	0	15	26	0	0	41	3	0	2	1	6	0	10	7	0	17	64	1
6:15	0	0	0	0	0	14	35	0	0	49	1	0	3	0	4	0	22	4	0	26	79	0
6:30	0	0	0	0	0	9	54	0	0	63	2	0	7	0	9	0	28	16	0	44	116	0
6:45	0	0	0	0	0	23	71	0	0	94	3	0	7	0	10	0	43	24	0	67	171	0
Total	0	0	0	0	0	61	186	0	0	247	9	0	19	1	29	0	103	51	0	154	430	1
7:00	0	0	0	0	0	31	82	0	0	113	4	0	20	0	24	0	61	14	0	75	212	0
7:15	0	0	0	0	0	30	82	0	1	113	7	0	8	0	15	0	56	18	0	74	202	1
7:30	0	0	0	0	0	52	119	0	1	172	3	0	6	0	9	0	75	26	2	103	284	3
7:45	0	0	0	0	0	81	76	0	4	161	10	0	12	0	22	0	72	34	0	106	289	4
Total	0	0	0	0	0	194	359	0	6	559	24	0	46	0	70	0	264	92	2	358	987	8
8:00	0	0	0	0	0	77	80	1	2	160	12	0	19	0	31	0	76	36	0	112	303	2
8:15	0	0	1	0	1	92	89	1	2	184	12	0	29	0	41	0	71	28	0	99	325	2
8:30	0	0	0	0	0	57	69	0	2	128	15	0	21	0	36	0	75	29	0	104	268	2
8:45	1	0	0	0	1	70	70	0	3	143	3	1	18	0	22	0	80	38	0	118	284	3
Total	1	0	1	0	2	296	308	2	9	615	42	1	87	0	130	0	302	131	0	433	1180	9
16:00	0	0	1	0	1	16	78	0	7	101	38	0	52	0	90	0	100	13	0	113	305	7
16:15	0	0	0	0	0	26	64	0	1	91	35	0	48	0	83	0	106	24	2	132	306	3
16:30	0	0	0	0	0	21	107	0	6	134	74	0	66	0	140	0	135	19	0	154	428	6
16:45	0	0	0	0	0	27	92	6	4	129	41	0	42	1	84	0	130	15	0	145	358	5
Total	0	0	1	0	1	90	341	6	18	455	188	0	208	1	397	0	471	71	2	544	1397	21
17:00	0	0	0	0	0	16	103	0	5	124	77	0	64	0	141	0	125	16	0	141	406	5
17:15	0	0	0	0	0	25	95	0	4	124	39	0	62	0	101	0	137	18	0	155	380	4
17:30	0	0	1	0	1	17	69	0	2	88	40	0	37	0	77	0	161	17	0	178	344	2
17:45	0	0	0	0	0	18	72	0	2	92	19	0	37	0	56	0	117	9	0	126	274	2
Total	0	0	1	0	1	76	339	0	13	428	175	0	200	0	375	0	540	60	0	600	1404	13
18:00	0	0	0	0	0	9	66	0	4	79	28	0	41	0	69	0	90	9	0	99	247	4
18:15	0	0	1	0	1	9	63	1	2	75	15	0	18	0	33	0	85	8	0	93	202	2
18:30	0	0	0	0	0	6	51	0	3	60	11	0	21	0	32	0	64	4	0	68	160	3
18:45	0	0	0	0	0	17	47	0	2	66	6	0	13	0	19	0	40	6	0	46	131	2
Total	0	0	1	0	1	41	227	1	11	280	60	0	93	0	153	0	279	27	0	306	740	11
Grand Total	1	0	4	0	5	758	1760	9	57	2584	498	1	653	2	1154	0	1959	432	4	2395	6138	63
Apprch %	20.0%	0.0%	80.0%	0.0%		29.3%	68.1%	0.3%	2.2%		43.2%	0.1%	56.6%	0.2%		0.0%	81.8%	18.0%	0.2%			
Total %	0.0%	0.0%	0.1%	0.0%	0.1%	12.3%	28.7%	0.1%	0.9%	42.1%	8.1%	0.0%	10.6%	0.0%	18.8%	0.0%	31.9%	7.0%	0.1%	39.0%	100.0%	

National Data and Surveying Services

City of El Dorado County
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 17-7052-002 Post St & White Rock Rd
Date : 2/14/2017

Unshifted Count = All Vehicles & Uturns

	Post St Southbound					White Rock Rd Westbound					Post St Northbound					White Rock Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	3	1	10	0	14	3	27	29	0	59	1	1	0	0	2	10	11	0	0	21	96	0
6:15	7	2	10	0	19	3	50	26	0	79	4	0	2	0	6	8	4	0	0	12	116	0
6:30	9	1	21	0	31	6	63	28	0	97	2	1	3	0	6	6	15	0	0	21	155	0
6:45	12	1	34	0	47	8	96	27	0	131	6	1	1	0	8	6	15	0	1	22	208	1
Total	31	5	75	0	111	20	236	110	0	366	13	3	6	0	22	30	45	0	1	76	575	1
7:00	8	0	14	0	22	4	94	28	0	126	5	1	2	0	8	14	28	3	0	45	201	0
7:15	18	1	17	0	36	4	119	36	0	159	8	0	2	0	10	7	36	3	0	46	251	0
7:30	8	2	27	0	37	10	115	40	0	165	14	1	3	0	18	15	50	0	1	66	286	1
7:45	7	0	32	0	39	4	156	50	0	210	9	1	4	0	14	15	53	2	0	70	333	0
Total	41	3	90	0	134	22	484	154	0	660	36	3	11	0	50	51	167	8	1	227	1071	1
8:00	14	1	31	0	46	6	138	52	0	196	12	0	2	0	14	19	63	2	0	84	340	0
8:15	11	0	19	0	30	6	138	46	0	190	8	0	2	0	10	11	83	3	0	97	327	0
8:30	8	1	24	0	33	9	106	32	0	147	5	2	2	0	9	16	52	3	0	71	260	0
8:45	13	2	20	0	35	4	116	49	0	169	11	5	2	0	18	24	53	1	0	78	300	0
Total	46	4	94	0	144	25	498	179	0	702	36	7	8	0	51	70	251	9	0	330	1227	0
16:00	35	6	27	2	70	11	73	32	0	116	15	4	5	0	24	35	135	0	0	170	380	2
16:15	37	8	42	0	87	7	84	36	0	127	11	1	12	0	24	40	145	5	0	190	428	0
16:30	28	1	34	0	63	12	81	30	0	123	11	5	6	0	22	49	161	6	3	219	427	3
16:45	46	5	38	0	89	5	75	28	0	108	12	5	5	0	22	46	176	5	0	227	446	0
Total	146	20	141	2	309	35	313	126	0	474	49	15	28	0	92	170	617	16	3	806	1681	5
17:00	41	3	43	0	87	9	96	30	0	135	17	4	5	0	26	50	186	3	0	239	487	0
17:15	35	2	46	1	84	7	106	49	0	162	20	1	7	0	28	26	181	4	1	212	486	2
17:30	45	10	45	0	100	9	80	39	0	128	6	2	10	0	18	32	169	2	1	204	450	1
17:45	34	1	34	0	69	12	68	45	0	125	10	3	6	0	19	30	121	2	1	154	367	1
Total	155	16	168	1	340	37	350	163	0	550	53	10	28	0	91	138	657	11	3	809	1790	4
18:00	34	7	23	0	64	7	90	40	0	137	6	3	5	0	14	25	129	0	2	156	371	2
18:15	28	3	27	0	58	9	60	33	1	103	7	1	5	0	13	11	102	3	0	116	290	1
18:30	38	4	16	0	58	2	65	16	0	83	9	5	5	0	19	16	83	1	1	101	261	1
18:45	28	10	9	0	47	7	57	19	1	84	9	2	6	0	17	14	68	6	1	89	237	2
Total	128	24	75	0	227	25	272	108	2	407	31	11	21	0	63	66	382	10	4	462	1159	6
Grand Total	547	72	643	3	1265	164	2153	840	2	3159	218	49	102	0	369	525	2119	54	12	2710	7503	17
Apprch %	43.2%	5.7%	50.8%	0.2%		5.2%	68.2%	26.6%	0.1%		59.1%	13.3%	27.6%	0.0%		19.4%	78.2%	2.0%	0.4%			
Total %	7.3%	1.0%	8.6%	0.0%	16.9%	2.2%	28.7%	11.2%	0.0%	42.1%	2.9%	0.7%	1.4%	0.0%	4.9%	7.0%	28.2%	0.7%	0.2%	36.1%	100.0%	

National Data and Surveying Services

City of El Dorado County
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 17-7052-003 Vine St/Valley View Pkwy & White Rock Rd
Date : 2/14/2017

Unshifted Count = All Vehicles & Uturns

	Vine St/Valley View Pkwy Southbound					White Rock Rd Westbound					Vine St/Valley View Pkwy Northbound					White Rock Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	0	0	0	0	0	6	45	4	0	55	10	4	16	0	30	0	10	4	0	14	99	0
6:15	1	2	0	0	3	9	59	3	0	71	21	0	18	0	39	0	13	5	0	18	131	0
6:30	1	0	1	0	2	8	72	8	0	88	16	2	23	0	41	0	16	7	0	23	154	0
6:45	6	7	1	0	14	13	98	18	0	129	19	4	37	0	60	2	23	10	0	35	238	0
Total	8	9	2	0	19	36	274	33	0	343	66	10	94	0	170	2	62	26	0	90	622	0
7:00	1	0	1	0	2	14	89	8	0	111	22	3	40	0	65	6	32	5	0	43	221	0
7:15	0	1	1	0	2	11	125	27	0	163	27	4	58	0	89	6	51	11	0	68	322	0
7:30	4	2	5	0	11	13	132	14	0	159	22	2	75	0	99	5	60	6	0	71	340	0
7:45	2	3	6	0	11	38	170	37	0	245	30	1	64	0	95	5	49	7	0	61	412	0
Total	7	6	13	0	26	76	516	86	0	678	101	10	237	0	348	22	192	29	0	243	1295	0
8:00	5	5	4	0	14	32	168	49	0	249	22	14	35	0	71	15	34	10	0	59	393	0
8:15	15	11	21	0	47	24	139	52	0	215	20	8	33	0	61	16	52	19	0	87	410	0
8:30	15	2	11	0	28	16	111	29	0	156	21	6	33	0	60	11	45	5	0	61	305	0
8:45	16	6	5	0	27	17	116	25	0	158	30	8	25	0	63	10	37	12	0	59	307	0
Total	51	24	41	0	116	89	534	155	0	778	93	36	126	0	255	52	168	46	0	266	1415	0
16:00	48	7	10	0	65	34	88	50	0	172	17	7	34	0	58	6	115	23	0	144	439	0
16:15	63	18	9	0	90	30	90	44	0	164	18	12	30	0	60	10	132	27	0	169	483	0
16:30	53	18	5	0	76	27	86	53	0	166	18	12	40	0	70	7	138	26	0	171	483	0
16:45	48	12	11	0	71	34	74	44	0	152	9	9	29	0	47	13	150	27	0	190	460	0
Total	212	55	35	0	302	125	338	191	0	654	62	40	133	0	235	36	535	103	0	674	1865	0
17:00	74	14	22	0	110	32	87	52	0	171	15	12	28	0	55	13	149	30	0	192	528	0
17:15	75	12	18	0	105	37	104	57	0	198	15	11	31	0	57	16	170	30	0	216	576	0
17:30	71	19	15	0	105	31	73	54	0	158	17	15	23	0	55	17	118	39	0	174	492	0
17:45	67	20	15	0	102	32	79	61	0	172	13	12	33	0	58	12	107	33	0	152	484	0
Total	287	65	70	0	422	132	343	224	0	699	60	50	115	0	225	58	544	132	0	734	2080	0
18:00	66	27	22	0	115	24	64	53	0	141	21	11	29	0	61	16	106	30	0	152	469	0
18:15	65	15	10	0	90	14	53	47	0	114	11	15	19	0	45	13	76	30	0	119	368	0
18:30	52	18	14	0	84	24	45	37	0	106	13	11	20	0	44	12	80	21	0	113	347	0
18:45	44	17	12	0	73	18	46	38	0	102	11	8	14	0	33	13	73	21	0	107	315	0
Total	227	77	58	0	362	80	208	175	0	463	56	45	82	0	183	54	335	102	0	491	1499	0
Grand Total	792	236	219	0	1247	538	2213	864	0	3615	438	191	787	0	1416	224	1836	438	0	2498	8776	0
Apprch %	63.5%	18.9%	17.6%	0.0%		14.9%	61.2%	23.9%	0.0%		30.9%	13.5%	55.6%	0.0%		9.0%	73.5%	17.5%	0.0%			
Total %	9.0%	2.7%	2.5%	0.0%	14.2%	6.1%	25.2%	9.8%	0.0%	41.2%	5.0%	2.2%	9.0%	0.0%	16.1%	2.6%	20.9%	5.0%	0.0%	28.5%	100.0%	

National Data and Surveying Services

City of El Dorado County
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 17-7052-004 Post St & Town Center Blvd
Date : 2/14/2017

Unshifted Count = All Vehicles & Uturns

	Post St Southbound					Town Center Blvd Westbound					Post St Northbound					Town Center Blvd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	0	4	6	0	10	1	1	1	0	3	20	8	0	0	28	18	6	18	1	43	84	1
6:15	1	6	5	0	12	0	1	0	0	1	15	12	0	0	27	26	3	15	3	47	87	3
6:30	0	2	12	0	14	1	0	0	0	1	24	5	1	0	30	26	6	25	1	58	103	1
6:45	0	6	8	0	14	0	4	1	0	5	27	17	2	0	46	34	11	19	1	65	130	1
Total	1	18	31	0	50	2	6	2	0	10	86	42	3	0	131	104	26	77	6	213	404	6
7:00	1	5	11	0	17	1	2	0	0	3	23	10	1	0	34	34	14	13	3	64	118	3
7:15	0	10	14	0	24	0	8	2	0	10	31	10	1	0	42	42	12	21	2	77	153	2
7:30	0	10	17	0	27	0	4	4	0	8	32	17	3	0	52	50	16	23	3	92	179	3
7:45	2	11	15	0	28	1	8	4	0	13	30	11	0	0	41	49	29	38	5	121	203	5
Total	3	36	57	0	96	2	22	10	0	34	116	48	5	0	169	175	71	95	13	354	653	13
8:00	3	9	12	0	24	1	4	6	0	11	33	11	0	0	44	51	20	33	2	106	185	2
8:15	1	10	16	0	27	3	11	4	0	18	35	15	4	0	54	54	31	30	3	118	217	3
8:30	1	8	20	0	29	1	22	0	0	23	32	9	4	0	45	60	24	29	3	116	213	3
8:45	2	12	19	0	33	4	12	7	0	23	39	20	6	0	65	66	28	34	4	132	253	4
Total	7	39	67	0	113	9	49	17	0	75	139	55	14	0	208	231	103	126	12	472	868	12
16:00	4	17	52	0	73	7	34	1	0	42	48	22	6	0	76	90	37	39	2	168	359	2
16:15	3	31	68	0	102	8	30	3	0	41	43	26	6	0	75	53	42	35	2	132	350	2
16:30	2	14	36	0	52	2	30	5	0	37	46	30	12	0	88	67	37	31	3	138	315	3
16:45	4	31	71	0	106	4	34	4	0	42	40	23	12	0	75	94	53	37	1	185	408	1
Total	13	93	227	0	333	21	128	13	0	162	177	101	36	0	314	304	169	142	8	623	1432	8
17:00	4	32	72	0	108	7	44	3	0	54	47	35	8	0	90	76	47	29	0	152	404	0
17:15	4	24	88	0	116	4	51	6	0	61	39	19	13	0	71	78	64	45	4	191	439	4
17:30	4	32	64	0	100	7	47	5	0	59	51	23	12	0	86	77	46	32	2	157	402	2
17:45	3	18	61	0	82	8	33	6	0	47	42	28	6	0	76	70	58	37	0	165	370	0
Total	15	106	285	0	406	26	175	20	0	221	179	105	39	0	323	301	215	143	6	665	1615	6
18:00	2	11	67	0	80	5	45	7	0	57	41	25	10	0	76	79	60	29	1	169	382	1
18:15	3	19	73	0	95	6	38	5	0	49	38	17	14	0	69	71	59	27	1	158	371	1
18:30	4	9	60	0	73	1	36	1	0	38	45	16	6	0	67	56	46	20	3	125	303	3
18:45	0	11	65	0	76	9	43	2	0	54	43	12	4	0	59	54	42	24	2	122	311	2
Total	9	50	265	0	324	21	162	15	0	198	167	70	34	0	271	260	207	100	7	574	1367	7
Grand Total	48	342	932	0	1322	81	542	77	0	700	864	421	131	0	1416	1375	791	683	52	2901	6339	52
Apprch %	3.6%	25.9%	70.5%	0.0%		11.6%	77.4%	11.0%	0.0%		61.0%	29.7%	9.3%	0.0%		47.4%	27.3%	23.5%	1.8%			
Total %	0.8%	5.4%	14.7%	0.0%	20.9%	1.3%	8.6%	1.2%	0.0%	11.0%	13.6%	6.6%	2.1%	0.0%	22.3%	21.7%	12.5%	10.8%	0.8%	45.8%	100.0%	

National Data and Surveying Services

City of El Dorado Hills
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 16-7916-003 Silva Valley Pkwy & US 50 WB Ramps
Date : 12/6/2016

Unshifted Count = All Vehicles & Uturns

	Silva Valley Pkwy Southbound					US 50 WB Ramps Westbound					Silva Valley Pkwy Northbound					US 50 WB Ramps Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	0	6	48	0	54	31	0	12	0	43	6	9	0	0	15	0	0	0	0	0	112	0
6:15	0	15	88	0	103	41	1	9	0	51	13	8	0	0	21	0	0	0	0	0	175	0
6:30	0	18	98	0	116	46	0	7	0	53	12	18	0	0	30	0	0	0	0	0	199	0
6:45	0	28	104	0	132	81	0	21	0	102	18	46	0	0	64	0	0	0	0	0	298	0
Total	0	67	338	0	405	199	1	49	0	249	49	81	0	0	130	0	0	0	0	0	784	0
7:00	0	30	99	0	129	78	1	33	0	112	18	59	0	0	77	0	0	0	0	0	318	0
7:15	0	50	104	0	154	86	1	27	0	114	10	65	0	0	75	0	0	0	0	0	343	0
7:30	0	60	107	0	167	80	0	24	0	104	21	105	0	1	127	0	0	0	0	0	398	1
7:45	0	74	109	0	183	108	0	35	0	143	14	110	0	0	124	0	0	0	0	0	450	0
Total	0	214	419	0	633	352	2	119	0	473	63	339	0	1	403	0	0	0	0	0	1509	1
8:00	0	69	117	0	186	110	0	20	0	130	14	57	0	0	71	0	0	0	0	0	387	0
8:15	0	61	98	0	159	96	0	23	0	119	9	59	0	0	68	0	0	0	0	0	346	0
8:30	0	47	93	0	140	68	0	21	0	89	14	68	0	0	82	0	0	0	0	0	311	0
8:45	0	30	89	0	119	75	0	17	0	92	17	61	0	0	78	0	0	0	0	0	289	0
Total	0	207	397	0	604	349	0	81	0	430	54	245	0	0	299	0	0	0	0	0	1333	0
16:00	0	56	33	0	89	54	0	33	0	87	8	166	0	0	174	0	0	0	0	0	350	0
16:15	0	34	36	0	70	69	1	35	0	105	6	164	0	1	171	0	0	0	0	0	346	1
16:30	0	41	37	0	78	52	0	31	0	83	9	208	0	0	217	0	0	0	0	0	378	0
16:45	0	45	33	0	78	50	1	35	0	86	13	217	0	0	230	0	0	0	0	0	394	0
Total	0	176	139	0	315	225	2	134	0	361	36	755	0	1	792	0	0	0	0	0	1468	1
17:00	0	55	47	0	102	59	0	43	0	102	13	202	0	0	215	0	0	0	0	0	419	0
17:15	0	48	46	0	94	67	0	44	0	111	16	236	0	0	252	0	0	0	0	0	457	0
17:30	0	39	39	0	78	58	0	33	0	91	11	225	0	0	236	0	0	0	0	0	405	0
17:45	0	44	38	0	82	66	0	31	0	97	12	224	0	0	236	0	0	0	0	0	415	0
Total	0	186	170	0	356	250	0	151	0	401	52	887	0	0	939	0	0	0	0	0	1696	0
18:00	0	54	31	0	85	51	0	26	0	77	8	190	0	0	198	0	0	0	0	0	360	0
18:15	0	46	24	0	70	37	0	22	0	59	10	181	0	0	191	0	0	0	0	0	320	0
18:30	0	37	28	0	65	37	0	22	0	59	4	165	0	0	169	0	0	0	0	0	293	0
18:45	0	34	23	0	57	36	0	11	0	47	12	160	0	0	172	0	0	0	0	0	276	0
Total	0	171	106	0	277	161	0	81	0	242	34	696	0	0	730	0	0	0	0	0	1249	0
Grand Total	0	1021	1569	0	2590	1536	5	615	0	2156	288	3003	0	2	3293	0	0	0	0	0	8039	2
Apprch %	0.0%	39.4%	60.6%	0.0%		71.2%	0.2%	28.5%	0.0%		8.7%	91.2%	0.0%	0.1%		0.0%	0.0%	0.0%	0.0%			
Total %	0.0%	12.7%	19.5%	0.0%	32.2%	19.1%	0.1%	7.7%	0.0%	26.8%	3.6%	37.4%	0.0%	0.0%	41.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

National Data and Surveying Services

City of El Dorado Hills
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Heavy Trucks On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 16-7916-004 Silva Valley Pkwy & US 50 EB Ramps
Date : 12/6/2016

Unshifted Count = All Vehicles & Uturns

	Silva Valley Pkwy Southbound					US 50 EB Ramps Westbound					Silva Valley Pkwy Northbound					US 50 EB Ramps Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
6:00	0	36	2	0	38	0	0	0	0	0	8	12	0	0	20	3	0	0	0	3	61	0
6:15	0	54	3	0	57	0	0	0	0	0	8	17	0	0	25	2	0	1	0	3	85	0
6:30	0	60	6	0	66	0	0	0	0	0	9	24	0	0	33	7	0	2	0	9	108	0
6:45	0	95	14	0	109	0	0	0	0	0	8	45	0	0	53	18	0	3	0	21	183	0
Total	0	245	25	0	270	0	0	0	0	0	33	98	0	0	131	30	0	6	0	36	437	0
7:00	0	92	16	0	108	0	0	0	0	0	15	58	0	0	73	14	0	4	0	18	199	0
7:15	0	107	27	0	134	0	0	0	0	0	22	60	0	0	82	17	0	4	0	21	237	0
7:30	0	112	28	0	140	0	0	0	0	0	37	105	0	0	142	21	0	3	0	24	306	0
7:45	0	164	28	0	192	0	0	0	0	0	30	100	0	0	130	22	0	3	0	25	347	0
Total	0	475	99	0	574	0	0	0	0	0	104	323	0	0	427	74	0	14	0	88	1089	0
8:00	0	139	37	0	176	0	0	0	0	0	26	47	0	0	73	20	0	6	0	26	275	0
8:15	0	132	26	0	158	0	0	0	0	0	26	56	0	0	82	16	0	7	0	23	263	0
8:30	0	94	22	0	116	0	0	0	0	0	39	53	0	0	92	26	0	5	0	31	239	0
8:45	0	91	11	0	102	0	0	0	0	0	23	52	0	0	75	29	0	4	0	33	210	0
Total	0	456	96	0	552	0	0	0	0	0	114	208	0	0	322	91	0	22	0	113	987	0
16:00	0	85	22	0	107	0	0	0	0	0	59	102	0	0	161	79	0	11	0	90	358	0
16:15	0	84	16	0	100	0	0	0	0	0	88	101	0	0	189	79	0	12	0	91	380	0
16:30	0	75	19	0	94	0	0	0	0	0	93	117	0	0	210	95	0	9	0	104	408	0
16:45	0	72	20	0	92	0	0	0	0	0	110	115	0	0	225	112	0	9	0	121	438	0
Total	0	316	77	0	393	0	0	0	0	0	350	435	0	0	785	365	0	41	0	406	1584	0
17:00	0	80	35	0	115	0	0	0	0	0	95	121	0	0	216	97	0	13	0	110	441	0
17:15	0	100	13	0	113	0	0	0	0	0	64	127	0	0	191	118	0	16	0	134	438	0
17:30	0	76	23	0	99	0	0	0	0	0	82	132	0	0	214	98	0	9	0	107	420	0
17:45	0	94	16	0	110	0	0	0	0	0	67	111	0	0	178	120	0	8	0	128	416	0
Total	0	350	87	0	437	0	0	0	0	0	308	491	0	0	799	433	0	46	0	479	1715	0
18:00	0	78	25	0	103	0	0	0	0	0	59	101	0	0	160	88	0	15	0	103	366	0
18:15	0	62	20	0	82	0	0	0	0	0	44	106	0	0	150	94	0	11	0	105	337	0
18:30	0	52	22	0	74	0	0	0	0	0	55	75	0	0	130	91	0	10	0	101	305	0
18:45	0	58	13	0	71	0	0	0	0	0	52	89	0	0	141	85	0	12	0	97	309	0
Total	0	250	80	0	330	0	0	0	0	0	210	371	0	0	581	358	0	48	0	406	1317	0
Grand Total	0	2092	464	0	2556	0	0	0	0	0	1119	1926	0	0	3045	1351	0	177	0	1528	7129	0
Apprch %	0.0%	81.8%	18.2%	0.0%		0.0%	0.0%	0.0%	0.0%		36.7%	63.3%	0.0%	0.0%		88.4%	0.0%	11.6%	0.0%			
Total %	0.0%	29.3%	6.5%	0.0%	35.9%	0.0%	0.0%	0.0%	0.0%	0.0%	15.7%	27.0%	0.0%	0.0%	42.7%	19.0%	0.0%	2.5%	0.0%	21.4%	100.0%	

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	94	96	102.1%	42.0	4.1	D
	Through	583	578	99.1%	10.4	0.6	B
	Right Turn	27	31	114.8%	5.8	1.2	A
	Subtotal	704	705	100.1%	14.5	0.9	B
SB	Left Turn	123	117	95.2%	45.0	3.4	D
	Through	1,397	1,383	99.0%	17.6	2.1	B
	Right Turn	28	27	95.0%	16.1	3.6	B
	Subtotal	1,548	1,526	98.6%	19.7	2.0	B
EB	Left Turn	30	30	101.4%	37.4	3.8	D
	Through	17	17	97.7%	35.1	5.1	D
	Right Turn	116	116	100.3%	19.5	1.4	B
	Subtotal	163	163	100.2%	24.4	1.9	C
WB	Left Turn	14	12	83.7%	34.1	5.6	C
	Through	10	10	99.8%	41.5	7.6	D
	Right Turn	46	47	101.8%	8.3	1.5	A
	Subtotal	70	69	97.9%	17.7	3.4	B
Total		2,485	2,463	99.1%	18.5	1.5	B

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	489	490	100.1%	48.6	1.7	D
	Through	541	537	99.2%	17.4	1.5	B
	Right Turn	123	122	99.0%	9.5	1.3	A
	Subtotal	1,153	1,148	99.6%	29.8	1.3	C
SB	Left Turn	50	47	94.1%	76.1	5.0	E
	Through	815	795	97.6%	37.0	2.2	D
	Right Turn	662	648	97.8%	29.1	6.2	C
	Subtotal	1,527	1,490	97.6%	34.8	3.8	C
EB	Left Turn	120	118	98.2%	44.4	2.2	D
	Through	52	50	95.3%	49.2	4.5	D
	Right Turn	366	370	101.2%	3.0	0.2	A
	Subtotal	538	538	100.0%	16.3	1.1	B
WB	Left Turn	92	95	103.3%	57.0	2.8	E
	Through	75	75	100.1%	57.9	5.0	E
	Right Turn	39	41	104.9%	9.1	3.9	A
	Subtotal	206	211	102.4%	48.1	2.7	D
Total		3,424	3,387	98.9%	31.0	1.7	C

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	866	845	97.6%	9.1	0.8	A
	Right Turn	146	148	101.3%	8.5	1.0	A
	Subtotal	1,012	993	98.2%	9.0	0.8	A
SB	Left Turn	192	197	102.9%	45.0	1.6	D
	Through	1,083	1,086	100.3%	15.9	0.7	B
	Right Turn						
	Subtotal	1,275	1,284	100.7%	20.4	0.6	C
EB	Left Turn						
	Through						
	Right Turn	1,073	1,033	96.3%	78.4	20.6	E
	Subtotal	1,073	1,033	96.3%	78.4	20.6	E
WB	Left Turn						
	Through						
	Right Turn	287	288	100.2%	9.3	0.3	A
	Subtotal	287	288	100.2%	9.3	0.3	A
Total		3,647	3,598	98.6%	33.0	6.1	C

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	61	57	93.6%	37.0	4.4	D
	Through	749	744	99.3%	16.9	0.8	B
	Right Turn	58	55	95.5%	4.9	1.0	A
	Subtotal	868	856	98.7%	17.4	0.9	B
SB	Left Turn	435	429	98.5%	35.3	1.9	D
	Through	1,428	1,406	98.4%	11.7	1.1	B
	Right Turn	293	279	95.4%	4.8	0.3	A
	Subtotal	2,156	2,114	98.0%	15.6	1.1	B
EB	Left Turn	10	11	112.3%	39.5	7.2	D
	Through	5	6	122.9%	34.6	11.1	C
	Right Turn	8	8	99.6%	17.5	5.5	B
	Subtotal	23	25	110.2%	31.7	6.3	C
WB	Left Turn	62	61	98.2%	28.6	2.9	C
	Through	28	27	95.0%	28.3	4.2	C
	Right Turn	244	241	98.7%	11.3	0.6	B
	Subtotal	334	328	98.3%	15.9	1.0	B
Total		3,381	3,324	98.3%	16.2	0.9	B

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	73	71	96.8%	58.9	6.0	E
	Through	496	494	99.7%	22.1	0.9	C
	Right Turn	147	148	100.4%	6.1	0.9	A
	Subtotal	716	713	99.5%	22.4	0.9	C
SB	Left Turn	111	109	98.6%	62.9	3.2	E
	Through	1,046	1,038	99.2%	21.9	1.8	C
	Right Turn	342	334	97.6%	11.7	0.9	B
	Subtotal	1,499	1,481	98.8%	22.6	1.6	C
EB	Left Turn	218	215	98.6%	53.1	3.2	D
	Through	99	99	99.6%	53.6	5.0	D
	Right Turn	42	43	101.5%	25.9	4.3	C
	Subtotal	359	356	99.2%	50.0	2.7	D
WB	Left Turn	321	299	93.1%	58.0	1.9	E
	Through	252	240	95.2%	59.1	1.9	E
	Right Turn	154	145	94.1%	6.3	0.8	A
	Subtotal	727	683	94.0%	47.4	1.4	D
Total		3,301	3,233	97.9%	30.8	0.8	C

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	0	294	124	9	302	364	2	37	0	66	0	0
Future Volume (veh/h)	0	294	124	9	302	364	2	37	0	66	0	0
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.99		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1874	1900		1900	1863	1900	1845	1845	1900	1900	1900
Adj Flow Rate, veh/h	0	320	113		328	396	2	59	0	0	0	0
Adj No. of Lanes	0	2	0		1	2	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.63	0.63	0.63	0.25	0.25
Percent Heavy Veh, %	0	2	2		0	2	2	3	0	0	0	0
Cap, veh/h	0	1674	580		346	3171	16	128	80	0	53	82
Arrive On Green	0.00	0.65	0.65		0.38	1.00	1.00	0.04	0.00	0.00	0.00	0.00
Sat Flow, veh/h	0	2688	899		1810	3611	18	1732	1845	0	1440	1900
Grp Volume(v), veh/h	0	218	215		328	194	204	59	0	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1780	1713		1810	1770	1860	1732	1845	0	1440	1900
Q Serve(g_s), s	0.0	6.7	6.9		23.7	0.0	0.0	4.6	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	6.9		23.7	0.0	0.0	4.6	0.0	0.0	0.0	0.0
Prop In Lane	0.00		0.52		1.00		0.01	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	0	1149	1106		346	1554	1633	128	80	0	53	82
V/C Ratio(X)	0.00	0.19	0.19		0.95	0.12	0.12	0.46	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1149	1106		609	1554	1633	482	456	0	347	470
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.90	0.90	0.90	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.7	9.7		41.0	0.0	0.0	64.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.4		9.2	0.1	0.1	0.9	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	3.3		12.6	0.1	0.1	2.2	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	10.0	10.1		50.3	0.1	0.1	64.9	0.0	0.0	0.0	0.0
LnGrp LOS		B	B		D	A	A	E				
Approach Vol, veh/h		433				726			59			0
Approach Delay, s/veh		10.1				22.8			64.9			0.0
Approach LOS		B				C			E			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	31.4	93.1		10.5		124.5		10.5
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	45.4	40.0		33.4		91.0		33.4
Max Q Clear Time (g_c+I1), s	25.7	8.9		0.0		2.0		6.6
Green Ext Time (p_c), s	0.1	6.3		0.0		6.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.3
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	1
Future Volume (veh/h)	1
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	0
Adj No. of Lanes	0
Peak Hour Factor	0.25
Percent Heavy Veh, %	0
Cap, veh/h	0
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	0
V/C Ratio(X)	0.00
Avail Cap(c_a), veh/h	0
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	1	60	249	7	26	547	188	43	2	11	40	3
Future Volume (veh/h)	1	60	249	7	26	547	188	43	2	11	40	3
Number		5	2	12	1	6	16	7	4	14	3	8
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1846	1845	1900	1900	1881	1900	1900	1900	1900	1810	1882
Adj Flow Rate, veh/h		63	262	5	29	601	194	55	3	0	48	4
Adj No. of Lanes		1	2	1	1	2	0	1	1	0	1	1
Peak Hour Factor		0.95	0.95	0.95	0.91	0.91	0.91	0.78	0.78	0.78	0.83	0.83
Percent Heavy Veh, %		3	3	0	0	1	1	0	0	0	5	0
Cap, veh/h		81	2725	1254	37	1986	640	71	35	0	61	21
Arrive On Green		0.02	0.26	0.26	0.02	0.75	0.75	0.04	0.02	0.00	0.04	0.01
Sat Flow, veh/h		1758	3505	1613	1810	2659	857	1810	1900	0	1723	1882
Grp Volume(v), veh/h		63	262	5	29	404	391	55	3	0	48	4
Grp Sat Flow(s),veh/h/ln		1758	1752	1613	1810	1787	1729	1810	1900	0	1723	1882
Q Serve(g_s), s		4.8	7.7	0.3	2.2	10.0	10.0	4.1	0.2	0.0	3.7	0.3
Cycle Q Clear(g_c), s		4.8	7.7	0.3	2.2	10.0	10.0	4.1	0.2	0.0	3.7	0.3
Prop In Lane		1.00		1.00	1.00		0.50	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h		81	2725	1254	37	1335	1291	71	35	0	61	21
V/C Ratio(X)		0.78	0.10	0.00	0.79	0.30	0.30	0.77	0.09	0.00	0.78	0.19
Avail Cap(c_a), veh/h		271	2725	1254	101	1335	1291	181	429	0	204	453
HCM Platoon Ratio		0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		65.8	14.0	11.3	65.8	5.6	5.6	64.3	65.1	0.0	64.6	66.2
Incr Delay (d2), s/veh		5.6	0.1	0.0	12.6	0.6	0.6	6.5	0.4	0.0	7.9	1.6
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		2.5	3.8	0.1	1.2	5.0	4.9	2.2	0.1	0.0	1.9	0.2
LnGrp Delay(d),s/veh		71.4	14.1	11.3	78.5	6.2	6.2	70.8	65.5	0.0	72.5	67.8
LnGrp LOS		E	B	B	E	A	A	E	E		E	E
Approach Vol, veh/h			330			824			58			52
Approach Delay, s/veh			25.0			8.7			70.5			72.2
Approach LOS			C			A			E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	111.0	9.8	7.0	11.4	106.8	10.8	6.0
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	7.5	61.0	16.0	30.5	* 21	47.0	13.5	32.5
Max Q Clear Time (g_c+I1), s	4.2	9.7	5.7	2.2	6.8	12.0	6.1	2.3
Green Ext Time (p_c), s	0.0	9.9	0.0	0.0	0.0	9.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	109
Future Volume (veh/h)	109
Number	18
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	0
Adj No. of Lanes	0
Peak Hour Factor	0.83
Percent Heavy Veh, %	0
Cap, veh/h	0
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	0
V/C Ratio(X)	0.00
Avail Cap(c_a), veh/h	0
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	195	42	107	609	152	94	25	207	26	21	36
Future Volume (veh/h)	41	195	42	107	609	152	94	25	207	26	21	36
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1847	1900	1900	1896	1900	1881	1900	1900	1827	1865	1900
Adj Flow Rate, veh/h	51	244	47	123	700	170	115	30	0	59	48	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.82	0.82	0.82	0.44	0.44	0.44
Percent Heavy Veh, %	5	2	2	0	0	0	1	0	0	4	0	0
Cap, veh/h	78	740	143	159	789	192	170	180	0	119	128	0
Arrive On Green	0.04	0.49	0.49	0.09	0.53	0.53	0.09	0.09	0.00	0.07	0.07	0.00
Sat Flow, veh/h	1723	1505	290	1810	1474	358	1792	1900	0	1740	1865	0
Grp Volume(v), veh/h	51	0	291	123	0	870	115	30	0	59	48	0
Grp Sat Flow(s),veh/h/ln	1723	0	1795	1810	0	1832	1792	1900	0	1740	1865	0
Q Serve(g_s), s	2.0	0.0	6.9	4.6	0.0	29.3	4.3	1.0	0.0	2.3	1.7	0.0
Cycle Q Clear(g_c), s	2.0	0.0	6.9	4.6	0.0	29.3	4.3	1.0	0.0	2.3	1.7	0.0
Prop In Lane	1.00		0.16	1.00		0.20	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	78	0	883	159	0	980	170	180	0	119	128	0
V/C Ratio(X)	0.66	0.00	0.33	0.77	0.00	0.89	0.68	0.17	0.00	0.50	0.38	0.00
Avail Cap(c_a), veh/h	618	0	1158	648	0	1182	1027	1089	0	873	936	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.8	0.0	10.7	31.1	0.0	14.4	30.5	29.0	0.0	31.3	31.1	0.0
Incr Delay (d2), s/veh	3.5	0.0	0.2	3.0	0.0	7.8	5.7	0.5	0.0	3.9	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	3.4	2.5	0.0	16.6	2.4	0.6	0.0	1.2	1.0	0.0
LnGrp Delay(d),s/veh	36.3	0.0	11.0	34.1	0.0	22.1	36.2	29.6	0.0	35.3	33.3	0.0
LnGrp LOS	D		B	C		C	D	C		D	C	
Approach Vol, veh/h		342			993			145			107	
Approach Delay, s/veh		14.7			23.6			34.9			34.4	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.6	40.3		9.0	6.6	43.3		10.8
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	6.6	8.9		4.3	4.0	31.3		6.3
Green Ext Time (p_c), s	0.1	8.7		0.5	0.0	6.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	23.5
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	12	231	103	126	0	9	49	17	0	139	55	14
Future Vol, veh/h	12	231	103	126	0	9	49	17	0	139	55	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.92	0.82	0.82	0.82	0.92	0.80	0.80	0.80
Heavy Vehicles, %	0	3	0	4	2	0	2	0	2	1	2	0
Mvmt Flow	13	260	116	142	0	11	60	21	0	174	69	18
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	13.2	11	12.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	80%	0%	100%	0%	0%	74%	0%	37%
Vol Right, %	0%	20%	0%	0%	100%	0%	26%	0%	63%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	139	69	243	103	126	9	66	7	106
LT Vol	139	0	243	0	0	9	0	7	0
Through Vol	0	55	0	103	0	0	49	0	39
RT Vol	0	14	0	0	126	0	17	0	67
Lane Flow Rate	174	86	273	116	142	11	80	8	123
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.349	0.158	0.507	0.2	0.215	0.023	0.157	0.017	0.227
Departure Headway (Hd)	7.239	6.608	6.69	6.236	5.477	7.659	7.001	7.598	6.644
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	495	541	538	574	653	465	509	469	537
Service Time	5.008	4.377	4.448	3.994	3.234	5.442	4.783	5.377	4.422
HCM Lane V/C Ratio	0.352	0.159	0.507	0.202	0.217	0.024	0.157	0.017	0.229
HCM Control Delay	13.9	10.6	16.2	10.6	9.7	10.6	11.1	10.5	11.4
HCM Lane LOS	B	B	C	B	A	B	B	B	B
HCM 95th-tile Q	1.5	0.6	2.8	0.7	0.8	0.1	0.6	0.1	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	7	39	67
Future Vol, veh/h	0	7	39	67
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	0	0	4
Mvmt Flow	0	8	45	78
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	11.3
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	394	0	102	58	331	0	0	272	431
Future Volume (veh/h)	0	0	0	394	0	102	58	331	0	0	272	431
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1863	1863	0	0	1881	1881
Adj Flow Rate, veh/h				453	0	17	75	430	0	0	292	80
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.87	0.87	0.87	0.77	0.77	0.77	0.93	0.93	0.93
Percent Heavy Veh, %				2	2	2	2	2	0	0	1	1
Cap, veh/h				760	0	338	206	1577	0	0	772	344
Arrive On Green				0.21	0.00	0.21	0.12	0.45	0.00	0.00	0.22	0.22
Sat Flow, veh/h				3548	0	1579	1774	3632	0	0	3668	1592
Grp Volume(v), veh/h				453	0	17	75	430	0	0	292	80
Grp Sat Flow(s),veh/h/ln				1774	0	1579	1774	1770	0	0	1787	1592
Q Serve(g_s), s				4.3	0.0	0.3	1.4	2.8	0.0	0.0	2.6	1.5
Cycle Q Clear(g_c), s				4.3	0.0	0.3	1.4	2.8	0.0	0.0	2.6	1.5
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				760	0	338	206	1577	0	0	772	344
V/C Ratio(X)				0.60	0.00	0.05	0.36	0.27	0.00	0.00	0.38	0.23
Avail Cap(c_a), veh/h				2874	0	1279	1197	4778	0	0	4825	2149
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				13.1	0.0	11.6	15.1	6.5	0.0	0.0	12.4	12.0
Incr Delay (d2), s/veh				0.3	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.1	0.0	0.1	0.7	1.4	0.0	0.0	1.3	0.7
LnGrp Delay(d),s/veh				13.4	0.0	11.6	15.5	6.5	0.0	0.0	12.5	12.1
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					470			505			372	
Approach Delay, s/veh					13.3			7.9			12.4	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		23.3			8.5	14.8		13.7
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		4.8			3.4	4.6		6.3
Green Ext Time (p_c), s		1.5			0.1	1.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	79	19	119	310	547	119
Future Volume (veh/h)	79	19	119	310	547	119
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1881	1881	1863	1863
Adj Flow Rate, veh/h	84	1	159	413	629	29
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.94	0.94	0.75	0.75	0.87	0.87
Percent Heavy Veh, %	5	5	1	1	2	2
Cap, veh/h	428	191	590	1961	955	426
Arrive On Green	0.12	0.12	0.17	0.55	0.27	0.27
Sat Flow, veh/h	3447	1538	3476	3668	3632	1577
Grp Volume(v), veh/h	84	1	159	413	629	29
Grp Sat Flow(s),veh/h/ln	1723	1538	1738	1787	1770	1577
Q Serve(g_s), s	0.8	0.0	1.5	2.3	6.1	0.5
Cycle Q Clear(g_c), s	0.8	0.0	1.5	2.3	6.1	0.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	428	191	590	1961	955	426
V/C Ratio(X)	0.20	0.01	0.27	0.21	0.66	0.07
Avail Cap(c_a), veh/h	2238	999	2708	4641	4596	2048
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	14.8	13.9	4.4	12.5	10.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.7	1.1	3.0	0.2
LnGrp Delay(d),s/veh	15.2	14.8	14.0	4.5	12.8	10.5
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	85			572	658	
Approach Delay, s/veh	15.2			7.1	12.7	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		27.9		10.6	10.7	17.2		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		4.3		2.8	3.5	8.1		
Green Ext Time (p_c), s		2.3		0.1	0.3	2.3		

Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	123	114	93.0%	45.2	3.1	D
	Through	1,228	1,180	96.1%	18.8	1.7	B
	Right Turn	69	68	98.1%	14.1	2.4	B
	Subtotal	1,420	1,362	95.9%	20.8	1.8	C
SB	Left Turn	139	135	97.4%	40.7	2.9	D
	Through	761	737	96.9%	16.4	1.1	B
	Right Turn	26	25	95.3%	11.8	2.7	B
	Subtotal	926	897	96.9%	20.0	1.4	B
EB	Left Turn	46	46	100.6%	40.1	3.9	D
	Through	22	22	98.2%	40.9	4.7	D
	Right Turn	85	82	96.2%	7.4	0.8	A
	Subtotal	153	150	97.8%	22.3	2.2	C
WB	Left Turn	55	50	90.8%	32.6	2.5	C
	Through	19	17	90.9%	34.3	8.8	C
	Right Turn	260	253	97.3%	15.4	1.6	B
	Subtotal	334	320	95.9%	19.1	1.5	B
Total		2,833	2,729	96.3%	20.4	1.2	C

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	994	953	95.9%	49.4	3.1	D
	Through	1,221	1,162	95.2%	19.2	0.9	B
	Right Turn	279	267	95.8%	15.9	1.5	B
	Subtotal	2,494	2,382	95.5%	30.9	1.7	C
SB	Left Turn	38	39	102.1%	77.9	8.7	E
	Through	537	501	93.2%	43.0	3.1	D
	Right Turn	330	326	98.7%	25.7	1.5	C
	Subtotal	905	865	95.6%	38.1	1.9	D
EB	Left Turn	125	121	97.1%	51.3	2.4	D
	Through	58	55	95.3%	54.5	7.2	D
	Right Turn	172	168	97.5%	2.5	0.5	A
	Subtotal	355	344	97.0%	28.0	2.6	C
WB	Left Turn	167	164	98.2%	58.9	2.6	E
	Through	60	58	97.1%	56.6	5.0	E
	Right Turn	74	72	96.8%	9.1	1.6	A
	Subtotal	301	294	97.7%	46.3	1.5	D
Total		4,055	3,885	95.8%	33.4	1.4	C

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	1,747	1,641	93.9%	20.9	2.7	C
	Right Turn	455	422	92.7%	27.9	4.4	C
	Subtotal	2,202	2,063	93.7%	22.4	3.0	C
SB	Left Turn	194	185	95.5%	42.9	1.3	D
	Through	683	651	95.3%	8.8	0.5	A
	Right Turn						
	Subtotal	877	836	95.4%	16.4	0.9	B
EB	Left Turn						
	Through						
	Right Turn	705	675	95.8%	24.8	3.2	C
	Subtotal	705	675	95.8%	24.8	3.2	C
WB	Left Turn						
	Through						
	Right Turn	746	717	96.1%	14.7	0.5	B
	Subtotal	746	717	96.1%	14.7	0.5	B
Total		4,530	4,291	94.7%	20.3	1.5	C

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	4	3	81.6%	75.8	18.8	E
	Through	1,323	1,251	94.6%	82.7	13.9	F
	Right Turn	79	78	99.2%	7.9	1.8	A
	Subtotal	1,406	1,333	94.8%	78.2	12.9	E
SB	Left Turn	478	459	96.0%	61.3	9.1	E
	Through	897	862	96.1%	16.7	2.1	B
	Right Turn	13	12	94.5%	2.4	0.6	A
	Subtotal	1,388	1,333	96.0%	32.0	4.6	C
EB	Left Turn	300	281	93.7%	64.0	11.3	E
	Through	24	23	96.0%	41.6	6.5	D
	Right Turn	89	88	98.8%	12.2	1.7	B
	Subtotal	413	392	95.0%	51.0	7.2	D
WB	Left Turn	63	60	94.6%	47.8	3.8	D
	Through	3	3	102.4%	49.1	24.0	D
	Right Turn	573	541	94.4%	24.1	1.5	C
	Subtotal	639	603	94.4%	26.6	1.4	C
Total		3,846	3,661	95.2%	50.0	5.4	D

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	63	61	97.4%	44.3	6.2	D
	Through	858	827	96.3%	28.6	1.9	C
	Right Turn	309	298	96.6%	14.1	1.7	B
	Subtotal	1,230	1,186	96.5%	25.8	1.6	C
SB	Left Turn	226	220	97.2%	41.8	1.9	D
	Through	597	574	96.1%	20.7	0.9	C
	Right Turn	225	216	96.2%	8.5	0.6	A
	Subtotal	1,048	1,010	96.4%	22.7	1.0	C
EB	Left Turn	350	334	95.6%	39.5	1.6	D
	Through	301	288	95.7%	32.0	1.7	C
	Right Turn	106	97	91.7%	20.2	2.7	C
	Subtotal	757	720	95.1%	33.9	1.2	C
WB	Left Turn	171	167	97.6%	37.8	2.1	D
	Through	146	139	95.5%	37.7	3.2	D
	Right Turn	195	190	97.5%	6.3	1.5	A
	Subtotal	512	496	97.0%	25.7	1.4	C
Total		3,547	3,412	96.2%	26.6	0.7	C

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	0	527	68	19	89	397	6	1	231	0	234	0
Future Volume (veh/h)	0	527	68	19	89	397	6	1	231	0	234	0
Number	5	2	12		1	6	16		3	8	18	7
Initial Q (Qb), veh	0	0	0		0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		0.98		1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1883	1900		1884	1900	1900		1900	1881	1900	1900
Adj Flow Rate, veh/h	0	549	66		94	418	5		278	0	21	0
Adj No. of Lanes	0	2	0		1	2	0		1	1	0	1
Peak Hour Factor	0.96	0.96	0.96		0.95	0.95	0.95		0.83	0.83	0.83	0.25
Percent Heavy Veh, %	0	1	1		1	0	0		0	0	0	0
Cap, veh/h	0	2084	250		116	2754	33		355	0	267	53
Arrive On Green	0.00	0.65	0.65		0.06	0.75	0.75		0.17	0.00	0.17	0.00
Sat Flow, veh/h	0	3312	386		1795	3652	44		1803	0	1593	1413
Grp Volume(v), veh/h	0	305	310		94	206	217		278	0	21	0
Grp Sat Flow(s),veh/h/ln	0	1789	1815		1795	1805	1891		1803	0	1593	1413
Q Serve(g_s), s	0.0	9.8	9.8		7.0	4.3	4.3		20.5	0.0	1.5	0.0
Cycle Q Clear(g_c), s	0.0	9.8	9.8		7.0	4.3	4.3		20.5	0.0	1.5	0.0
Prop In Lane	0.00		0.21		1.00		0.02		1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1159	1175		116	1361	1426		355	0	267	53
V/C Ratio(X)	0.00	0.26	0.26		0.81	0.15	0.15		0.78	0.00	0.08	0.00
Avail Cap(c_a), veh/h	0	1159	1175		271	1361	1426		793	0	654	396
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.90	0.90	0.90		1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	10.1	10.1		62.3	4.6	4.6		55.3	0.0	47.4	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.5		4.5	0.2	0.2		1.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.0	5.1		3.6	2.2	2.3		10.3	0.0	0.7	0.0
LnGrp Delay(d),s/veh	0.0	10.6	10.7		66.8	4.8	4.8		56.7	0.0	47.5	0.0
LnGrp LOS		B	B		E	A	A		E		D	
Approach Vol, veh/h		615				517				299		
Approach Delay, s/veh		10.6				16.1				56.1		
Approach LOS		B				B				E		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	14.3	93.4		27.2		107.8		27.2
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	20.4	43.0		55.4		69.0		55.4
Max Q Clear Time (g_c+I1), s	9.0	11.8		0.0		6.3		22.5
Green Ext Time (p_c), s	0.0	8.2		0.0		9.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	0	0
Future Volume (veh/h)	0	0
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900
Adj Flow Rate, veh/h	0	0
Adj No. of Lanes	1	0
Peak Hour Factor	0.25	0.25
Percent Heavy Veh, %	0	0
Cap, veh/h	318	0
Arrive On Green	0.00	0.00
Sat Flow, veh/h	1900	0
Grp Volume(v), veh/h	0	0
Grp Sat Flow(s),veh/h/ln	1900	0
Q Serve(g_s), s	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0
Prop In Lane		0.00
Lane Grp Cap(c), veh/h	318	0
V/C Ratio(X)	0.00	0.00
Avail Cap(c_a), veh/h	780	0
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.0
LnGrp LOS		
Approach Vol, veh/h	0	
Approach Delay, s/veh	0.0	
Approach LOS		
Timer		

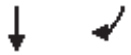
User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (veh/h)	2	154	712	14	30	357	146	55	12	27	1	167
Future Volume (veh/h)	2	154	712	14	30	357	146	55	12	27	1	167
Number		5	2	12	1	6	16	7	4	14		3
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0		0
Ped-Bike Adj(A_pbT)		1.00		0.98	1.00		0.98	1.00		1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Adj Sat Flow, veh/h/ln		1900	1881	1900	1900	1887	1900	1863	1900	1900		1900
Adj Flow Rate, veh/h		167	774	10	37	435	150	65	14	0		186
Adj No. of Lanes		1	2	1	1	2	0	1	1	0		1
Peak Hour Factor		0.92	0.92	0.92	0.82	0.82	0.82	0.84	0.84	0.84		0.90
Percent Heavy Veh, %		0	1	0	0	1	1	2	0	0		0
Cap, veh/h		191	2502	1104	48	1605	548	83	17	0		210
Arrive On Green		0.11	0.70	0.70	0.03	0.62	0.62	0.05	0.01	0.00		0.12
Sat Flow, veh/h		1810	3574	1577	1810	2608	890	1774	1900	0		1810
Grp Volume(v), veh/h		167	774	10	37	298	287	65	14	0		186
Grp Sat Flow(s),veh/h/ln		1810	1787	1577	1810	1792	1705	1774	1900	0		1810
Q Serve(g_s), s		12.3	11.2	0.3	2.7	10.3	10.5	4.9	1.0	0.0		13.7
Cycle Q Clear(g_c), s		12.3	11.2	0.3	2.7	10.3	10.5	4.9	1.0	0.0		13.7
Prop In Lane		1.00		1.00	1.00		0.52	1.00		0.00		1.00
Lane Grp Cap(c), veh/h		191	2502	1104	48	1103	1049	83	17	0		210
V/C Ratio(X)		0.87	0.31	0.01	0.78	0.27	0.27	0.78	0.80	0.00		0.88
Avail Cap(c_a), veh/h		252	2502	1104	74	1103	1049	177	317	0		295
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Upstream Filter(I)		0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	0.00		1.00
Uniform Delay (d), s/veh		59.5	7.8	6.1	65.3	12.0	12.0	63.7	66.8	0.0		58.8
Incr Delay (d2), s/veh		17.4	0.3	0.0	9.9	0.6	0.6	6.0	26.1	0.0		16.0
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
%ile BackOfQ(50%),veh/ln		7.0	5.6	0.1	1.5	5.3	5.1	2.5	0.6	0.0		7.8
LnGrp Delay(d),s/veh		76.9	8.1	6.1	75.2	12.6	12.7	69.7	92.9	0.0		74.7
LnGrp LOS		E	A	A	E	B	B	E	F			E
Approach Vol, veh/h			951			622			79			
Approach Delay, s/veh			20.1			16.3			73.8			
Approach LOS			C			B			E			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	100.5	20.7	5.7	19.5	89.1	11.8	14.6
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	5.5	65.0	22.0	22.5	* 19	51.0	13.5	30.5
Max Q Clear Time (g_c+I1), s	4.7	13.2	15.7	3.0	14.3	12.5	6.9	3.5
Green Ext Time (p_c), s	0.0	14.6	0.0	0.0	0.0	13.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.0
HCM 2010 LOS	C

Notes



Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	20	172
Future Volume (veh/h)	20	172
Number	8	18
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1883	1900
Adj Flow Rate, veh/h	22	0
Adj No. of Lanes	1	0
Peak Hour Factor	0.90	0.90
Percent Heavy Veh, %	0	0
Cap, veh/h	141	0
Arrive On Green	0.08	0.00
Sat Flow, veh/h	1883	0
Grp Volume(v), veh/h	22	0
Grp Sat Flow(s),veh/h/ln	1883	0
Q Serve(g_s), s	1.5	0.0
Cycle Q Clear(g_c), s	1.5	0.0
Prop In Lane		0.00
Lane Grp Cap(c), veh/h	141	0
V/C Ratio(X)	0.16	0.00
Avail Cap(c_a), veh/h	425	0
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	0.00
Uniform Delay (d), s/veh	58.4	0.0
Incr Delay (d2), s/veh	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0
LnGrp Delay(d),s/veh	58.6	0.0
LnGrp LOS	E	
Approach Vol, veh/h	208	
Approach Delay, s/veh	73.0	
Approach LOS	E	
Timer		

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	544	132	132	343	224	60	50	115	287	65	70
Future Volume (veh/h)	58	544	132	132	343	224	60	50	115	287	65	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1896	1900	1900	1900	1900	1900	1900	1900	1881	1900	1900
Adj Flow Rate, veh/h	68	640	150	150	390	243	62	52	58	299	68	49
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.97	0.97	0.97	0.96	0.96	0.96
Percent Heavy Veh, %	5	0	0	0	0	0	0	0	0	1	0	0
Cap, veh/h	87	640	150	182	522	325	161	73	81	373	209	151
Arrive On Green	0.05	0.43	0.43	0.10	0.48	0.48	0.09	0.09	0.09	0.21	0.21	0.21
Sat Flow, veh/h	1723	1486	348	1810	1086	676	1810	816	911	1792	1004	723
Grp Volume(v), veh/h	68	0	790	150	0	633	62	0	110	299	0	117
Grp Sat Flow(s),veh/h/ln	1723	0	1834	1810	0	1762	1810	0	1727	1792	0	1727
Q Serve(g_s), s	4.1	0.0	45.0	8.5	0.0	30.4	3.4	0.0	6.5	16.6	0.0	6.0
Cycle Q Clear(g_c), s	4.1	0.0	45.0	8.5	0.0	30.4	3.4	0.0	6.5	16.6	0.0	6.0
Prop In Lane	1.00		0.19	1.00		0.38	1.00		0.53	1.00		0.42
Lane Grp Cap(c), veh/h	87	0	790	182	0	847	161	0	154	373	0	360
V/C Ratio(X)	0.78	0.00	1.00	0.82	0.00	0.75	0.39	0.00	0.72	0.80	0.00	0.33
Avail Cap(c_a), veh/h	412	0	790	433	0	847	693	0	661	600	0	579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.0	0.0	29.7	46.1	0.0	22.0	44.9	0.0	46.3	39.3	0.0	35.1
Incr Delay (d2), s/veh	5.6	0.0	32.0	3.6	0.0	3.9	1.9	0.0	7.5	5.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	29.6	4.4	0.0	15.7	1.8	0.0	3.4	8.7	0.0	2.9
LnGrp Delay(d),s/veh	54.6	0.0	61.8	49.6	0.0	25.8	46.8	0.0	53.8	44.3	0.0	35.8
LnGrp LOS	D		F	D		C	D		D	D		D
Approach Vol, veh/h		858			783			172			416	
Approach Delay, s/veh		61.2			30.4			51.3			41.9	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	51.0		26.0	8.8	56.2		13.5
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	10.5	47.0		18.6	6.1	32.4		8.5
Green Ext Time (p_c), s	0.2	0.0		2.0	0.1	6.4		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	46.0
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	47.9
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	7	325	210	143	0	22	176	18	0	177	100	45
Future Vol, veh/h	7	325	210	143	0	22	176	18	0	177	100	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	3	2	0	0	0	2	1	0	0
Mvmt Flow	8	361	233	159	0	25	198	20	0	199	112	51
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	48.3	28.2	24.4
HCM LOS	E	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	69%	0%	100%	0%	0%	91%	0%	29%
Vol Right, %	0%	31%	0%	0%	100%	0%	9%	0%	71%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	177	145	332	210	143	22	194	16	414
LT Vol	177	0	332	0	0	22	0	16	0
Through Vol	0	100	0	210	0	0	176	0	119
RT Vol	0	45	0	0	143	0	18	0	295
Lane Flow Rate	199	163	369	233	159	25	218	17	445
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.589	0.449	0.994	0.596	0.375	0.075	0.633	0.051	1
Departure Headway (Hd)	10.662	9.93	9.702	9.203	8.505	11.075	10.458	10.59	9.572
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	340	363	376	392	424	326	347	338	378
Service Time	8.403	7.671	7.444	6.945	6.247	8.775	8.214	8.36	7.342
HCM Lane V/C Ratio	0.585	0.449	0.981	0.594	0.375	0.077	0.628	0.05	1.177
HCM Control Delay	27.6	20.5	77.1	24.7	16.3	14.7	29.7	13.9	78.2
HCM Lane LOS	D	C	F	C	C	B	D	B	F
HCM 95th-tile Q	3.6	2.2	11.6	3.7	1.7	0.2	4.1	0.2	11.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	16	119	295
Future Vol, veh/h	0	16	119	295
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	0	1	0
Mvmt Flow	0	17	128	317
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	75.8
HCM LOS	F

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	250	0	151	52	890	0	0	187	170
Future Volume (veh/h)	0	0	0	250	0	151	52	890	0	0	187	170
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				278	0	35	56	957	0	0	215	24
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.93	0.93	0.93	0.87	0.87	0.87
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				772	0	343	173	1572	0	0	805	359
Arrive On Green				0.21	0.00	0.21	0.10	0.44	0.00	0.00	0.22	0.22
Sat Flow, veh/h				3619	0	1611	1810	3705	0	0	3705	1608
Grp Volume(v), veh/h				278	0	35	56	957	0	0	215	24
Grp Sat Flow(s),veh/h/ln				1810	0	1611	1810	1805	0	0	1805	1608
Q Serve(g_s), s				2.3	0.0	0.6	1.0	7.3	0.0	0.0	1.8	0.4
Cycle Q Clear(g_c), s				2.3	0.0	0.6	1.0	7.3	0.0	0.0	1.8	0.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				772	0	343	173	1572	0	0	805	359
V/C Ratio(X)				0.36	0.00	0.10	0.32	0.61	0.00	0.00	0.27	0.07
Avail Cap(c_a), veh/h				3027	0	1347	1261	5032	0	0	5032	2241
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				12.0	0.0	11.3	15.1	7.8	0.0	0.0	11.5	11.0
Incr Delay (d2), s/veh				0.1	0.0	0.0	0.4	0.1	0.0	0.0	0.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.2	0.0	0.3	0.5	3.6	0.0	0.0	0.9	0.2
LnGrp Delay(d),s/veh				12.1	0.0	11.4	15.5	7.9	0.0	0.0	11.6	11.0
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					313			1013			239	
Approach Delay, s/veh					12.0			8.3			11.5	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		22.4			7.6	14.8		13.4
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		9.3			3.0	3.8		4.3
Green Ext Time (p_c), s		2.7			0.0	2.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	433	46	308	509	350	87
Future Volume (veh/h)	433	46	308	509	350	87
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	487	10	335	553	368	15
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.89	0.89	0.92	0.92	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	699	312	660	1822	779	347
Arrive On Green	0.19	0.19	0.19	0.50	0.22	0.22
Sat Flow, veh/h	3619	1615	3510	3705	3705	1608
Grp Volume(v), veh/h	487	10	335	553	368	15
Grp Sat Flow(s),veh/h/ln	1810	1615	1755	1805	1805	1608
Q Serve(g_s), s	5.2	0.2	3.6	3.7	3.7	0.3
Cycle Q Clear(g_c), s	5.2	0.2	3.6	3.7	3.7	0.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	699	312	660	1822	779	347
V/C Ratio(X)	0.70	0.03	0.51	0.30	0.47	0.04
Avail Cap(c_a), veh/h	2171	969	2527	4330	4330	1928
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.7	13.7	15.2	6.0	14.3	12.9
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.2	1.7	1.9	1.9	0.1
LnGrp Delay(d),s/veh	16.2	13.7	15.4	6.1	14.4	13.0
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	497			888	383	
Approach Delay, s/veh	16.1			9.6	14.4	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		27.8		13.8	12.0	15.8		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		5.7		7.2	5.6	5.7		
Green Ext Time (p_c), s		2.0		0.8	0.6	2.0		

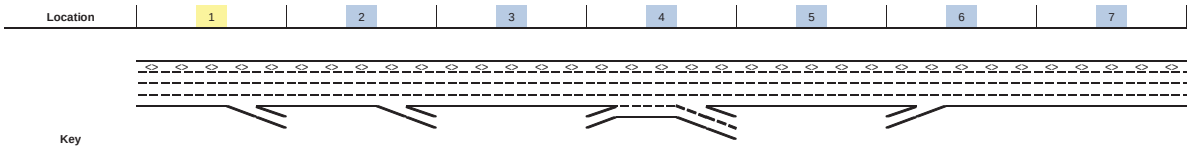
Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

APPENDIX A.2:
TECHNICAL CALCULATIONS –
EXISTING CONDITIONS
FREEWAY LOS

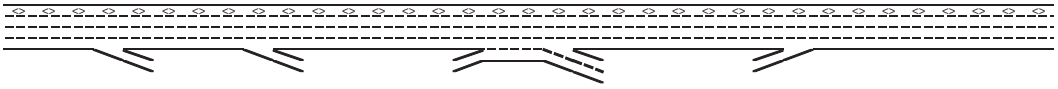
Project: EDH Town Center Apartments EIR **Alternative:** Existing Conditions
Freeway Corridor: Eastbound US 50 **Time Period:** AM Peak Hour



Key
<> Express Lane (HOV)
No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	2,560	1,487	1,200	1,200	1,440	1,440	1,678
On Ramp Volume				338		238	
Off Ramp Volume	1,073	287		98			
Express Lane Volume	128	74	60	60	72	72	84
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	2,432	1,413	1,140	1,478	1,368	1,606	1,594
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.980	0.980	0.980	0.980	0.980	0.980	0.862
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,851	1,656	1,337	1,733	1,604	1,883	2,125
GP Flow (pcphpl)	950	552	446	433	535	628	708
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.40	0.23	0.19	0.18	0.23	0.27	0.30
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	14.6	8.5	6.9	6.7	8.2	9.7	10.9
LOS	B	A	A	A	A	A	A
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				1,362		1,620	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.19		0.23	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	1,673	1,341		1,626			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.24	0.19		0.23			
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	128	74	60	60	72	72	84
PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	166	96	78	78	93	93	117

Location	1	2	3	4	5	6	7



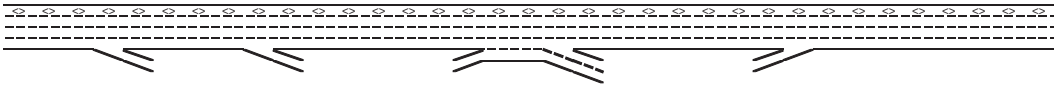
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
EL Flow (pcphpl)	166	96	78	78	93	93	117
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.09	0.06	0.04	0.04	0.05	0.05	0.07
Calculate On Ramp Flow Rate							
On Volume (vph)				338		238	
PHF				0.92		0.92	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				2.0%		3.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.990		0.985	
f_P				1.00		1.00	
On Flow (pcph)				371		263	
On Flow (pcphpl)				371		263	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.18		0.14	
Calculate Off Ramp Flow Rate							
Off Volume (vph)	1,073	287		98			
PHF	0.92	0.92		0.94			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	2.0%	2.0%		5.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.990	0.990		0.976			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	1,178	315		107			
Off Flow (pcphpl)	1,178	315		53			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.56	0.17		0.03			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		1,178					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	315	371				193	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						1,620	

Location	1	2	3	4	5	6	7



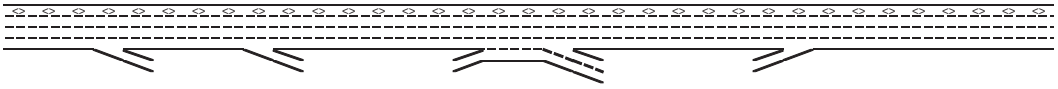
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						1,148	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.646						
P_{FM}						0.593	
v_{12} (pcph)						961	
v_3 (pcph)						660	
v_{34} (pcph)							
v_{12a} (pcph)						961	
v_{R12a} (pcph)						1,223	
Merge Speed Index						0.31	
Merge Area Speed						57.9	
Outer Lanes Volume						660	
Outer Lanes Speed						64.4	
Segment Speed						60.1	
Merge v/c ratio						0.27	
Merge Density						11.4	
Merge LOS						B	
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	2,851	1,656					
Up Ramp L_{EQ}		13,835					
Down Ramp L_{EQ}	505	378					
P_{FD} (Eqn 13-9)	0.635	0.704					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.602						
P_{FD}	0.635	0.704					
v_{12} (pcph)	2,240	1,259					
v_3 (pcph)	612	397					
v_{34} (pcph)							
v_{12a} (pcph)	2,240	1,259					
Diverge Speed Index	0.40	0.59					
Diverge Area Speed	55.7	51.5					
Outer Lanes Volume	612	397					
Outer Lanes Speed	71.3	71.3					
Segment Speed	58.4	55.2					
Diverge v/c ratio	0.51	0.29					
Diverge Density	22.2	13.7					
Diverge LOS	C	B					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				68			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				3.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.983			
f_P				1.00			
On to Off Flow (pcph)				79			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				270			
PHF				0.92			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				2.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.990			
f_P				1.00			
On to ML Flow (pcph)				297			

Location	1	2	3	4	5	6	7



Key

<> Express Lane (HOV)

No Trucks

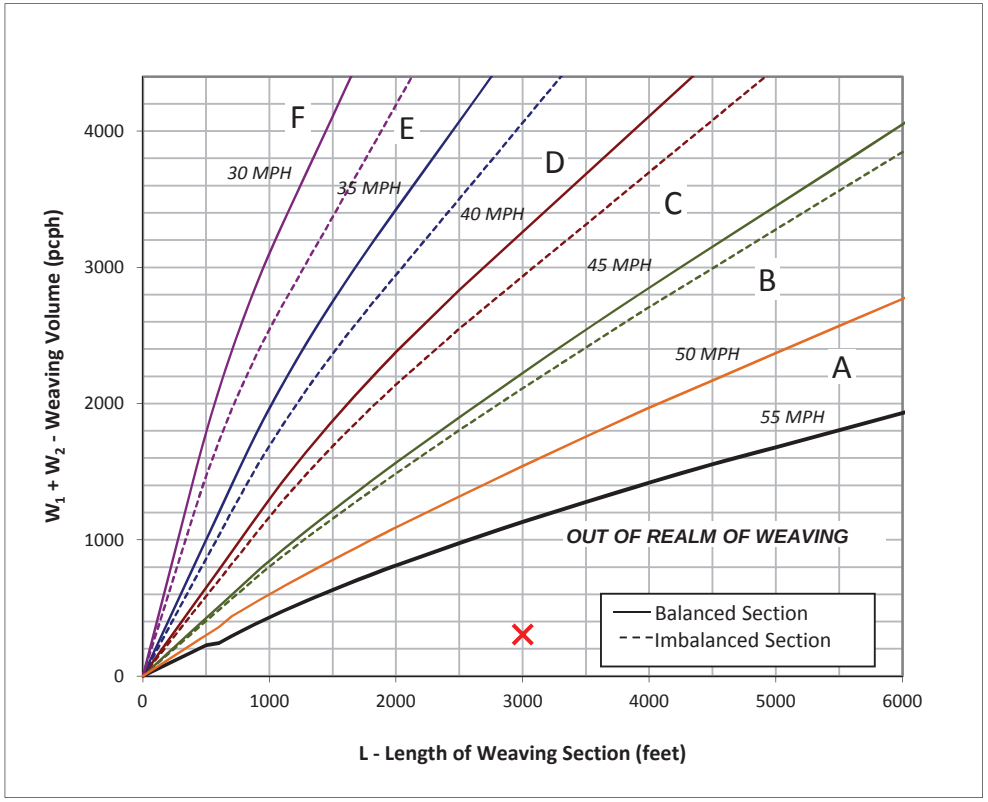
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				30			
PHF				0.94			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				5.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.976			
f_P				1.00			
ML to Off Flow (pcph)				33			
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				1,110			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				4.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.980			
f_P				1.00			
GP to GP Flow (pcph)				1,301			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				330			
Non-Weave Flow				1,380			
Segment Flow				1,710			
Max Weave Length				4,465			
Length Check				OK			
Ideal Weave Capacity				2,161			
f_{HV}				0.982			
f_P				0.998			
Capacity Condition 1				6,357			
Capacity Condition 2				12,192			
Weave v/c ratio				0.26			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				297			
Weave LC Rate				930			
Non-Weave LC Rate 1				790			
Non-Weave LC Rate 2				1,997			
Non-Weave LC Rate 3				-598			
Segment LC Rate				1,721			
Weave Intensity Factor				0.201			
Weave Speed				56.6			
Non-Weave Speed				60.1			
Segment Speed				59.4			
Weave Density				9.6			
Weave LOS				A			
Summarize Segment Operations							
Segment v/c ratio	0.51	0.29	0.19	0.26	0.23	0.27	0.30
Segment Density	22.2	13.7	6.9	9.6	8.2	11.4	10.9
Segment LOS	C	B	A	A	A	B	A
Over Capacity							

Leisch Method for Weaving Analysis

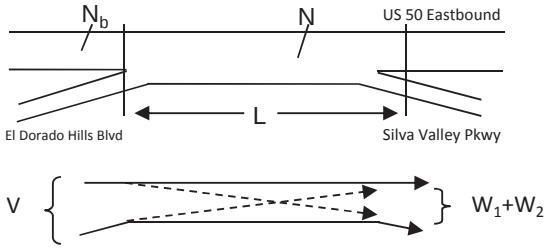
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Existing AM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	1,538	Volume (vph)*	270	Volume (vph)*	30
Truck Percentage	4%	Truck Percentage	2%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	1,569	Volume (pcph)	273	Volume (pcph)	31



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

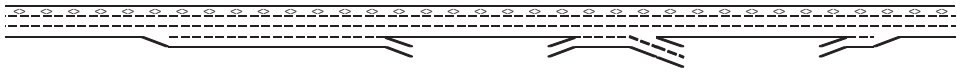
* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Existing Conditions
Freeway Corridor: Westbound US 50 **Time Period:** AM Peak Hour

Data Entry Value
Calculated Value

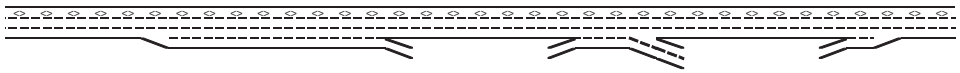
Location	8	9	10	11	12	13	14



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segment							
Type	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length							880
Decel Length			1,500				
Mainline Volume	3,798	3,798	3,798	3,302	3,302	3,253	3,253
On Ramp Volume					489		1,223
Off Ramp Volume			496		538		
Express Lane Volume	418	418	418	363	363	358	358
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	3,380	3,380	3,380	2,939	3,428	2,895	4,118
PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
GP Lanes	2	3	3	2	3	2	2
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.995
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	3,614	3,614	3,614	3,142	3,665	3,095	4,403
GP Flow (pcphpl)	1,807	1,205	1,205	1,571	1,222	1,548	2,201
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.77	0.51	0.51	0.67	0.52	0.66	0.94
Speed (mph)	62.7	65.0	65.0	64.6	65.0	64.7	55.9
Density (pcphpl)	28.8	18.5	18.5	24.3	18.8	23.9	39.4
LOS	D	C	C	C	C	C	E
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)		3,614			3,139		3,060
GP_{IN} Cap (pcph)		4,700			4,700		4,700
GP_{IN} v/c ratio		0.77			0.67		0.65
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)			3,038		3,074		
GP_{OUT} Cap (pcph)			4,700		4,700		
GP_{OUT} v/c ratio			0.65		0.65		
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	418	418	418	363	363	358	358
PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Express Lanes	1	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	474	474	474	412	412	406	406
EL Flow (pcphpl)	474	474	474	412	412	406	406
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							

Location	8	9	10	11	12	13	14



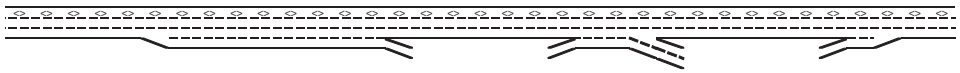
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.27	0.27	0.27	0.24	0.24	0.23	0.23
Calculate On Ramp Flow Rate							
On Volume (vph)					489		1,223
PHF					0.93		0.92
Total Lanes					1		1
Terrain					Level		Level
Grade %					0.0%		0.0%
Grade Length (mi)					0.00		0.00
Truck & Bus %					0.0%		2.0%
RV %					0.0%		0.0%
E_T					1.5		1.5
E_R					1.2		1.2
f_{HV}					1.000		0.990
f_P					1.00		1.00
On Flow (pcph)					526		1,343
On Flow (pcphpl)					526		1,343
Calculate On Ramp Roadway Operations							
On Ramp Type					Right		Right
On Ramp Speed (mph)					45		45
On Ramp Cap (pcph)					2,100		2,100
On Ramp v/c ratio					0.25		0.64
Calculate Off Ramp Flow Rate							
Off Volume (vph)			496		538		
PHF			0.87		0.92		
Total Lanes			1		2		
Terrain			Level		Level		
Grade %			0.0%		0.0%		
Grade Length (mi)			0.00		0.00		
Truck & Bus %			2.0%		2.0%		
RV %			0.0%		0.0%		
E_T			1.5		1.5		
E_R			1.2		1.2		
f_{HV}			0.990		0.990		
f_P			1.00		1.00		
Off Flow (pcph)			576		591		
Off Flow (pcphpl)			576		295		
Calculate Off Ramp Roadway Operations							
Off Ramp Type			Right		Right		
Off Ramp Speed			45		25		
Off Ramp Cap (pcph)			2,100		3,800		
Off Ramp v/c ratio			0.27		0.16		
Determine Adjacent Ramp for Three-Lane Mainline							
Up Type			On		Off		
Up Distance			5,200		2,550		
Up Flow (pcph)			832		576		
Down Type			On		No		
Down Distance			1,500				
Down Flow (pcph)			1,343				
Calculate Merge Influence Area Operations							
Effective v_P (pcph)							3,060
Up Ramp L_{EQ}							
Down Ramp L_{EQ}							
P_{FM} (Eqn 13-3)							0.602
P_{FM} (Eqn 13-4)					#VALUE!		
P_{FM} (Eqn 13-5)							
P_{FM}							1.000
v_{12} (pcph)							3,060
v_3 (pcph)							
v_{34} (pcph)							
v_{12a} (pcph)							3,060

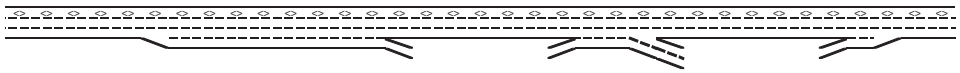
Location	8	9	10	11	12	13	14



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
v_{R12a} (pcph)							4,403
Merge Speed Index							0.56
Merge Area Speed							52.1
Outer Lanes Volume							
Outer Lanes Speed							
Segment Speed							52.1
Merge v/c ratio							0.96
Merge Density							33.7
Merge LOS							D
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)			3,614				
Up Ramp L_{EQ}			7,538				
Down Ramp L_{EQ}			1,634				
P_{FD} (Eqn 13-9)			0.643				
P_{FD} (Eqn 13-10)			0.673				
P_{FD} (Eqn 13-11)							
P_{FD}			0.673				
v_{12} (pcph)			2,620				
v_3 (pcph)			994				
v_{34} (pcph)							
v_{12a} (pcph)			2,620				
Diverge Speed Index			0.35				
Diverge Area Speed			57.0				
Outer Lanes Volume			994				
Outer Lanes Speed			71.3				
Segment Speed			60.3				
Diverge v/c ratio			0.60				
Diverge Density			13.3				
Diverge LOS			B				
Calculate On Ramp to Off Ramp Flow Rate for Weav							
On to Off Volume (vph)					91		
PHF					0.94		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					1.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.995		
f_P					1.00		
On to Off Flow (pcph)					98		
Calculate On Ramp to Mainline Flow Rate for Weav							
On to ML Volume (vph)					398		
PHF					0.93		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					0.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					1.000		
f_P					1.00		
On to ML Flow (pcph)					427		
Calculate Mainline to Off Ramp Flow Rate for Weav							
ML to Off Volume (vph)					447		
PHF					0.92		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					2.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.990		
f_P					1.00		
ML to Off Flow (pcph)					490		
Calculate General Purpose Lanes to General Purpo							

Location	8	9	10	11	12	13	14



Key
<> Express Lane (HOV)
No Trucks

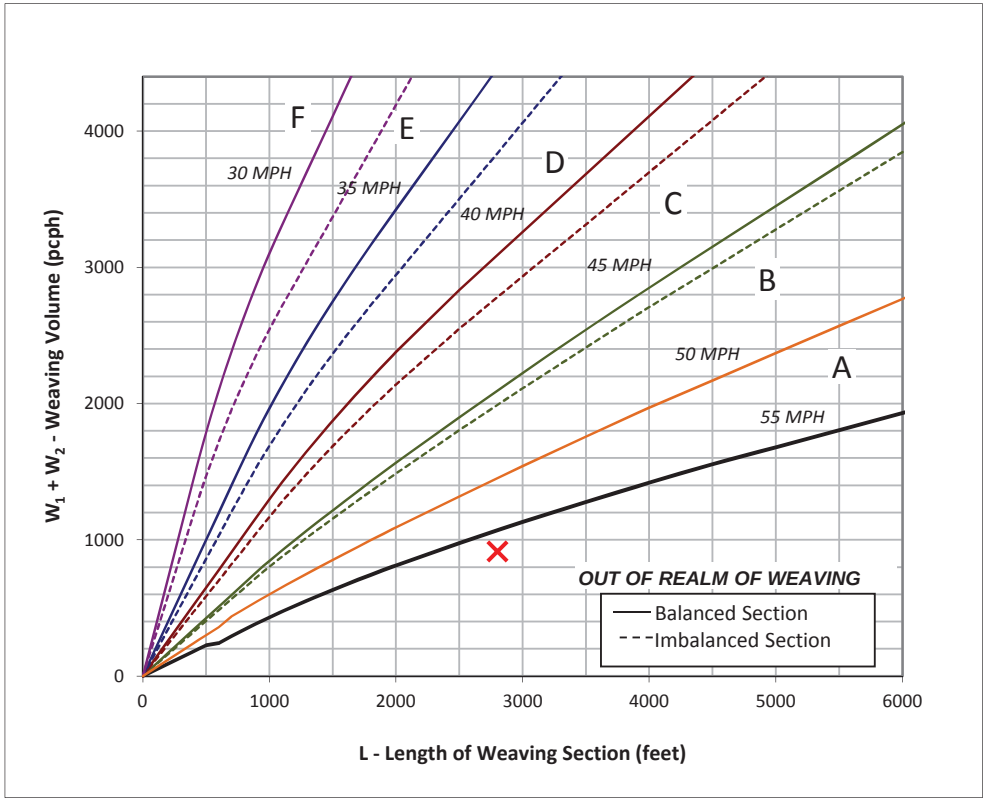
Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
GP to GP Volume (vph)					2,492		
PHF					0.94		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					1.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.995		
f_p					1.00		
GP to GP Flow (pcph)					2,665		
Calculate Weave Segment Operations							
Weave Type					One-sided		
Weave Length					1,800		
Segment Lanes					2		
Weave Lanes					2		
Weave Flow (pcph)					918		
Non-Weave Flow					2,762		
Segment Flow					3,680		
Max Weave Length					5,047		
Length Check					OK		
Ideal Weave Capacity					2,102		
f_{HV}					0.995		
f_p					1.000		
Capacity Condition 1					4,182		
Capacity Condition 2					9,575		
Weave v/c ratio					0.88		
Interchange Density					1		
Lane Changes On to ML					1		
Lane Changes ML to Off					0		
Lane Changes On to Off					0		
Min Lane Change Rate					427		
Weave LC Rate					1,082		
Non-Weave LC Rate 1					1,159		
Non-Weave LC Rate 2					2,305		
Non-Weave LC Rate 3					-255		
Segment LC Rate					2,242		
Weave Intensity Factor					0.269		
Weave Speed					54.4		
Non-Weave Speed					53.1		
Segment Speed					53.4		
Weave Density					34.4		
Weave LOS					D		
Summarize Segment Operations							
Segment v/c ratio	0.77	0.51	0.60	0.67	0.88	0.66	0.96
Segment Density	28.8	18.5	13.3	24.3	34.4	23.9	33.7
Segment LOS	D	C	B	C	D	C	D
Over Capacity							

Leisch Method for Weaving Analysis

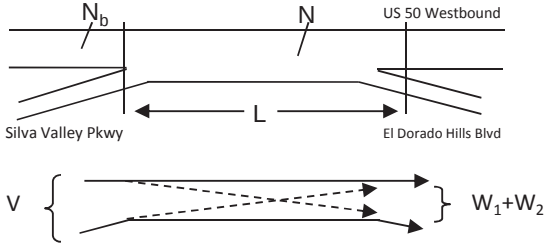
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Existing AM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,791	Volume (vph)*	430	Volume (vph)*	479
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,829	Volume (pcph)	430	Volume (pcph)	484



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

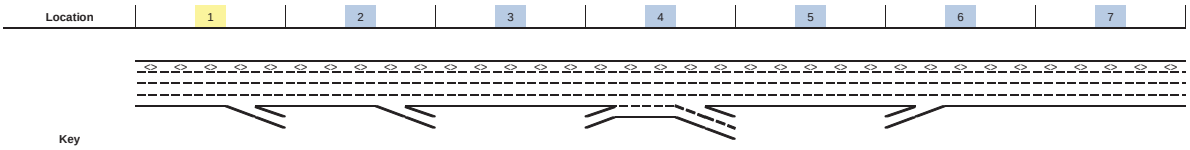
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

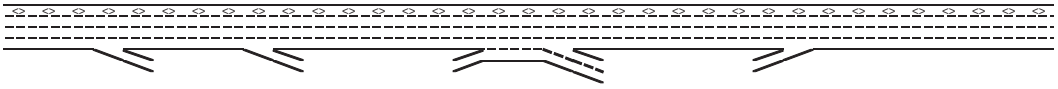
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Existing Conditions
Freeway Corridor: Eastbound US 50 **Time Period:** PM Peak Hour



Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	4,870	4,165	3,419	3,419	3,588	3,588	3,983
On Ramp Volume				648		395	
Off Ramp Volume	705	746		479			
Express Lane Volume	536	458	376	376	395	395	438
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	4,334	3,707	3,043	3,691	3,193	3,588	3,545
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	6.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,491	3,841	3,153	3,824	3,309	3,718	3,837
GP Flow (pcphpl)	1,497	1,280	1,051	956	1,103	1,239	1,279
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.64	0.54	0.45	0.41	0.47	0.53	0.54
Speed (mph)	64.9	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	23.1	19.7	16.2	14.7	17.0	19.1	19.7
LOS	C	C	B	B	B	C	C
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				3,153		3,195	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.45		0.45	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	3,760	3,068		3,286			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.53	0.44		0.47			
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	536	458	376	376	395	395	438
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	601	514	422	422	443	443	531

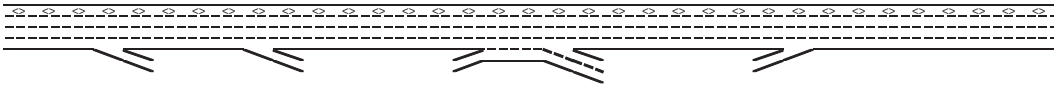
Location	1	2	3	4	5	6	7



Key
<> Express Lane (HOV)
No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
EL Flow (pcphpl)	601	514	422	422	443	443	531
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.34	0.29	0.24	0.24	0.25	0.25	0.30
Calculate On Ramp Flow Rate							
On Volume (vph)				648		395	
PHF				0.97		0.76	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				1.0%		1.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.995		0.995	
f_P				1.00		1.00	
On Flow (pcph)				671		522	
On Flow (pcphpl)				671		522	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.32		0.27	
Calculate Off Ramp Flow Rate							
Off Volume (vph)	705	746		479			
PHF	0.97	0.97		0.89			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	1.0%	1.0%		0.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.995	0.995		1.000			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	730	773		538			
Off Flow (pcphpl)	730	773		269			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.35	0.41		0.13			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		730					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	773	671				127	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						3,195	

Location	1	2	3	4	5	6	7



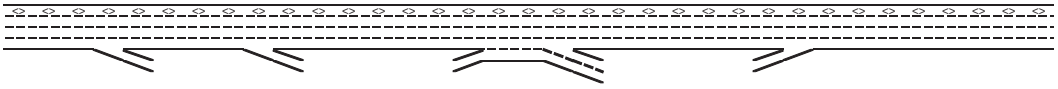
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						751	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.788						
P_{FM}						0.593	
v_{12} (pcph)						1,895	
v_3 (pcph)						1,301	
v_{34} (pcph)							
v_{12a} (pcph)						1,895	
v_{R12a} (pcph)						2,417	
Merge Speed Index						0.34	
Merge Area Speed						57.2	
Outer Lanes Volume						1,301	
Outer Lanes Speed						62.1	
Segment Speed						58.9	
Merge v/c ratio						0.53	
Merge Density						20.6	
Merge LOS						C	
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	4,491	3,841					
Up Ramp L_{EQ}		7,261					
Down Ramp L_{EQ}	1,049	905					
P_{FD} (Eqn 13-9)	0.614	0.628					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.635						
P_{FD}	0.635	0.628					
v_{12} (pcph)	3,119	2,701					
v_3 (pcph)	1,372	1,140					
v_{34} (pcph)							
v_{12a} (pcph)	3,119	2,701					
Diverge Speed Index	0.36	0.63					
Diverge Area Speed	56.6	50.6					
Outer Lanes Volume	1,372	1,140					
Outer Lanes Speed	69.9	70.8					
Segment Speed	60.1	55.2					
Diverge v/c ratio	0.71	0.61					
Diverge Density	29.7	26.1					
Diverge LOS	D	C					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				121			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.998			
f_P				1.00			
On to Off Flow (pcph)				125			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				527			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
On to ML Flow (pcph)				546			

Location	1	2	3	4	5	6	7



Key

<> Express Lane (HOV)

No Trucks

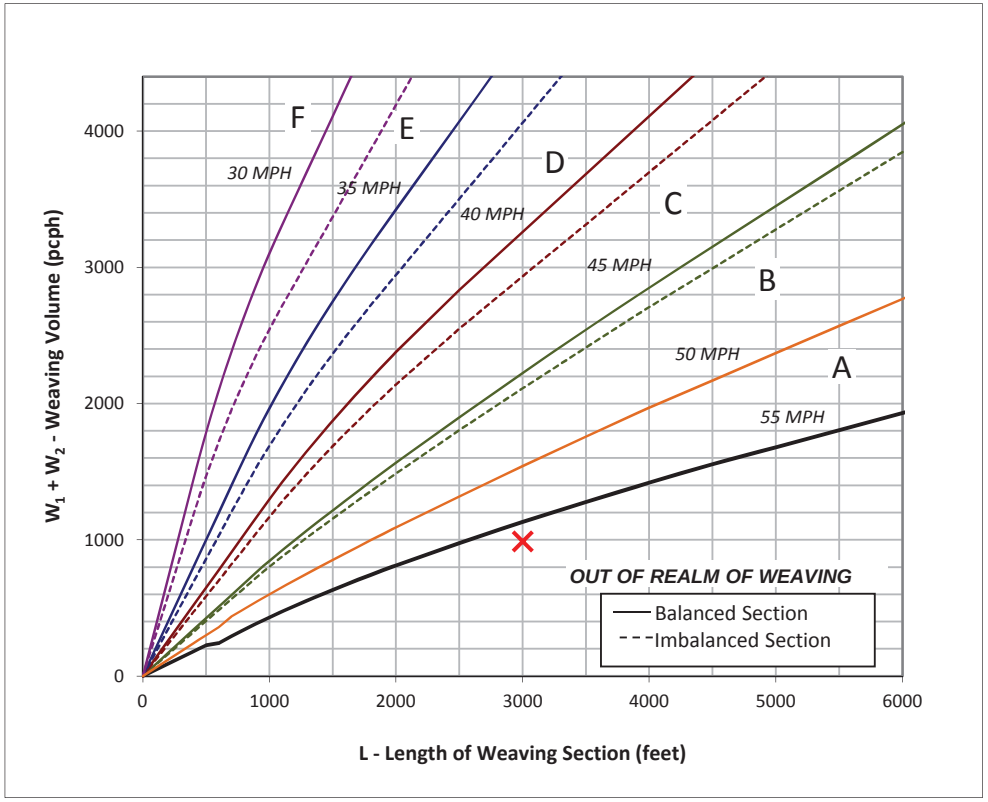
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				358			
PHF				0.89			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				1.000			
f_P				1.00			
ML to Off Flow (pcph)				402			
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				2,685			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
GP to GP Flow (pcph)				2,782			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				948			
Non-Weave Flow				2,907			
Segment Flow				3,855			
Max Weave Length				5,011			
Length Check				OK			
Ideal Weave Capacity				2,120			
f_{HV}				0.996			
f_P				0.999			
Capacity Condition 1				6,327			
Capacity Condition 2				9,711			
Weave v/c ratio				0.61			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				546			
Weave LC Rate				1,179			
Non-Weave LC Rate 1				1,105			
Non-Weave LC Rate 2				2,337			
Non-Weave LC Rate 3				845			
Segment LC Rate				2,285			
Weave Intensity Factor				0.251			
Weave Speed				55.0			
Non-Weave Speed				54.9			
Segment Speed				54.9			
Weave Density				23.4			
Weave LOS				C			
Summarize Segment Operations							
Segment v/c ratio	0.71	0.61	0.45	0.61	0.47	0.53	0.54
Segment Density	29.7	26.1	16.2	23.4	17.0	20.6	19.7
Segment LOS	D	C	B	C	B	C	C
Over Capacity							

Leisch Method for Weaving Analysis

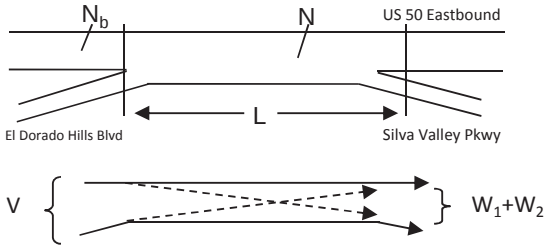
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Existing PM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,067	Volume (vph)*	577	Volume (vph)*	408
Truck Percentage	1%	Truck Percentage	1%	Truck Percentage	0%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,087	Volume (pcph)	580	Volume (pcph)	408



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

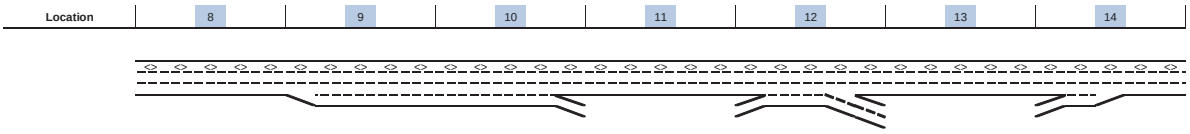
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Existing Conditions

Freeway Corridor: Westbound US 50 **Time Period:** PM Peak Hour

Data Entry Value

Calculated Value



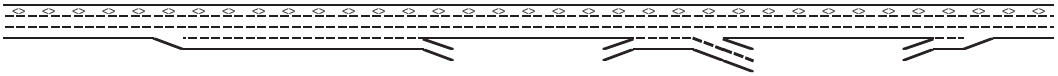
Key

<> Express Lane (HOV)

No Trucks

Location	8	9	10	11	12	13	14
Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segment							
Type	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length							880
Decel Length			1,500				
Mainline Volume	2,341	2,341	2,341	1,940	1,940	1,807	1,807
On Ramp Volume					222		1,384
Off Ramp Volume			401		355		
Express Lane Volume	187	187	187	155	155	145	145
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	2,154	2,154	2,154	1,785	2,007	1,662	3,046
PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96
GP Lanes	2	3	3	2	3	2	2
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,266	2,266	2,266	1,878	2,111	1,749	3,205
GP Flow (pcphpl)	1,133	755	755	939	704	875	1,603
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.48	0.32	0.32	0.40	0.30	0.37	0.68
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	64.4
Density (pcphpl)	17.4	11.6	11.6	14.4	10.8	13.5	24.9
LOS	B	B	B	B	A	B	C
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)		2,266			1,865		1,771
GP_{IN} Cap (pcph)		4,700			4,700		4,700
GP_{IN} v/c ratio		0.48			0.40		0.38
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)			1,820		1,744		
GP_{OUT} Cap (pcph)			4,700		4,700		
GP_{OUT} v/c ratio			0.39		0.37		
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	187	187	187	155	155	145	145
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	210	210	210	174	174	162	162

Location	8	9	10	11	12	13	14



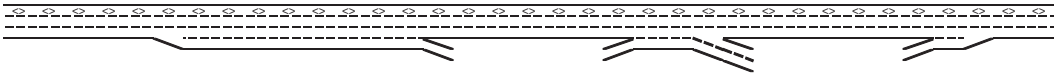
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
EL Flow (pcphpl)	210	210	210	174	174	162	162
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.12	0.12	0.12	0.10	0.10	0.09	0.09
Calculate On Ramp Flow Rate							
On Volume (vph)					222		1,384
PHF					0.9		0.97
Total Lanes					1		1
Terrain					Level		Level
Grade %					0.0%		0.0%
Grade Length (mi)					0.00		0.00
Truck & Bus %					0.0%		1.0%
RV %					0.0%		0.0%
E_T					1.5		1.5
E_R					1.2		1.2
f_{HV}					1.000		0.995
f_P					1.00		1.00
On Flow (pcph)					247		1,434
On Flow (pcphpl)					247		1,434
Calculate On Ramp Roadway Operations							
On Ramp Type					Right		Right
On Ramp Speed (mph)					45		45
On Ramp Cap (pcph)					2,100		2,100
On Ramp v/c ratio					0.12		0.68
Calculate Off Ramp Flow Rate							
Off Volume (vph)			401		355		
PHF			0.9		0.97		
Total Lanes			1		2		
Terrain			Level		Level		
Grade %			0.0%		0.0%		
Grade Length (mi)			0.00		0.00		
Truck & Bus %			0.0%		1.0%		
RV %			0.0%		0.0%		
E_T			1.5		1.5		
E_R			1.2		1.2		
f_{HV}			1.000		0.995		
f_P			1.00		1.00		
Off Flow (pcph)			446		368		
Off Flow (pcphpl)			446		184		
Calculate Off Ramp Roadway Operations							
Off Ramp Type			Right		Right		
Off Ramp Speed			45		25		
Off Ramp Cap (pcph)			2,100		3,800		
Off Ramp v/c ratio			0.21		0.10		
Determine Adjacent Ramp for Three-Lane Mainline S							
Up Type			On		Off		
Up Distance			5,200		2,550		
Up Flow (pcph)			271		446		
Down Type			On		No		
Down Distance			1,500				
Down Flow (pcph)			1,434				
Calculate Merge Influence Area Operations							
Effective v_P (pcph)							1,771

Location	8	9	10	11	12	13	14



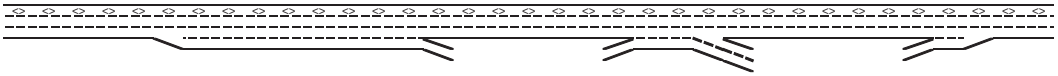
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Up Ramp L_{EQ}							
Down Ramp L_{EQ}							
P_{FM} (Eqn 13-3)							0.602
P_{FM} (Eqn 13-4)					#VALUE!		
P_{FM} (Eqn 13-5)							
P_{FM}							1.000
v_{12} (pcph)							1,771
v_3 (pcph)							
v_{34} (pcph)							
v_{12a} (pcph)							1,771
v_{R12a} (pcph)							3,205
Merge Speed Index							0.34
Merge Area Speed							57.2
Outer Lanes Volume							
Outer Lanes Speed							
Segment Speed							57.2
Merge v/c ratio							0.70
Merge Density							24.3
Merge LOS							C
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)			2,266				
Up Ramp L_{EQ}			3,041				
Down Ramp L_{EQ}			1,570				
P_{FD} (Eqn 13-9)			0.683				
P_{FD} (Eqn 13-10)			0.660				
P_{FD} (Eqn 13-11)							
P_{FD}			0.683				
v_{12} (pcph)			1,689				
v_3 (pcph)			577				
v_{34} (pcph)							
v_{12a} (pcph)			1,689				
Diverge Speed Index			0.34				
Diverge Area Speed			57.2				
Outer Lanes Volume			577				
Outer Lanes Speed			71.3				
Segment Speed			60.3				
Diverge v/c ratio			0.38				
Diverge Density			5.3				
Diverge LOS			A				
Calculate On Ramp to Off Ramp Flow Rate for Wea							
On to Off Volume (vph)					93		
PHF					0.96		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					0.5%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.998		
f_P					1.00		
On to Off Flow (pcph)					97		
Calculate On Ramp to Mainline Flow Rate for Weave							
On to ML Volume (vph)					129		
PHF					0.9		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					0.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					1.000		
f_P					1.00		
On to ML Flow (pcph)					144		

Location	8	9	10	11	12	13	14



Key

<> Express Lane (HOV)

No Trucks

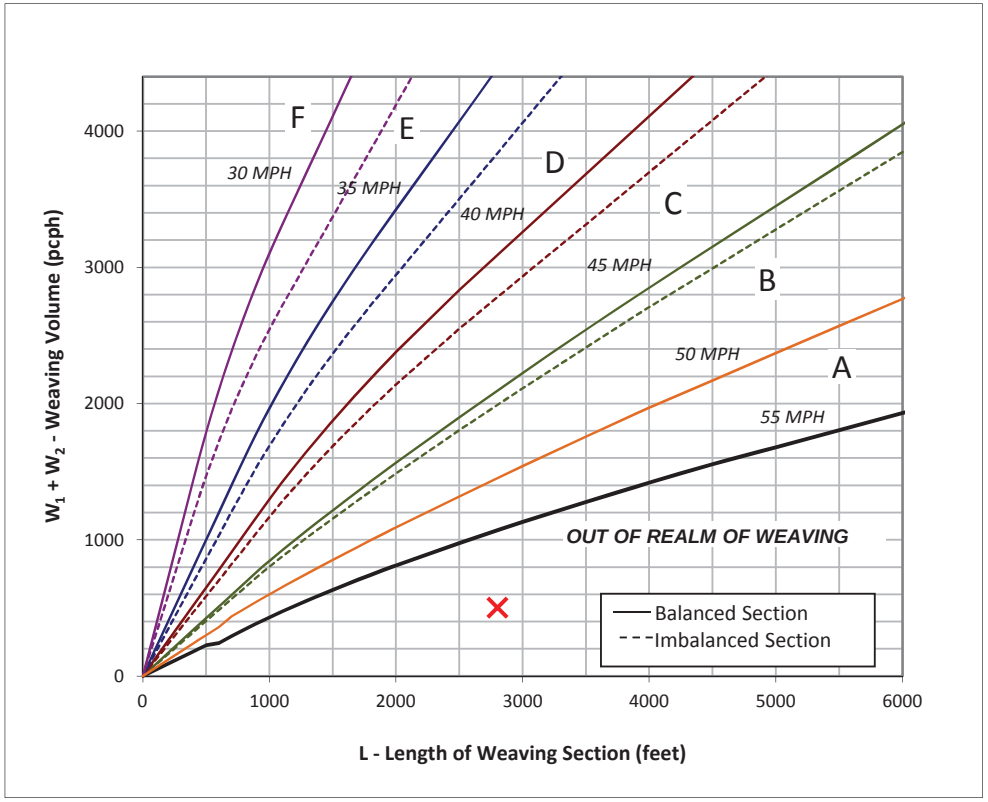
Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Mainline to Off Ramp Flow Rate for Weav							
ML to Off Volume (vph)					262		
PHF					0.97		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					1.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.995		
f_P					1.00		
ML to Off Flow (pcph)					272		
Calculate General Purpose Lanes to General Purpos							
GP to GP Volume (vph)					1,522		
PHF					0.96		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					2.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.990		
f_P					1.00		
GP to GP Flow (pcph)					1,602		
Calculate Weave Segment Operations							
Weave Type					One-sided		
Weave Length					1,800		
Segment Lanes					2		
Weave Lanes					2		
Weave Flow (pcph)					416		
Non-Weave Flow					1,698		
Segment Flow					2,114		
Max Weave Length					4,502		
Length Check					OK		
Ideal Weave Capacity					2,143		
f_{HV}					0.992		
f_P					1.000		
Capacity Condition 1					4,251		
Capacity Condition 2					12,104		
Weave v/c ratio					0.49		
Interchange Density					2		
Lane Changes On to ML					1		
Lane Changes ML to Off					0		
Lane Changes On to Off					0		
Min Lane Change Rate					144		
Weave LC Rate					781		
Non-Weave LC Rate 1					940		
Non-Weave LC Rate 2					2,068		
Non-Weave LC Rate 3					-254		
Segment LC Rate					1,721		
Weave Intensity Factor					0.218		
Weave Speed					56.0		
Non-Weave Speed					58.9		
Segment Speed					58.3		
Weave Density					18.1		
Weave LOS					B		
Summarize Segment Operations							
Segment v/c ratio	0.48	0.32	0.38	0.40	0.49	0.37	0.70
Segment Density	17.4	11.6	5.3	14.4	18.1	13.5	24.3
Segment LOS	B	B	A	B	B	B	C
Over Capacity							

Leisch Method for Weaving Analysis

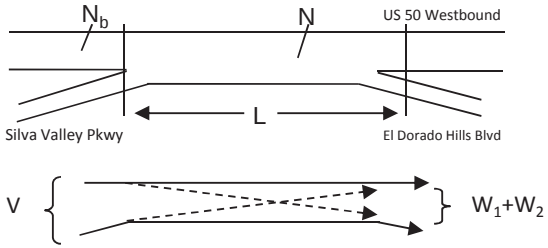
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Existing PM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,162	Volume (vph)*	184	Volume (vph)*	317
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	1%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	2,184	Volume (pcph)	184	Volume (pcph)	319



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

APPENDIX A.3:
TECHNICAL CALCULATIONS –
EXISTING PLUS PROJECT CONDITIONS
INTERSECTION LOS

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	95	99	104.6%	40.3	3.9	D
	Through	592	605	102.3%	10.4	1.4	B
	Right Turn	27	30	111.5%	6.3	1.5	A
	Subtotal	714	735	102.9%	14.3	1.5	B
SB	Left Turn	123	121	98.7%	47.2	4.1	D
	Through	1,399	1,446	103.4%	19.2	2.6	B
	Right Turn	28	30	106.8%	19.4	4.2	B
	Subtotal	1,550	1,597	103.1%	21.3	2.6	C
EB	Left Turn	30	28	92.3%	40.0	5.2	D
	Through	17	19	110.6%	45.1	8.3	D
	Right Turn	117	120	102.3%	19.8	2.4	B
	Subtotal	164	166	101.3%	26.1	2.0	C
WB	Left Turn	14	15	105.0%	36.7	6.3	D
	Through	10	10	95.0%	42.5	10.9	D
	Right Turn	46	49	105.4%	8.2	2.0	A
	Subtotal	70	73	103.9%	18.3	2.4	B
Total		2,498	2,571	102.9%	19.5	1.6	B

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	528	562	106.3%	49.5	1.9	D
	Through	551	565	102.5%	17.2	1.6	B
	Right Turn	124	128	103.5%	9.6	1.0	A
	Subtotal	1,203	1,255	104.3%	30.9	1.5	C
SB	Left Turn	50	50	100.8%	76.7	6.4	E
	Through	818	822	100.4%	36.5	1.8	D
	Right Turn	662	679	102.5%	31.3	5.5	C
	Subtotal	1,530	1,551	101.4%	35.6	2.7	D
EB	Left Turn	120	117	97.8%	42.9	2.2	D
	Through	52	53	102.7%	47.2	5.8	D
	Right Turn	366	374	102.2%	3.0	0.3	A
	Subtotal	538	545	101.3%	15.9	1.1	B
WB	Left Turn	93	94	101.2%	58.2	4.7	E
	Through	75	76	100.7%	59.5	4.9	E
	Right Turn	39	42	106.7%	10.4	4.2	B
	Subtotal	207	211	102.0%	49.3	3.4	D
Total		3,478	3,561	102.4%	31.7	0.9	C

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	916	940	102.6%	8.6	0.4	A
	Right Turn	148	152	102.8%	8.0	0.5	A
	Subtotal	1,064	1,092	102.6%	8.5	0.4	A
SB	Left Turn	192	195	101.3%	45.5	1.8	D
	Through	1,087	1,115	102.6%	15.9	0.8	B
	Right Turn						
	Subtotal	1,279	1,309	102.4%	20.3	0.9	C
EB	Left Turn						
	Through						
	Right Turn	1,083	1,072	99.0%	66.7	30.6	E
	Subtotal	1,083	1,072	99.0%	66.7	30.6	E
WB	Left Turn						
	Through						
	Right Turn	287	298	103.8%	9.3	0.4	A
	Subtotal	287	298	103.8%	9.3	0.4	A
Total		3,713	3,771	101.6%	29.1	8.6	C

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	61	59	96.2%	38.2	3.2	D
	Through	769	799	103.9%	16.5	1.1	B
	Right Turn	60	65	107.7%	4.4	0.9	A
	Subtotal	890	922	103.6%	17.1	0.9	B
SB	Left Turn	444	444	100.1%	34.9	3.4	C
	Through	1,433	1,439	100.4%	12.0	0.8	B
	Right Turn	293	304	103.7%	5.3	0.4	A
	Subtotal	2,170	2,187	100.8%	15.7	0.9	B
EB	Left Turn	10	11	112.0%	37.9	8.1	D
	Through	6	7	120.0%	40.0	12.8	D
	Right Turn	8	10	127.5%	12.4	4.9	B
	Subtotal	24	29	119.2%	29.5	4.3	C
WB	Left Turn	66	65	99.1%	29.6	3.0	C
	Through	32	34	105.6%	28.7	3.4	C
	Right Turn	276	280	101.6%	12.2	0.7	B
	Subtotal	374	380	101.5%	16.7	0.9	B
Total		3,458	3,518	101.7%	16.3	0.8	B

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	73	76	103.4%	63.7	3.8	E
	Through	497	525	105.5%	22.7	1.2	C
	Right Turn	149	149	99.9%	6.1	0.6	A
	Subtotal	719	749	104.2%	23.5	1.3	C
SB	Left Turn	116	110	95.2%	64.7	3.5	E
	Through	1,048	1,059	101.0%	20.9	1.3	C
	Right Turn	344	354	103.0%	12.3	1.4	B
	Subtotal	1,508	1,524	101.0%	22.1	0.8	C
EB	Left Turn	219	221	101.1%	52.2	1.4	D
	Through	101	99	98.0%	52.0	3.7	D
	Right Turn	42	43	102.9%	22.8	4.6	C
	Subtotal	362	364	100.4%	48.7	2.1	D
WB	Left Turn	329	326	98.9%	58.4	2.7	E
	Through	260	263	101.2%	60.4	2.3	E
	Right Turn	174	180	103.5%	6.4	0.4	A
	Subtotal	763	769	100.7%	46.9	1.3	D
Total		3,352	3,405	101.6%	30.9	0.6	C

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	0	296	124	9	304	372	2	37	0	67	0	0
Future Volume (veh/h)	0	296	124	9	304	372	2	37	0	67	0	0
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.99		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1874	1900		1900	1863	1900	1845	1845	1900	1900	1900
Adj Flow Rate, veh/h	0	322	113		330	404	2	59	0	0	0	0
Adj No. of Lanes	0	2	0		1	2	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.63	0.63	0.63	0.25	0.25
Percent Heavy Veh, %	0	2	2		0	2	2	3	0	0	0	0
Cap, veh/h	0	1674	577		348	3172	16	128	80	0	53	82
Arrive On Green	0.00	0.64	0.64		0.38	1.00	1.00	0.04	0.00	0.00	0.00	0.00
Sat Flow, veh/h	0	2692	896		1810	3612	18	1732	1845	0	1440	1900
Grp Volume(v), veh/h	0	219	216		330	198	208	59	0	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1780	1714		1810	1770	1860	1732	1845	0	1440	1900
Q Serve(g_s), s	0.0	6.7	6.9		23.8	0.0	0.0	4.6	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	6.9		23.8	0.0	0.0	4.6	0.0	0.0	0.0	0.0
Prop In Lane	0.00		0.52		1.00		0.01	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	0	1147	1104		348	1554	1633	128	80	0	53	82
V/C Ratio(X)	0.00	0.19	0.20		0.95	0.13	0.13	0.46	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1147	1104		609	1554	1633	482	456	0	347	470
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.90	0.90	0.90	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.7	9.8		40.9	0.0	0.0	64.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.4		9.5	0.2	0.1	0.9	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	3.4		12.7	0.1	0.1	2.2	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	10.1	10.2		50.4	0.2	0.1	64.9	0.0	0.0	0.0	0.0
LnGrp LOS		B	B		D	A	A	E				
Approach Vol, veh/h		435				736			59			0
Approach Delay, s/veh		10.1				22.7			64.9			0.0
Approach LOS		B				C			E			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	31.6	93.0		10.5		124.5		10.5
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	45.4	40.0		33.4		91.0		33.4
Max Q Clear Time (g_c+I1), s	25.8	8.9		0.0		2.0		6.6
Green Ext Time (p_c), s	0.1	6.4		0.0		6.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.3
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	1
Future Volume (veh/h)	1
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	0
Adj No. of Lanes	0
Peak Hour Factor	0.25
Percent Heavy Veh, %	0
Cap, veh/h	0
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	0
V/C Ratio(X)	0.00
Avail Cap(c_a), veh/h	0
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	1	62	256	7	26	570	189	43	3	11	42	4
Future Volume (veh/h)	1	62	256	7	26	570	189	43	3	11	42	4
Number		5	2	12	1	6	16	7	4	14	3	8
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1845	1845	1900	1900	1881	1900	1900	1900	1900	1810	1882
Adj Flow Rate, veh/h		65	269	5	29	626	195	55	4	0	51	5
Adj No. of Lanes		1	2	1	1	2	0	1	1	0	1	1
Peak Hour Factor		0.95	0.95	0.95	0.91	0.91	0.91	0.78	0.78	0.78	0.83	0.83
Percent Heavy Veh, %		3	3	0	0	1	1	0	0	0	5	0
Cap, veh/h		83	2722	1253	37	1999	622	71	32	0	65	22
Arrive On Green		0.02	0.26	0.26	0.02	0.74	0.74	0.04	0.02	0.00	0.04	0.01
Sat Flow, veh/h		1758	3505	1613	1810	2685	835	1810	1900	0	1723	1882
Grp Volume(v), veh/h		65	269	5	29	416	405	55	4	0	51	5
Grp Sat Flow(s),veh/h/ln		1758	1752	1613	1810	1787	1733	1810	1900	0	1723	1882
Q Serve(g_s), s		5.0	7.9	0.3	2.2	10.5	10.5	4.1	0.3	0.0	4.0	0.4
Cycle Q Clear(g_c), s		5.0	7.9	0.3	2.2	10.5	10.5	4.1	0.3	0.0	4.0	0.4
Prop In Lane		1.00		1.00	1.00		0.48	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h		83	2722	1253	37	1331	1291	71	32	0	65	22
V/C Ratio(X)		0.78	0.10	0.00	0.79	0.31	0.31	0.77	0.12	0.00	0.78	0.23
Avail Cap(c_a), veh/h		271	2722	1253	101	1331	1291	181	429	0	204	453
HCM Platoon Ratio		0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		65.8	14.1	11.3	65.8	5.7	5.7	64.3	65.4	0.0	64.4	66.1
Incr Delay (d2), s/veh		5.5	0.1	0.0	12.6	0.6	0.6	6.5	0.6	0.0	7.5	1.9
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		2.6	3.9	0.1	1.2	5.3	5.2	2.2	0.2	0.0	2.0	0.2
LnGrp Delay(d),s/veh		71.2	14.2	11.3	78.5	6.3	6.4	70.8	66.0	0.0	71.9	68.0
LnGrp LOS		E	B	B	E	A	A	E	E		E	E
Approach Vol, veh/h			339			850			59			56
Approach Delay, s/veh			25.1			8.8			70.5			71.6
Approach LOS			C			A			E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	110.9	10.1	6.8	11.6	106.5	10.8	6.1
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	7.5	61.0	16.0	30.5	* 21	47.0	13.5	32.5
Max Q Clear Time (g_c+I1), s	4.2	9.9	6.0	2.3	7.0	12.5	6.1	2.4
Green Ext Time (p_c), s	0.0	10.4	0.0	0.0	0.0	9.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.5
HCM 2010 LOS	B

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	122
Future Volume (veh/h)	122
Number	18
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	0
Adj No. of Lanes	0
Peak Hour Factor	0.83
Percent Heavy Veh, %	0
Cap, veh/h	0
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	0
V/C Ratio(X)	0.00
Avail Cap(c_a), veh/h	0
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	197	42	107	610	157	94	27	207	42	28	59
Future Volume (veh/h)	48	197	42	107	610	157	94	27	207	42	28	59
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1847	1900	1900	1896	1900	1881	1900	1900	1827	1862	1900
Adj Flow Rate, veh/h	60	246	47	123	701	175	115	33	15	95	64	20
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.82	0.82	0.82	0.44	0.44	0.44
Percent Heavy Veh, %	5	2	2	0	0	0	1	0	0	4	0	0
Cap, veh/h	82	733	140	158	772	193	172	119	54	163	127	40
Arrive On Green	0.05	0.49	0.49	0.09	0.53	0.53	0.10	0.10	0.10	0.09	0.09	0.09
Sat Flow, veh/h	1723	1507	288	1810	1465	366	1792	1233	561	1740	1358	424
Grp Volume(v), veh/h	60	0	293	123	0	876	115	0	48	95	0	84
Grp Sat Flow(s),veh/h/ln	1723	0	1795	1810	0	1831	1792	0	1794	1740	0	1782
Q Serve(g_s), s	2.6	0.0	7.6	5.0	0.0	32.9	4.7	0.0	1.9	4.0	0.0	3.4
Cycle Q Clear(g_c), s	2.6	0.0	7.6	5.0	0.0	32.9	4.7	0.0	1.9	4.0	0.0	3.4
Prop In Lane	1.00		0.16	1.00		0.20	1.00		0.31	1.00		0.24
Lane Grp Cap(c), veh/h	82	0	873	158	0	964	172	0	172	163	0	167
V/C Ratio(X)	0.74	0.00	0.34	0.78	0.00	0.91	0.67	0.00	0.28	0.58	0.00	0.50
Avail Cap(c_a), veh/h	569	0	1066	597	0	1088	946	0	947	804	0	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.6	0.0	11.9	33.8	0.0	16.3	33.1	0.0	31.8	32.9	0.0	32.7
Incr Delay (d2), s/veh	4.7	0.0	0.2	3.1	0.0	10.6	5.5	0.0	1.1	4.1	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	3.8	2.7	0.0	19.1	2.6	0.0	1.0	2.1	0.0	1.8
LnGrp Delay(d),s/veh	40.4	0.0	12.2	36.9	0.0	26.9	38.5	0.0	32.9	37.0	0.0	35.6
LnGrp LOS	D		B	D		C	D		C	D		D
Approach Vol, veh/h		353			999			163			179	
Approach Delay, s/veh		16.9			28.1			36.9			36.3	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	42.9		11.3	7.1	45.9		11.5
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	7.0	9.6		6.0	4.6	34.9		6.7
Green Ext Time (p_c), s	0.1	8.8		0.9	0.1	5.0		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	12	236	110	126	0	21	74	17	0	139	56	17
Future Vol, veh/h	12	236	110	126	0	21	74	17	0	139	56	17
Peak Hour Factor	0.89	0.89	0.89	0.89	0.92	0.82	0.82	0.82	0.92	0.80	0.80	0.80
Heavy Vehicles, %	0	3	0	4	2	0	2	0	2	1	2	0
Mvmt Flow	13	265	124	142	0	26	90	21	0	174	70	21
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	14.3	12.1	13.5
HCM LOS	B	B	B

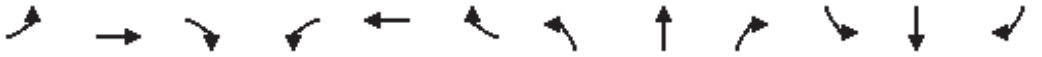
Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	77%	0%	100%	0%	0%	81%	0%	34%
Vol Right, %	0%	23%	0%	0%	100%	0%	19%	0%	66%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	139	73	248	110	126	21	91	7	125
LT Vol	139	0	248	0	0	21	0	7	0
Through Vol	0	56	0	110	0	0	74	0	43
RT Vol	0	17	0	0	126	0	17	0	82
Lane Flow Rate	174	91	279	124	142	26	111	8	145
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.365	0.175	0.54	0.224	0.226	0.057	0.228	0.018	0.284
Departure Headway (Hd)	7.677	7.023	7.077	6.622	5.86	7.99	7.38	8	7.025
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	471	514	513	545	616	450	488	450	515
Service Time	5.377	4.723	4.777	4.322	3.56	5.7	5.09	5.709	4.734
HCM Lane V/C Ratio	0.369	0.177	0.544	0.228	0.231	0.058	0.227	0.018	0.282
HCM Control Delay	14.7	11.2	17.8	11.2	10.3	11.2	12.3	10.9	12.5
HCM Lane LOS	B	B	C	B	B	B	B	B	B
HCM 95th-tile Q	1.7	0.6	3.2	0.9	0.9	0.2	0.9	0.1	1.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	7	43	82
Future Vol, veh/h	0	7	43	82
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	0	0	4
Mvmt Flow	0	8	50	95
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	12.4
HCM LOS	B

Lane



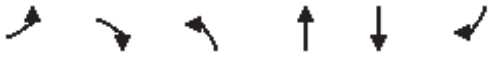
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	397	0	102	58	339	0	0	275	431
Future Volume (veh/h)	0	0	0	397	0	102	58	339	0	0	275	431
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1863	1863	0	0	1881	1881
Adj Flow Rate, veh/h				456	0	17	75	440	0	0	296	80
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.87	0.87	0.87	0.77	0.77	0.77	0.93	0.93	0.93
Percent Heavy Veh, %				2	2	2	2	2	0	0	1	1
Cap, veh/h				760	0	338	206	1577	0	0	772	344
Arrive On Green				0.21	0.00	0.21	0.12	0.45	0.00	0.00	0.22	0.22
Sat Flow, veh/h				3548	0	1579	1774	3632	0	0	3668	1592
Grp Volume(v), veh/h				456	0	17	75	440	0	0	296	80
Grp Sat Flow(s),veh/h/ln				1774	0	1579	1774	1770	0	0	1787	1592
Q Serve(g_s), s				4.3	0.0	0.3	1.4	2.9	0.0	0.0	2.6	1.5
Cycle Q Clear(g_c), s				4.3	0.0	0.3	1.4	2.9	0.0	0.0	2.6	1.5
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				760	0	338	206	1577	0	0	772	344
V/C Ratio(X)				0.60	0.00	0.05	0.36	0.28	0.00	0.00	0.38	0.23
Avail Cap(c_a), veh/h				2874	0	1279	1197	4777	0	0	4825	2148
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				13.1	0.0	11.6	15.1	6.5	0.0	0.0	12.4	12.0
Incr Delay (d2), s/veh				0.3	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.1	0.0	0.1	0.7	1.4	0.0	0.0	1.3	0.7
LnGrp Delay(d),s/veh				13.4	0.0	11.6	15.5	6.5	0.0	0.0	12.5	12.1
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					473			515			376	
Approach Delay, s/veh					13.3			7.8			12.4	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		23.3			8.5	14.8		13.7
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		4.9			3.4	4.6		6.3
Green Ext Time (p_c), s		1.6			0.1	1.6		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	79	19	129	318	553	119
Future Volume (veh/h)	79	19	129	318	553	119
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1881	1881	1863	1863
Adj Flow Rate, veh/h	84	1	172	424	636	29
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.94	0.94	0.75	0.75	0.87	0.87
Percent Heavy Veh, %	5	5	1	1	2	2
Cap, veh/h	426	190	603	1976	961	428
Arrive On Green	0.12	0.12	0.17	0.55	0.27	0.27
Sat Flow, veh/h	3447	1538	3476	3668	3632	1578
Grp Volume(v), veh/h	84	1	172	424	636	29
Grp Sat Flow(s),veh/h/ln	1723	1538	1738	1787	1770	1578
Q Serve(g_s), s	0.9	0.0	1.7	2.3	6.2	0.5
Cycle Q Clear(g_c), s	0.9	0.0	1.7	2.3	6.2	0.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	426	190	603	1976	961	428
V/C Ratio(X)	0.20	0.01	0.29	0.21	0.66	0.07
Avail Cap(c_a), veh/h	2213	988	2678	4590	4545	2026
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.3	15.0	14.0	4.4	12.6	10.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.8	1.1	3.0	0.2
LnGrp Delay(d),s/veh	15.4	15.0	14.1	4.4	12.9	10.5
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	85			596	665	
Approach Delay, s/veh	15.4			7.2	12.8	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		28.3		10.6	11.0	17.4		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		4.3		2.9	3.7	8.2		
Green Ext Time (p_c), s		2.4		0.1	0.3	2.4		

Intersection Summary	
HCM 2010 Ctrl Delay	10.5
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	124	126	101.2%	45.1	3.6	D
	Through	1,231	1,226	99.6%	18.7	1.9	B
	Right Turn	69	68	99.0%	13.6	1.9	B
	Subtotal	1,424	1,420	99.7%	20.8	1.8	C
SB	Left Turn	139	146	105.0%	42.6	2.8	D
	Through	768	757	98.5%	15.9	1.1	B
	Right Turn	26	27	103.8%	11.2	2.5	B
	Subtotal	933	930	99.6%	19.9	1.3	B
EB	Left Turn	46	46	100.0%	39.2	4.5	D
	Through	22	22	100.5%	42.9	4.3	D
	Right Turn	86	85	99.2%	7.1	1.0	A
	Subtotal	154	153	99.6%	21.8	2.5	C
WB	Left Turn	55	51	92.0%	32.6	3.8	C
	Through	19	18	94.7%	34.4	6.3	C
	Right Turn	260	264	101.6%	15.7	1.7	B
	Subtotal	334	333	99.6%	19.3	2.0	B
Total		2,845	2,835	99.7%	20.4	1.4	C

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	1,010	1,036	102.5%	54.7	5.7	D
	Through	1,225	1,213	99.0%	19.0	1.3	B
	Right Turn	280	278	99.3%	15.6	1.8	B
	Subtotal	2,515	2,527	100.5%	33.3	2.9	C
SB	Left Turn	38	34	89.7%	80.2	6.5	F
	Through	545	527	96.7%	42.7	2.5	D
	Right Turn	330	325	98.5%	26.1	2.7	C
	Subtotal	913	886	97.0%	38.0	2.4	D
EB	Left Turn	125	121	96.9%	52.1	2.6	D
	Through	58	61	105.2%	53.5	4.8	D
	Right Turn	174	175	100.3%	2.4	0.3	A
	Subtotal	357	357	99.9%	28.1	2.7	C
WB	Left Turn	168	169	100.3%	59.5	4.5	E
	Through	60	62	102.7%	63.5	3.9	E
	Right Turn	74	78	105.5%	9.8	3.7	A
	Subtotal	302	308	102.1%	47.6	3.0	D
Total		4,087	4,077	99.8%	34.9	1.8	C

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	1,768	1,750	99.0%	20.3	2.2	C
	Right Turn	456	453	99.4%	27.2	3.7	C
	Subtotal	2,224	2,203	99.0%	21.7	2.4	C
SB	Left Turn	194	188	96.8%	43.7	1.5	D
	Through	694	686	98.8%	9.5	0.7	A
	Right Turn						
	Subtotal	888	874	98.4%	16.9	0.6	B
EB	Left Turn						
	Through						
	Right Turn	737	750	101.8%	27.8	3.3	C
	Subtotal	737	750	101.8%	27.8	3.3	C
WB	Left Turn						
	Through						
	Right Turn	746	753	100.9%	14.9	0.5	B
	Subtotal	746	753	100.9%	14.9	0.5	B
Total		4,595	4,579	99.7%	20.7	1.0	C

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	4	4	92.5%	81.3	17.7	F
	Through	1,332	1,306	98.0%	89.3	13.4	F
	Right Turn	83	88	105.5%	7.7	0.7	A
	Subtotal	1,419	1,397	98.4%	84.2	12.7	F
SB	Left Turn	506	507	100.2%	67.6	9.8	E
	Through	912	918	100.7%	17.1	1.6	B
	Right Turn	13	14	104.6%	2.5	0.8	A
	Subtotal	1,431	1,439	100.5%	34.8	4.5	C
EB	Left Turn	300	309	103.0%	63.6	7.6	E
	Through	27	28	103.0%	43.5	4.0	D
	Right Turn	89	88	98.8%	13.6	2.5	B
	Subtotal	416	425	102.1%	52.0	5.8	D
WB	Left Turn	65	64	97.7%	46.7	4.7	D
	Through	5	4	76.0%	49.9	12.3	D
	Right Turn	586	585	99.8%	24.7	2.8	C
	Subtotal	656	652	99.4%	27.1	2.9	C
Total		3,922	3,912	99.8%	53.0	5.0	D

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	63	64	101.7%	45.2	3.5	D
	Through	860	867	100.8%	28.1	1.4	C
	Right Turn	316	325	102.7%	14.7	0.7	B
	Subtotal	1,239	1,255	101.3%	25.5	0.9	C
SB	Left Turn	241	236	98.0%	42.5	2.9	D
	Through	598	603	100.9%	21.7	1.7	C
	Right Turn	226	229	101.4%	8.7	0.7	A
	Subtotal	1,065	1,069	100.3%	23.5	1.4	C
EB	Left Turn	352	342	97.2%	38.0	3.0	D
	Through	308	316	102.5%	32.5	2.1	C
	Right Turn	106	102	96.6%	21.2	2.8	C
	Subtotal	766	760	99.2%	33.5	2.1	C
WB	Left Turn	175	174	99.6%	38.9	2.4	D
	Through	150	148	98.5%	37.7	4.3	D
	Right Turn	204	212	104.0%	6.0	0.4	A
	Subtotal	529	534	101.0%	25.5	1.7	C
Total		3,599	3,618	100.5%	26.6	0.8	C

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	0	534	68	19	90	401	6	1	231	0	236	0
Future Volume (veh/h)	0	534	68	19	90	401	6	1	231	0	236	0
Number	5	2	12		1	6	16		3	8	18	7
Initial Q (Qb), veh	0	0	0		0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		0.98		1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1883	1900		1884	1900	1900		1900	1881	1900	1900
Adj Flow Rate, veh/h	0	556	66		95	422	6		278	0	20	0
Adj No. of Lanes	0	2	0		1	2	0		1	1	0	1
Peak Hour Factor	0.96	0.96	0.96		0.95	0.95	0.95		0.83	0.83	0.83	0.25
Percent Heavy Veh, %	0	1	1		1	0	0		0	0	0	0
Cap, veh/h	0	2086	247		117	2747	39		355	0	267	53
Arrive On Green	0.00	0.65	0.65		0.07	0.75	0.75		0.17	0.00	0.17	0.00
Sat Flow, veh/h	0	3317	382		1795	3643	52		1803	0	1593	1414
Grp Volume(v), veh/h	0	308	314		95	209	219		278	0	20	0
Grp Sat Flow(s),veh/h/ln	0	1789	1815		1795	1805	1889		1803	0	1593	1414
Q Serve(g_s), s	0.0	9.9	10.0		7.1	4.3	4.4		20.5	0.0	1.4	0.0
Cycle Q Clear(g_c), s	0.0	9.9	10.0		7.1	4.3	4.4		20.5	0.0	1.4	0.0
Prop In Lane	0.00		0.21		1.00		0.03		1.00		1.00	1.00
Lane Grp Cap(c), veh/h	0	1158	1175		117	1361	1425		355	0	267	53
V/C Ratio(X)	0.00	0.27	0.27		0.81	0.15	0.15		0.78	0.00	0.07	0.00
Avail Cap(c_a), veh/h	0	1158	1175		271	1361	1425		793	0	654	397
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.90	0.90	0.90		1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	10.1	10.2		62.3	4.6	4.6		55.3	0.0	47.4	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.6		4.5	0.2	0.2		1.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.1	5.2		3.7	2.2	2.3		10.3	0.0	0.6	0.0
LnGrp Delay(d),s/veh	0.0	10.7	10.7		66.8	4.8	4.8		56.7	0.0	47.4	0.0
LnGrp LOS		B	B		E	A	A		E		D	
Approach Vol, veh/h		622				523				298		
Approach Delay, s/veh		10.7				16.1				56.1		
Approach LOS		B				B				E		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	14.4	93.4		27.2		107.8		27.2
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	20.4	43.0		55.4		69.0		55.4
Max Q Clear Time (g_c+I1), s	9.1	12.0		0.0		6.4		22.5
Green Ext Time (p_c), s	0.0	8.3		0.0		9.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	22.0
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	0	0
Future Volume (veh/h)	0	0
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900
Adj Flow Rate, veh/h	0	0
Adj No. of Lanes	1	0
Peak Hour Factor	0.25	0.25
Percent Heavy Veh, %	0	0
Cap, veh/h	318	0
Arrive On Green	0.00	0.00
Sat Flow, veh/h	1900	0
Grp Volume(v), veh/h	0	0
Grp Sat Flow(s),veh/h/ln	1900	0
Q Serve(g_s), s	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0
Prop In Lane		0.00
Lane Grp Cap(c), veh/h	318	0
V/C Ratio(X)	0.00	0.00
Avail Cap(c_a), veh/h	780	0
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.0
LnGrp LOS		
Approach Vol, veh/h	0	
Approach Delay, s/veh	0.0	
Approach LOS		
Timer		

User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (veh/h)	2	161	734	14	30	367	148	55	13	27	1	168
Future Volume (veh/h)	2	161	734	14	30	367	148	55	13	27	1	168
Number		5	2	12	1	6	16	7	4	14		3
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0		0
Ped-Bike Adj(A_pbT)		1.00		0.98	1.00		0.98	1.00		1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Adj Sat Flow, veh/h/ln		1900	1881	1900	1900	1887	1900	1863	1900	1900		1900
Adj Flow Rate, veh/h		175	798	10	37	448	153	65	15	0		187
Adj No. of Lanes		1	2	1	1	2	0	1	1	0		1
Peak Hour Factor		0.92	0.92	0.92	0.82	0.82	0.82	0.84	0.84	0.84		0.90
Percent Heavy Veh, %		0	1	0	0	1	1	2	0	0		0
Cap, veh/h		199	2497	1102	48	1594	539	83	19	0		211
Arrive On Green		0.11	0.70	0.70	0.03	0.61	0.61	0.05	0.01	0.00		0.12
Sat Flow, veh/h		1810	3574	1577	1810	2614	884	1774	1900	0		1810
Grp Volume(v), veh/h		175	798	10	37	306	295	65	15	0		187
Grp Sat Flow(s),veh/h/ln		1810	1787	1577	1810	1792	1706	1774	1900	0		1810
Q Serve(g_s), s		12.9	11.7	0.3	2.7	10.8	11.0	4.9	1.1	0.0		13.7
Cycle Q Clear(g_c), s		12.9	11.7	0.3	2.7	10.8	11.0	4.9	1.1	0.0		13.7
Prop In Lane		1.00		1.00	1.00		0.52	1.00		0.00		1.00
Lane Grp Cap(c), veh/h		199	2497	1102	48	1093	1040	83	19	0		211
V/C Ratio(X)		0.88	0.32	0.01	0.78	0.28	0.28	0.78	0.80	0.00		0.88
Avail Cap(c_a), veh/h		252	2497	1102	74	1093	1040	177	317	0		295
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Upstream Filter(I)		0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	0.00		1.00
Uniform Delay (d), s/veh		59.2	7.9	6.2	65.3	12.4	12.4	63.7	66.7	0.0		58.7
Incr Delay (d2), s/veh		19.5	0.3	0.0	9.9	0.6	0.7	6.0	24.0	0.0		16.2
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
%ile BackOfQ(50%),veh/ln		7.5	5.9	0.1	1.5	5.5	5.4	2.5	0.7	0.0		7.8
LnGrp Delay(d),s/veh		78.7	8.2	6.2	75.2	13.0	13.1	69.7	90.7	0.0		74.9
LnGrp LOS		E	A	A	E	B	B	E	F			E
Approach Vol, veh/h			983			638			80			
Approach Delay, s/veh			20.7			16.7			73.6			
Approach LOS			C			B			E			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	100.3	20.8	5.8	20.1	88.3	11.8	14.8
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	5.5	65.0	22.0	22.5	* 19	51.0	13.5	30.5
Max Q Clear Time (g_c+I1), s	4.7	13.7	15.7	3.1	14.9	13.0	6.9	3.5
Green Ext Time (p_c), s	0.0	15.2	0.0	0.0	0.0	14.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.3
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	20	178
Future Volume (veh/h)	20	178
Number	8	18
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1883	1900
Adj Flow Rate, veh/h	22	0
Adj No. of Lanes	1	0
Peak Hour Factor	0.90	0.90
Percent Heavy Veh, %	0	0
Cap, veh/h	144	0
Arrive On Green	0.08	0.00
Sat Flow, veh/h	1883	0
Grp Volume(v), veh/h	22	0
Grp Sat Flow(s),veh/h/ln	1883	0
Q Serve(g_s), s	1.5	0.0
Cycle Q Clear(g_c), s	1.5	0.0
Prop In Lane		0.00
Lane Grp Cap(c), veh/h	144	0
V/C Ratio(X)	0.15	0.00
Avail Cap(c_a), veh/h	425	0
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	0.00
Uniform Delay (d), s/veh	58.3	0.0
Incr Delay (d2), s/veh	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0
LnGrp Delay(d),s/veh	58.4	0.0
LnGrp LOS	E	
Approach Vol, veh/h	209	
Approach Delay, s/veh	73.2	
Approach LOS	E	
Timer		

User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	545	132	132	345	237	60	56	115	294	68	80
Future Volume (veh/h)	80	545	132	132	345	237	60	56	115	294	68	80
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1896	1900	1900	1900	1900	1900	1900	1900	1881	1900	1900
Adj Flow Rate, veh/h	94	641	150	150	392	255	62	58	65	306	71	56
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.97	0.97	0.97	0.96	0.96	0.96
Percent Heavy Veh, %	5	0	0	0	0	0	0	0	0	1	0	0
Cap, veh/h	119	630	147	182	485	316	175	79	88	377	202	160
Arrive On Green	0.07	0.42	0.42	0.10	0.46	0.46	0.10	0.10	0.10	0.21	0.21	0.21
Sat Flow, veh/h	1723	1486	348	1810	1065	693	1810	815	913	1792	961	758
Grp Volume(v), veh/h	94	0	791	150	0	647	62	0	123	306	0	127
Grp Sat Flow(s),veh/h/ln	1723	0	1834	1810	0	1759	1810	0	1728	1792	0	1719
Q Serve(g_s), s	5.7	0.0	45.0	8.6	0.0	33.7	3.4	0.0	7.4	17.3	0.0	6.7
Cycle Q Clear(g_c), s	5.7	0.0	45.0	8.6	0.0	33.7	3.4	0.0	7.4	17.3	0.0	6.7
Prop In Lane	1.00		0.19	1.00		0.39	1.00		0.53	1.00		0.44
Lane Grp Cap(c), veh/h	119	0	777	182	0	801	175	0	167	377	0	362
V/C Ratio(X)	0.79	0.00	1.02	0.83	0.00	0.81	0.35	0.00	0.74	0.81	0.00	0.35
Avail Cap(c_a), veh/h	406	0	777	426	0	801	682	0	651	591	0	567
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.7	0.0	30.6	46.8	0.0	24.9	44.8	0.0	46.6	39.9	0.0	35.7
Incr Delay (d2), s/veh	4.4	0.0	36.7	3.6	0.0	6.4	1.5	0.0	7.6	5.7	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	30.6	4.5	0.0	17.8	1.8	0.0	3.9	9.1	0.0	3.2
LnGrp Delay(d),s/veh	53.1	0.0	67.3	50.4	0.0	31.3	46.4	0.0	54.3	45.6	0.0	36.5
LnGrp LOS	D		F	D		C	D		D	D		D
Approach Vol, veh/h		885			797			185			433	
Approach Delay, s/veh		65.8			34.9			51.6			42.9	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.2	51.0		26.5	10.8	54.3		14.5
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	10.6	47.0		19.3	7.7	35.7		9.4
Green Ext Time (p_c), s	0.2	0.0		2.1	0.1	5.3		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.6
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	49.3
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	7	339	231	143	0	27	186	18	0	177	102	53
Future Vol, veh/h	7	339	231	143	0	27	186	18	0	177	102	53
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	3	2	0	0	0	2	1	0	0
Mvmt Flow	8	377	257	159	0	30	209	20	0	199	115	60
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	50.7	30.8	25.5
HCM LOS	F	D	D

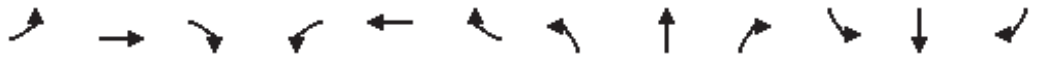
Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	66%	0%	100%	0%	0%	91%	0%	29%
Vol Right, %	0%	34%	0%	0%	100%	0%	9%	0%	71%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	177	155	346	231	143	27	204	16	423
LT Vol	177	0	346	0	0	27	0	16	0
Through Vol	0	102	0	231	0	0	186	0	121
RT Vol	0	53	0	0	143	0	18	0	302
Lane Flow Rate	199	174	384	257	159	30	229	17	455
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.597	0.486	1	0.664	0.38	0.094	0.675	0.051	1
Departure Headway (Hd)	10.801	10.049	9.817	9.318	8.62	11.167	10.609	10.694	9.716
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	334	359	369	388	416	321	342	337	378
Service Time	8.573	7.821	7.602	7.103	6.405	8.937	8.378	8.394	7.416
HCM Lane V/C Ratio	0.596	0.485	1.041	0.662	0.382	0.093	0.67	0.05	1.204
HCM Control Delay	28.5	22	79.4	28.8	16.6	15.1	32.9	14	78.5
HCM Lane LOS	D	C	F	D	C	C	D	B	F
HCM 95th-tile Q	3.6	2.6	11.7	4.6	1.7	0.3	4.7	0.2	11.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	16	121	302
Future Vol, veh/h	0	16	121	302
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	0	1	0
Mvmt Flow	0	17	130	325
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	76.1
HCM LOS	F

Lane



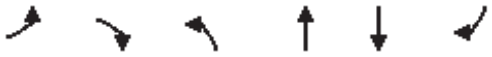
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	258	0	151	52	894	0	0	194	170
Future Volume (veh/h)	0	0	0	258	0	151	52	894	0	0	194	170
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				287	0	36	56	961	0	0	223	24
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.93	0.93	0.93	0.87	0.87	0.87
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				774	0	345	173	1571	0	0	804	358
Arrive On Green				0.21	0.00	0.21	0.10	0.44	0.00	0.00	0.22	0.22
Sat Flow, veh/h				3619	0	1611	1810	3705	0	0	3705	1608
Grp Volume(v), veh/h				287	0	36	56	961	0	0	223	24
Grp Sat Flow(s),veh/h/ln				1810	0	1611	1810	1805	0	0	1805	1608
Q Serve(g_s), s				2.4	0.0	0.6	1.0	7.4	0.0	0.0	1.8	0.4
Cycle Q Clear(g_c), s				2.4	0.0	0.6	1.0	7.4	0.0	0.0	1.8	0.4
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				774	0	345	173	1571	0	0	804	358
V/C Ratio(X)				0.37	0.00	0.10	0.32	0.61	0.00	0.00	0.28	0.07
Avail Cap(c_a), veh/h				3024	0	1346	1260	5027	0	0	5027	2239
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				12.0	0.0	11.3	15.2	7.8	0.0	0.0	11.6	11.0
Incr Delay (d2), s/veh				0.1	0.0	0.0	0.4	0.1	0.0	0.0	0.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.2	0.0	0.3	0.5	3.6	0.0	0.0	0.9	0.2
LnGrp Delay(d),s/veh				12.2	0.0	11.4	15.6	8.0	0.0	0.0	11.6	11.0
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					323			1017			247	
Approach Delay, s/veh					12.1			8.4			11.6	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		22.4			7.6	14.8		13.5
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		9.4			3.0	3.8		4.4
Green Ext Time (p_c), s		2.8			0.0	2.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	433	46	312	513	365	87
Future Volume (veh/h)	433	46	312	513	365	87
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	487	10	339	558	384	16
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.89	0.89	0.92	0.92	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	699	312	660	1822	779	347
Arrive On Green	0.19	0.19	0.19	0.50	0.22	0.22
Sat Flow, veh/h	3619	1615	3510	3705	3705	1608
Grp Volume(v), veh/h	487	10	339	558	384	16
Grp Sat Flow(s),veh/h/ln	1810	1615	1755	1805	1805	1608
Q Serve(g_s), s	5.2	0.2	3.6	3.8	3.9	0.3
Cycle Q Clear(g_c), s	5.2	0.2	3.6	3.8	3.9	0.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	699	312	660	1822	779	347
V/C Ratio(X)	0.70	0.03	0.51	0.31	0.49	0.05
Avail Cap(c_a), veh/h	2170	968	2526	4330	4330	1928
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.7	13.7	15.2	6.0	14.3	12.9
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.2	1.8	1.9	1.9	0.1
LnGrp Delay(d),s/veh	16.2	13.7	15.4	6.1	14.5	13.0
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	497			897	400	
Approach Delay, s/veh	16.1			9.6	14.5	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		27.8		13.8	12.0	15.8		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		5.8		7.2	5.6	5.9		
Green Ext Time (p_c), s		2.0		0.8	0.6	2.0		

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

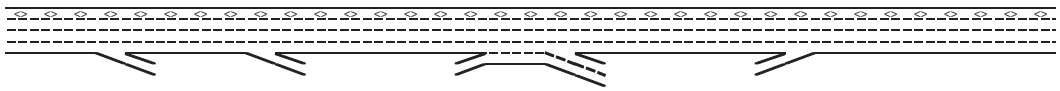
APPENDIX A.4:
TECHNICAL CALCULATIONS –
EXISTING PLUS PROJECT CONDITIONS
FREEWAY LOS

Project: EDH Town Center Apartments EIR **Alternative:** Existing + Project Conditions

Freeway Corridor: Eastbound US 50 **Time Period:** AM Peak Hour

Data Entry Value

Calculated Value



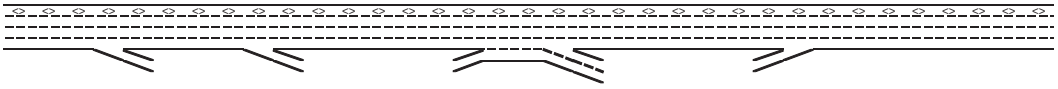
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5	6	7
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	2,560	1,477	1,190	1,190	1,432	1,432	1,680
On Ramp Volume				340		248	
Off Ramp Volume	1,083	287		98			
Express Lane Volume	128	74	60	60	72	72	84
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	2,432	1,403	1,131	1,471	1,360	1,608	1,596
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.980	0.980	0.980	0.980	0.980	0.980	0.862
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,851	1,645	1,325	1,724	1,595	1,886	2,128
GP Flow (pcphpl)	950	548	442	431	532	629	709
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.40	0.23	0.19	0.18	0.23	0.27	0.30
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	14.6	8.4	6.8	6.6	8.2	9.7	10.9
LOS	B	A	A	A	A	A	A
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				1,351		1,612	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.19		0.23	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	1,662	1,330		1,617			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.24	0.19		0.23			
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	128	74	60	60	72	72	84
PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	166	96	77	77	93	93	117

Location	1	2	3	4	5	6	7



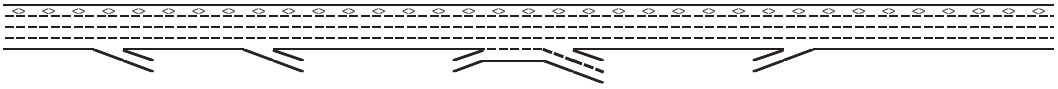
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
EL Flow (pcphpl)	166	96	77	77	93	93	117
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.09	0.05	0.04	0.04	0.05	0.05	0.07
Calculate On Ramp Flow Rate							
On Volume (vph)				340		248	
PHF				0.92		0.92	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				2.0%		3.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.990		0.985	
f_P				1.00		1.00	
On Flow (pcph)				373		274	
On Flow (pcphpl)				373		274	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.18		0.14	
Calculate Off Ramp Flow Rate							
Off Volume (vph)	1,083	287		98			
PHF	0.92	0.92		0.94			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	2.0%	2.0%		5.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.990	0.990		0.976			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	1,189	315		107			
Off Flow (pcphpl)	1,189	315		53			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.57	0.17		0.03			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		1,189					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	315	373				193	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						1,612	

Location	1	2	3	4	5	6	7



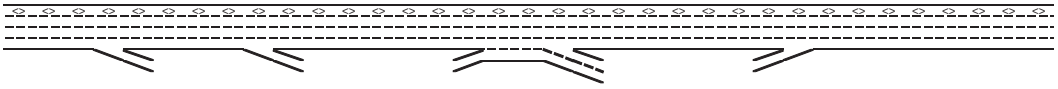
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						1,148	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.646						
P_{FM}						0.593	
v_{12} (pcph)						956	
v_3 (pcph)						656	
v_{34} (pcph)							
v_{12a} (pcph)						956	
v_{R12a} (pcph)						1,229	
Merge Speed Index						0.31	
Merge Area Speed						57.9	
Outer Lanes Volume						656	
Outer Lanes Speed						64.4	
Segment Speed						60.0	
Merge v/c ratio						0.27	
Merge Density						11.5	
Merge LOS						B	
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	2,851	1,645					
Up Ramp L_{EQ}		14,006					
Down Ramp L_{EQ}	508	380					
P_{FD} (Eqn 13-9)	0.634	0.704					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.602						
P_{FD}	0.634	0.704					
v_{12} (pcph)	2,243	1,252					
v_3 (pcph)	608	393					
v_{34} (pcph)							
v_{12a} (pcph)	2,243	1,252					
Diverge Speed Index	0.41	0.59					
Diverge Area Speed	55.7	51.5					
Outer Lanes Volume	608	393					
Outer Lanes Speed	71.3	71.3					
Segment Speed	58.4	55.2					
Diverge v/c ratio	0.51	0.28					
Diverge Density	22.2	13.7					
Diverge LOS	C	B					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				68			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				3.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.983			
f_P				1.00			
On to Off Flow (pcph)				80			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				272			
PHF				0.92			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				2.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.990			
f_P				1.00			
On to ML Flow (pcph)				299			

Location	1	2	3	4	5	6	7



Key

<> Express Lane (HOV)

No Trucks

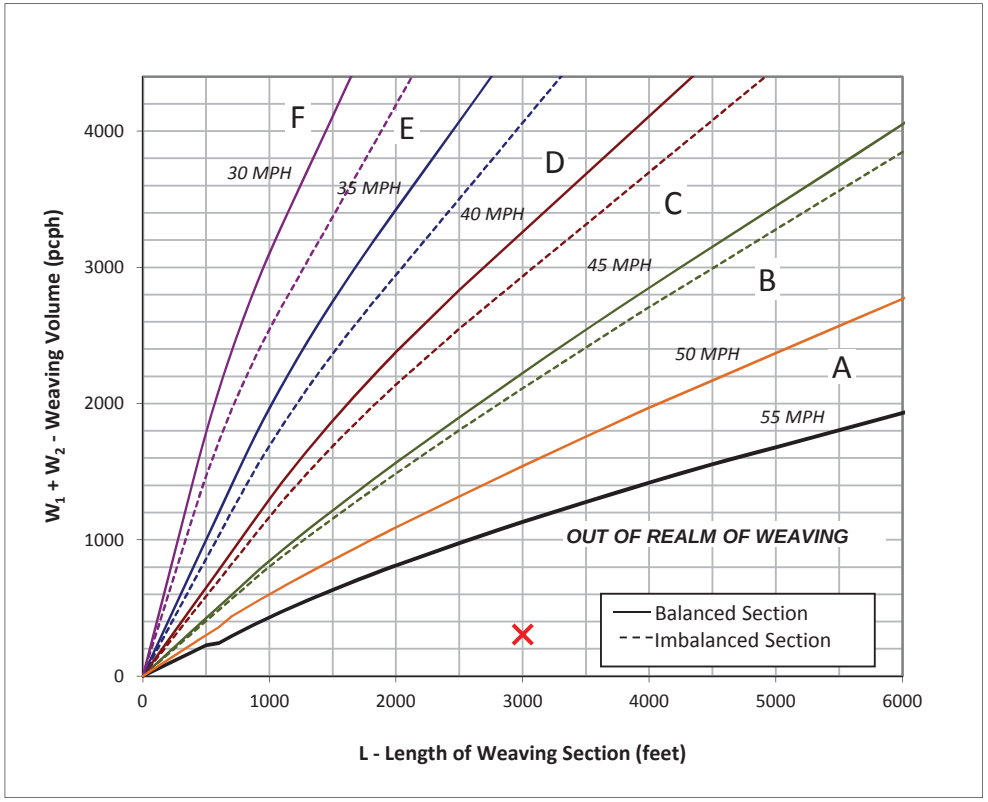
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				30			
PHF				0.94			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				5.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.976			
f_P				1.00			
ML to Off Flow (pcph)				33			
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				1,101			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				4.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.980			
f_P				1.00			
GP to GP Flow (pcph)				1,290			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				331			
Non-Weave Flow				1,370			
Segment Flow				1,701			
Max Weave Length				4,483			
Length Check				OK			
Ideal Weave Capacity				2,160			
f_{HV}				0.982			
f_P				0.998			
Capacity Condition 1				6,353			
Capacity Condition 2				12,081			
Weave v/c ratio				0.26			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				299			
Weave LC Rate				932			
Non-Weave LC Rate 1				788			
Non-Weave LC Rate 2				1,994			
Non-Weave LC Rate 3				-607			
Segment LC Rate				1,721			
Weave Intensity Factor				0.201			
Weave Speed				56.6			
Non-Weave Speed				60.1			
Segment Speed				59.4			
Weave Density				9.5			
Weave LOS				A			
Summarize Segment Operations							
Segment v/c ratio	0.51	0.28	0.19	0.26	0.23	0.27	0.30
Segment Density	22.2	13.7	6.8	9.5	8.2	11.5	10.9
Segment LOS	C	B	A	A	A	B	A
Over Capacity							

Leisch Method for Weaving Analysis

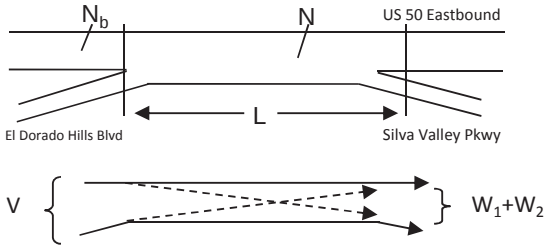
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Existing + Project AM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	1,530	Volume (vph)*	272	Volume (vph)*	30
Truck Percentage	4%	Truck Percentage	2%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	1,561	Volume (pcph)	275	Volume (pcph)	31



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

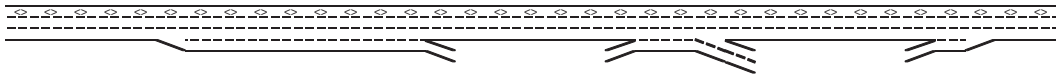
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Existing + Project Conditions

Freeway Corridor: Westbound US 50 **Time Period:** AM Peak Hour

Data Entry Value

Calculated Value



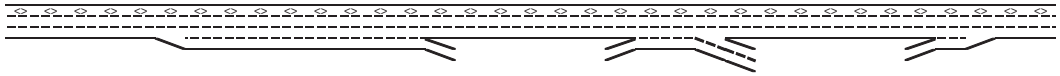
Key

<> Express Lane (HOV)

No Trucks

Location	8	9	10	11	12	13	14
Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segment							
Type	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length							880
Decel Length			1,500				
Mainline Volume	3,801	3,801	3,801	3,302	3,302	3,253	3,253
On Ramp Volume					489		1,262
Off Ramp Volume			499		538		
Express Lane Volume	418	418	418	363	363	358	358
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	3,383	3,383	3,383	2,939	3,428	2,895	4,157
PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
GP Lanes	2	3	3	2	3	2	2
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.995
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	3,617	3,617	3,617	3,142	3,665	3,095	4,445
GP Flow (pcphpl)	1,808	1,206	1,206	1,571	1,222	1,548	2,222
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.77	0.51	0.51	0.67	0.52	0.66	0.95
Speed (mph)	62.6	65.0	65.0	64.6	65.0	64.7	55.4
Density (pcphpl)	28.9	18.5	18.5	24.3	18.8	23.9	40.1
LOS	D	C	C	C	C	C	E
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)		3,617			3,139		3,059
GP_{IN} Cap (pcph)		4,700			4,700		4,700
GP_{IN} v/c ratio		0.77			0.67		0.65
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)			3,038		3,074		
GP_{OUT} Cap (pcph)			4,700		4,700		
GP_{OUT} v/c ratio			0.65		0.65		
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	418	418	418	363	363	358	358
PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Express Lanes	1	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	474	474	474	412	412	406	406

Location	8	9	10	11	12	13	14



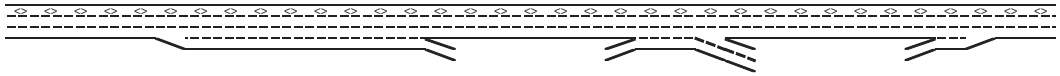
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
EL Flow (pcphpl)	474	474	474	412	412	406	406
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.27	0.27	0.27	0.24	0.24	0.23	0.23
Calculate On Ramp Flow Rate							
On Volume (vph)					489		1,262
PHF					0.93		0.92
Total Lanes					1		1
Terrain					Level		Level
Grade %					0.0%		0.0%
Grade Length (mi)					0.00		0.00
Truck & Bus %					0.0%		2.0%
RV %					0.0%		0.0%
E_T					1.5		1.5
E_R					1.2		1.2
f_{HV}					1.000		0.990
f_P					1.00		1.00
On Flow (pcph)					526		1,385
On Flow (pcphpl)					526		1,385
Calculate On Ramp Roadway Operations							
On Ramp Type					Right		Right
On Ramp Speed (mph)					45		45
On Ramp Cap (pcph)					2,100		2,100
On Ramp v/c ratio					0.25		0.66
Calculate Off Ramp Flow Rate							
Off Volume (vph)			499		538		
PHF			0.87		0.92		
Total Lanes			1		2		
Terrain			Level		Level		
Grade %			0.0%		0.0%		
Grade Length (mi)			0.00		0.00		
Truck & Bus %			2.0%		2.0%		
RV %			0.0%		0.0%		
E_T			1.5		1.5		
E_R			1.2		1.2		
f_{HV}			0.990		0.990		
f_P			1.00		1.00		
Off Flow (pcph)			579		591		
Off Flow (pcphpl)			579		295		
Calculate Off Ramp Roadway Operations							
Off Ramp Type			Right		Right		
Off Ramp Speed			45		25		
Off Ramp Cap (pcph)			2,100		3,800		
Off Ramp v/c ratio			0.28		0.16		
Determine Adjacent Ramp for Three-Lane Mainline S							
Up Type			On		Off		
Up Distance			5,200		2,550		
Up Flow (pcph)			835		579		
Down Type			On		No		
Down Distance			1,500				
Down Flow (pcph)			1,385				
Calculate Merge Influence Area Operations							
Effective v_P (pcph)							3,059

Location	8	9	10	11	12	13	14



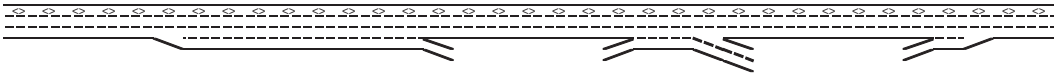
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Up Ramp L_{EQ}							
Down Ramp L_{EQ}							
P_{FM} (Eqn 13-3)							0.602
P_{FM} (Eqn 13-4)					#VALUE!		
P_{FM} (Eqn 13-5)							
P_{FM}							1.000
v_{12} (pcph)							3,059
v_3 (pcph)							
v_{34} (pcph)							
v_{12a} (pcph)							3,059
v_{R12a} (pcph)							4,445
Merge Speed Index							0.57
Merge Area Speed							51.8
Outer Lanes Volume							
Outer Lanes Speed							
Segment Speed							51.8
Merge v/c ratio							0.97
Merge Density							34.0
Merge LOS							D
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)			3,617				
Up Ramp L_{EQ}			7,582				
Down Ramp L_{EQ}			1,689				
P_{FD} (Eqn 13-9)			0.643				
P_{FD} (Eqn 13-10)			0.673				
P_{FD} (Eqn 13-11)							
P_{FD}			0.673				
v_{12} (pcph)			2,623				
v_3 (pcph)			993				
v_{34} (pcph)							
v_{12a} (pcph)			2,623				
Diverge Speed Index			0.35				
Diverge Area Speed			56.9				
Outer Lanes Volume			993				
Outer Lanes Speed			71.3				
Segment Speed			60.3				
Diverge v/c ratio			0.60				
Diverge Density			13.3				
Diverge LOS			B				
Calculate On Ramp to Off Ramp Flow Rate for Wea							
On to Off Volume (vph)					91		
PHF					0.94		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					1.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.995		
f_P					1.00		
On to Off Flow (pcph)					98		
Calculate On Ramp to Mainline Flow Rate for Weave							
On to ML Volume (vph)					398		
PHF					0.93		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					0.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					1.000		
f_P					1.00		
On to ML Flow (pcph)					427		

Location	8	9	10	11	12	13	14



Key

<> Express Lane (HOV)

No Trucks

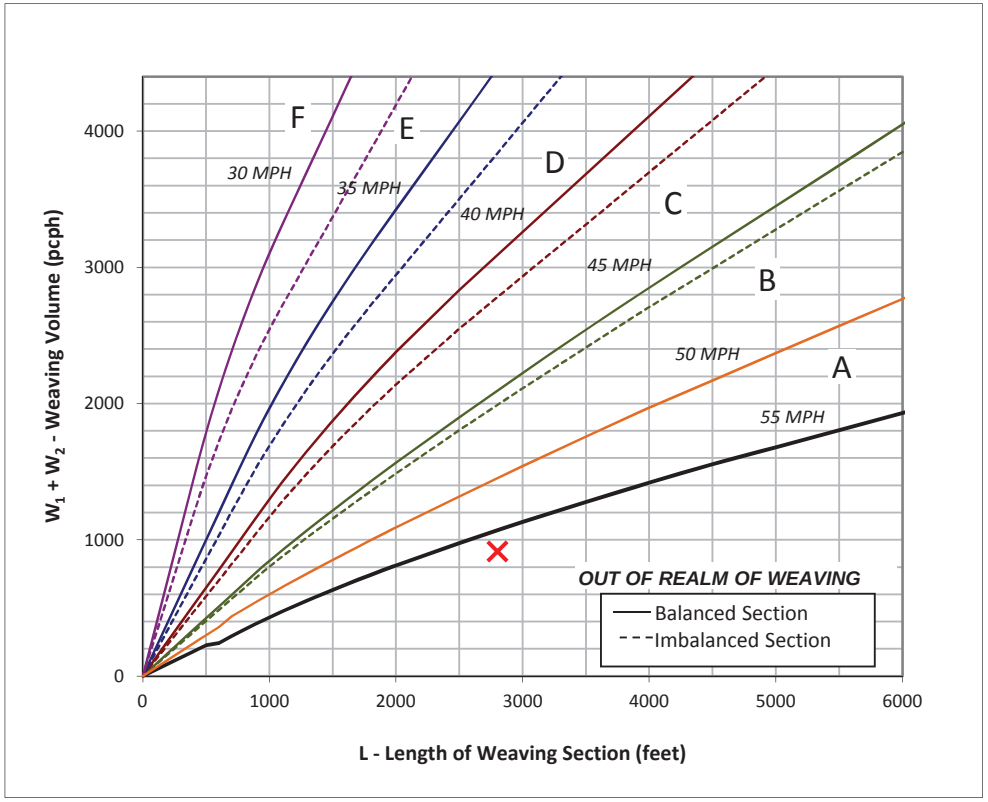
Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Mainline to Off Ramp Flow Rate for Weav							
ML to Off Volume (vph)					447		
PHF					0.92		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					2.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.990		
f_P					1.00		
ML to Off Flow (pcph)					490		
Calculate General Purpose Lanes to General Purpos							
GP to GP Volume (vph)					2,492		
PHF					0.94		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					1.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.995		
f_P					1.00		
GP to GP Flow (pcph)					2,665		
Calculate Weave Segment Operations							
Weave Type					One-sided		
Weave Length					1,800		
Segment Lanes					2		
Weave Lanes					2		
Weave Flow (pcph)					918		
Non-Weave Flow					2,762		
Segment Flow					3,680		
Max Weave Length					5,047		
Length Check					OK		
Ideal Weave Capacity					2,102		
f_{HV}					0.995		
f_P					1.000		
Capacity Condition 1					4,182		
Capacity Condition 2					9,575		
Weave v/c ratio					0.88		
Interchange Density					1		
Lane Changes On to ML					1		
Lane Changes ML to Off					0		
Lane Changes On to Off					0		
Min Lane Change Rate					427		
Weave LC Rate					1,082		
Non-Weave LC Rate 1					1,159		
Non-Weave LC Rate 2					2,305		
Non-Weave LC Rate 3					-255		
Segment LC Rate					2,242		
Weave Intensity Factor					0.269		
Weave Speed					54.4		
Non-Weave Speed					53.1		
Segment Speed					53.4		
Weave Density					34.4		
Weave LOS					D		
Summarize Segment Operations							
Segment v/c ratio	0.77	0.51	0.60	0.67	0.88	0.66	0.97
Segment Density	28.9	18.5	13.3	24.3	34.4	23.9	34.0
Segment LOS	D	C	B	C	D	C	D
Over Capacity							

Leisch Method for Weaving Analysis

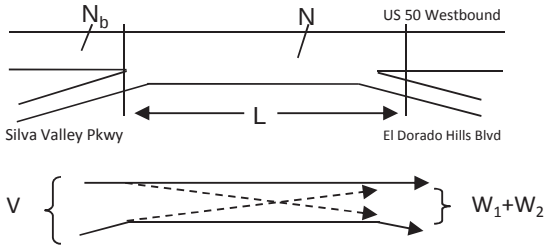
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Existing + Project AM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,791	Volume (vph)*	430	Volume (vph)*	479
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,829	Volume (pcph)	430	Volume (pcph)	484



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

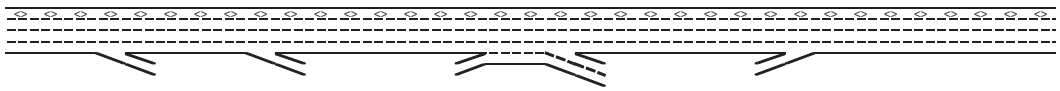
The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Existing + Project Conditions
Freeway Corridor: Eastbound US 50 **Time Period:** PM Peak Hour

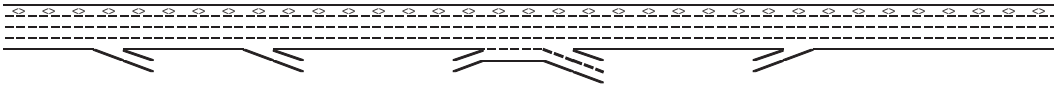
Data Entry Value
Calculated Value



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5	6	7
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	4,870	4,133	3,387	3,387	3,557	3,557	3,956
On Ramp Volume				649		399	
Off Ramp Volume	737	746		479			
Express Lane Volume	536	455	373	373	391	391	435
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	4,334	3,678	3,014	3,663	3,166	3,565	3,521
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	6.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,491	3,811	3,123	3,796	3,280	3,693	3,811
GP Flow (pcphpl)	1,497	1,270	1,041	949	1,093	1,231	1,270
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.64	0.54	0.44	0.40	0.47	0.52	0.54
Speed (mph)	64.9	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	23.1	19.5	16.0	14.6	16.8	18.9	19.5
LOS	C	C	B	B	B	C	C
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				3,123		3,166	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.44		0.45	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	3,727	3,038		3,257			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.53	0.43		0.46			
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	536	455	373	373	391	391	435
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	601	510	418	418	439	439	527

Location	1	2	3	4	5	6	7



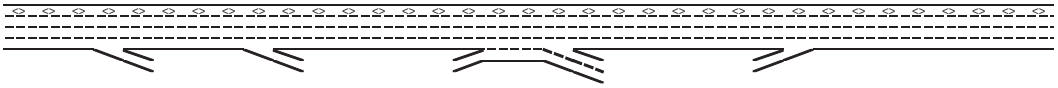
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
EL Flow (pcphpl)	601	510	418	418	439	439	527
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.34	0.29	0.24	0.24	0.25	0.25	0.30
Calculate On Ramp Flow Rate							
On Volume (vph)				649		399	
PHF				0.97		0.76	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				1.0%		1.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.995		0.995	
f_P				1.00		1.00	
On Flow (pcph)				672		528	
On Flow (pcphpl)				672		528	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.32		0.28	
Calculate Off Ramp Flow Rate							
Off Volume (vph)	737	746		479			
PHF	0.97	0.97		0.89			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	1.0%	1.0%		0.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.995	0.995		1.000			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	764	773		538			
Off Flow (pcphpl)	764	773		269			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.36	0.41		0.13			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		764					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	773	672				127	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						3,166	

Location	1	2	3	4	5	6	7



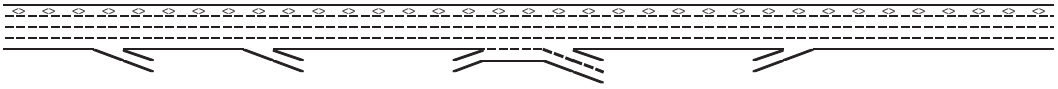
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						751	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.788						
P_{FM}						0.593	
v_{12} (pcph)						1,877	
v_3 (pcph)						1,289	
v_{34} (pcph)							
v_{12a} (pcph)						1,877	
v_{R12a} (pcph)						2,405	
Merge Speed Index						0.34	
Merge Area Speed						57.3	
Outer Lanes Volume						1,289	
Outer Lanes Speed						62.2	
Segment Speed						58.9	
Merge v/c ratio						0.52	
Merge Density						20.5	
Merge LOS						C	
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	4,491	3,811					
Up Ramp L_{EQ}		7,643					
Down Ramp L_{EQ}	1,067	905					
P_{FD} (Eqn 13-9)	0.613	0.629					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.635						
P_{FD}	0.635	0.629					
v_{12} (pcph)	3,131	2,684					
v_3 (pcph)	1,360	1,127					
v_{34} (pcph)							
v_{12a} (pcph)	3,131	2,684					
Diverge Speed Index	0.37	0.63					
Diverge Area Speed	56.6	50.6					
Outer Lanes Volume	1,360	1,127					
Outer Lanes Speed	69.9	70.8					
Segment Speed	60.0	55.2					
Diverge v/c ratio	0.71	0.61					
Diverge Density	29.8	26.0					
Diverge LOS	D	C					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				121			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.998			
f_P				1.00			
On to Off Flow (pcph)				125			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				528			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
On to ML Flow (pcph)				547			

Location	1	2	3	4	5	6	7



Key

<> Express Lane (HOV)

No Trucks

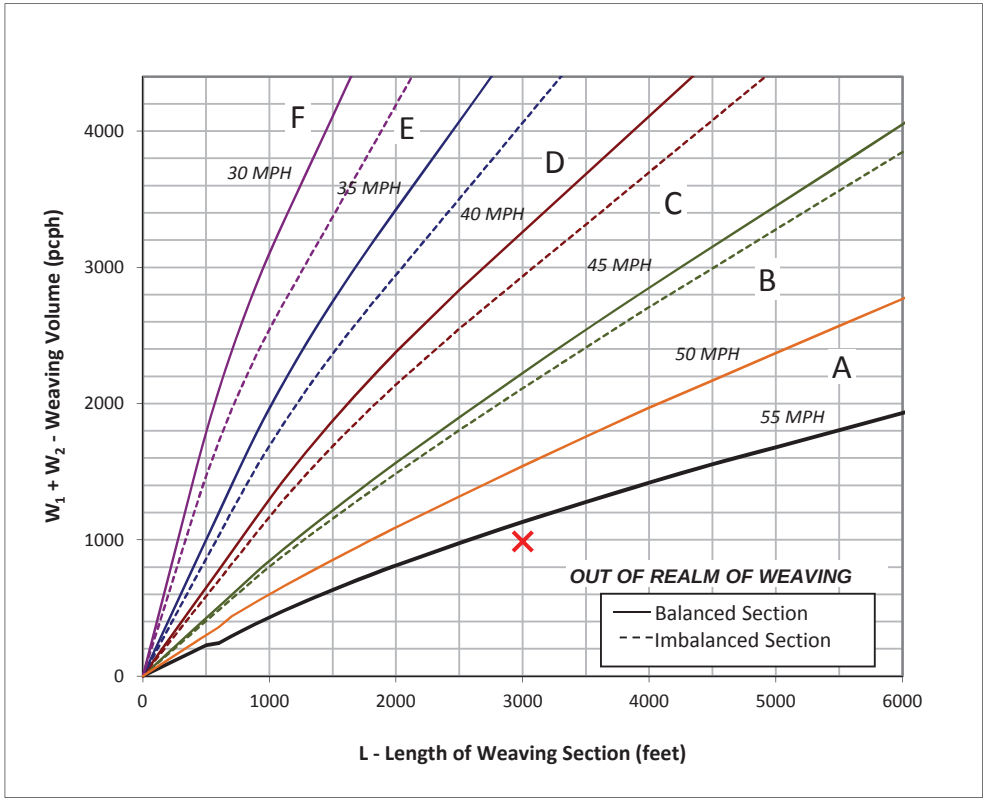
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				358			
PHF				0.89			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				1.000			
f_P				1.00			
ML to Off Flow (pcph)				402			
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				2,657			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
GP to GP Flow (pcph)				2,753			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				949			
Non-Weave Flow				2,878			
Segment Flow				3,827			
Max Weave Length				5,031			
Length Check				OK			
Ideal Weave Capacity				2,118			
f_{HV}				0.996			
f_P				0.999			
Capacity Condition 1				6,322			
Capacity Condition 2				9,633			
Weave v/c ratio				0.60			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				547			
Weave LC Rate				1,180			
Non-Weave LC Rate 1				1,099			
Non-Weave LC Rate 2				2,331			
Non-Weave LC Rate 3				817			
Segment LC Rate				2,279			
Weave Intensity Factor				0.251			
Weave Speed				55.0			
Non-Weave Speed				54.9			
Segment Speed				55.0			
Weave Density				23.2			
Weave LOS				C			
Summarize Segment Operations							
Segment v/c ratio	0.71	0.61	0.44	0.60	0.47	0.52	0.54
Segment Density	29.8	26.0	16.0	23.2	16.8	20.5	19.5
Segment LOS	D	C	B	C	B	C	C
Over Capacity							

Leisch Method for Weaving Analysis

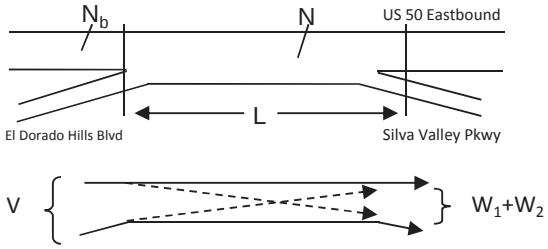
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Existing + Project PM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,036	Volume (vph)*	578	Volume (vph)*	408
Truck Percentage	1%	Truck Percentage	1%	Truck Percentage	0%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,056	Volume (pcph)	580	Volume (pcph)	408



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

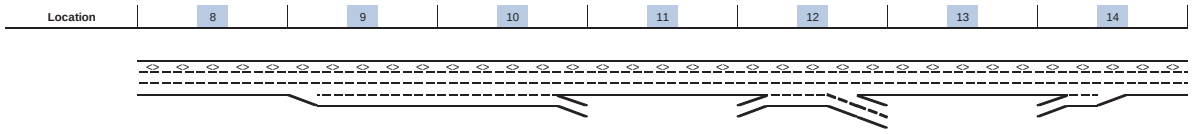
The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Existing + Project Conditions
Freeway Corridor: Westbound US 50 **Time Period:** PM Peak Hour

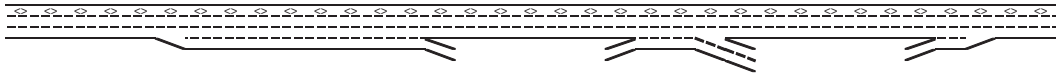
Data Entry Value
Calculated Value



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segment							
Type	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length							880
Decel Length			1,500				
Mainline Volume	2,351	2,351	2,351	1,942	1,942	1,807	1,807
On Ramp Volume					222		1,400
Off Ramp Volume			409		357		
Express Lane Volume	188	188	188	155	155	145	145
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	2,163	2,163	2,163	1,787	2,009	1,662	3,062
PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96
GP Lanes	2	3	3	2	3	2	2
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,276	2,276	2,276	1,880	2,113	1,749	3,222
GP Flow (pcphpl)	1,138	759	759	940	704	875	1,611
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.48	0.32	0.32	0.40	0.30	0.37	0.69
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	64.4
Density (pcphpl)	17.5	11.7	11.7	14.5	10.8	13.5	25.0
LOS	B	B	B	B	A	B	C
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)		2,276			1,867		1,771
GP_{IN} Cap (pcph)		4,700			4,700		4,700
GP_{IN} v/c ratio		0.48			0.40		0.38
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)			1,821		1,743		
GP_{OUT} Cap (pcph)			4,700		4,700		
GP_{OUT} v/c ratio			0.39		0.37		
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	188	188	188	155	155	145	145
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	211	211	211	174	174	162	162

Location	8	9	10	11	12	13	14



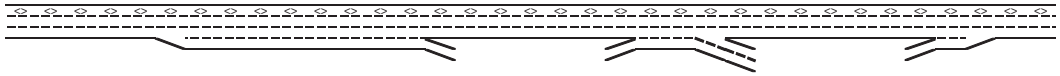
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
EL Flow (pcphpl)	211	211	211	174	174	162	162
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.12	0.12	0.12	0.10	0.10	0.09	0.09
Calculate On Ramp Flow Rate							
On Volume (vph)					222		1,400
PHF					0.9		0.97
Total Lanes					1		1
Terrain					Level		Level
Grade %					0.0%		0.0%
Grade Length (mi)					0.00		0.00
Truck & Bus %					0.0%		1.0%
RV %					0.0%		0.0%
E_T					1.5		1.5
E_R					1.2		1.2
f_{HV}					1.000		0.995
f_P					1.00		1.00
On Flow (pcph)					247		1,451
On Flow (pcphpl)					247		1,451
Calculate On Ramp Roadway Operations							
On Ramp Type					Right		Right
On Ramp Speed (mph)					45		45
On Ramp Cap (pcph)					2,100		2,100
On Ramp v/c ratio					0.12		0.69
Calculate Off Ramp Flow Rate							
Off Volume (vph)			409		357		
PHF			0.9		0.97		
Total Lanes			1		2		
Terrain			Level		Level		
Grade %			0.0%		0.0%		
Grade Length (mi)			0.00		0.00		
Truck & Bus %			0.0%		1.0%		
RV %			0.0%		0.0%		
E_T			1.5		1.5		
E_R			1.2		1.2		
f_{HV}			1.000		0.995		
f_P			1.00		1.00		
Off Flow (pcph)			454		370		
Off Flow (pcphpl)			454		185		
Calculate Off Ramp Roadway Operations							
Off Ramp Type			Right		Right		
Off Ramp Speed			45		25		
Off Ramp Cap (pcph)			2,100		3,800		
Off Ramp v/c ratio			0.22		0.10		
Determine Adjacent Ramp for Three-Lane Mainline S							
Up Type			On		Off		
Up Distance			5,200		2,550		
Up Flow (pcph)			282		454		
Down Type			On		No		
Down Distance			1,500				
Down Flow (pcph)			1,451				
Calculate Merge Influence Area Operations							
Effective v_P (pcph)							1,771

Location	8	9	10	11	12	13	14



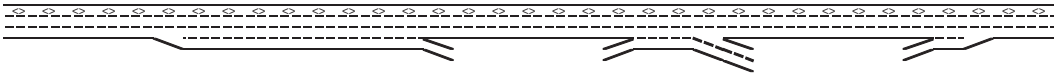
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Up Ramp L_{EQ}							
Down Ramp L_{EQ}							
P_{FM} (Eqn 13-3)							0.602
P_{FM} (Eqn 13-4)					#VALUE!		
P_{FM} (Eqn 13-5)							
P_{FM}							1.000
v_{12} (pcph)							1,771
v_3 (pcph)							
v_{34} (pcph)							
v_{12a} (pcph)							1,771
v_{R12a} (pcph)							3,222
Merge Speed Index							0.34
Merge Area Speed							57.2
Outer Lanes Volume							
Outer Lanes Speed							
Segment Speed							57.2
Merge v/c ratio							0.70
Merge Density							24.4
Merge LOS							C
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)			2,276				
Up Ramp L_{EQ}			3,175				
Down Ramp L_{EQ}			1,595				
P_{FD} (Eqn 13-9)			0.682				
P_{FD} (Eqn 13-10)			0.661				
P_{FD} (Eqn 13-11)							
P_{FD}			0.682				
v_{12} (pcph)			1,697				
v_3 (pcph)			579				
v_{34} (pcph)							
v_{12a} (pcph)			1,697				
Diverge Speed Index			0.34				
Diverge Area Speed			57.2				
Outer Lanes Volume			579				
Outer Lanes Speed			71.3				
Segment Speed			60.2				
Diverge v/c ratio			0.39				
Diverge Density			5.3				
Diverge LOS			A				
Calculate On Ramp to Off Ramp Flow Rate for Wea							
On to Off Volume (vph)					93		
PHF					0.96		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					0.5%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.998		
f_P					1.00		
On to Off Flow (pcph)					97		
Calculate On Ramp to Mainline Flow Rate for Weave							
On to ML Volume (vph)					129		
PHF					0.9		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					0.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					1.000		
f_P					1.00		
On to ML Flow (pcph)					144		

Location	8	9	10	11	12	13	14



Key

<> Express Lane (HOV)

No Trucks

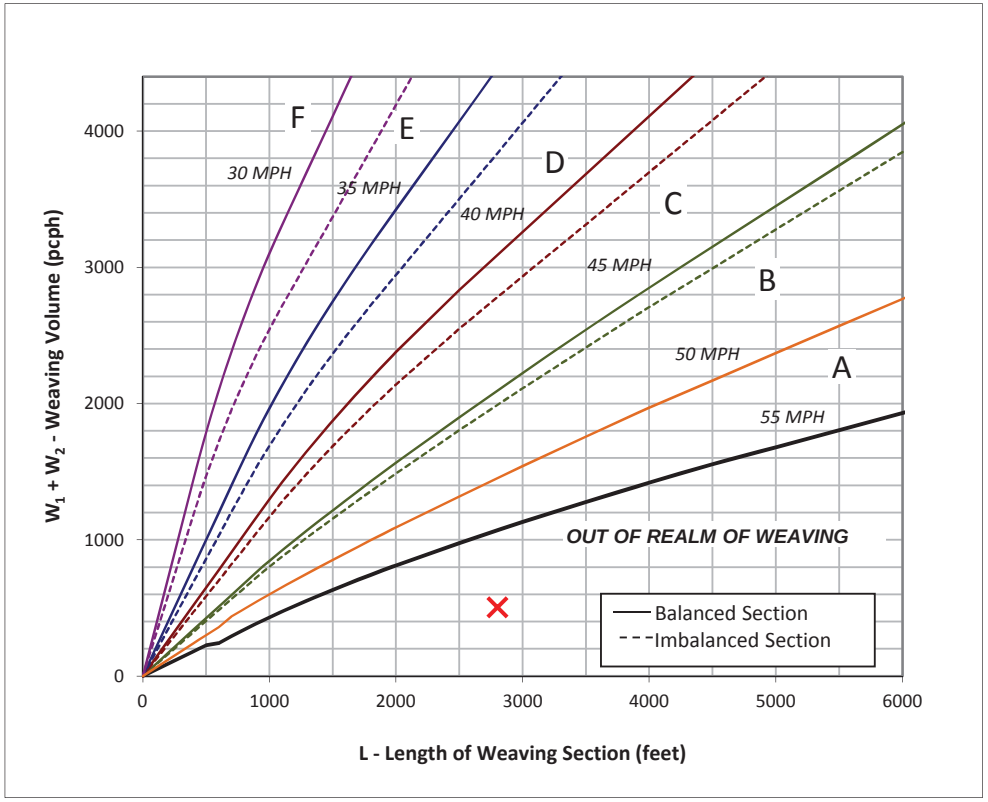
Name	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Mainline to Off Ramp Flow Rate for Weav							
ML to Off Volume (vph)					264		
PHF					0.97		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					1.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.995		
f_P					1.00		
ML to Off Flow (pcph)					274		
Calculate General Purpose Lanes to General Purpos							
GP to GP Volume (vph)					1,522		
PHF					0.96		
Terrain					Level		
Grade %					0.0%		
Grade Length (mi)					0.00		
Truck & Bus %					2.0%		
RV %					0.0%		
E_T					1.5		
E_R					1.2		
f_{HV}					0.990		
f_P					1.00		
GP to GP Flow (pcph)					1,601		
Calculate Weave Segment Operations							
Weave Type					One-sided		
Weave Length					1,800		
Segment Lanes					2		
Weave Lanes					2		
Weave Flow (pcph)					418		
Non-Weave Flow					1,698		
Segment Flow					2,116		
Max Weave Length					4,510		
Length Check					OK		
Ideal Weave Capacity					2,143		
f_{HV}					0.992		
f_P					1.000		
Capacity Condition 1					4,250		
Capacity Condition 2					12,055		
Weave v/c ratio					0.49		
Interchange Density					2		
Lane Changes On to ML					1		
Lane Changes ML to Off					0		
Lane Changes On to Off					0		
Min Lane Change Rate					144		
Weave LC Rate					781		
Non-Weave LC Rate 1					940		
Non-Weave LC Rate 2					2,068		
Non-Weave LC Rate 3					-254		
Segment LC Rate					1,721		
Weave Intensity Factor					0.218		
Weave Speed					56.0		
Non-Weave Speed					58.9		
Segment Speed					58.3		
Weave Density					18.1		
Weave LOS					B		
Summarize Segment Operations							
Segment v/c ratio	0.48	0.32	0.39	0.40	0.49	0.37	0.70
Segment Density	17.5	11.7	5.3	14.5	18.1	13.5	24.4
Segment LOS	B	B	A	B	B	B	C
Over Capacity							

Leisch Method for Weaving Analysis

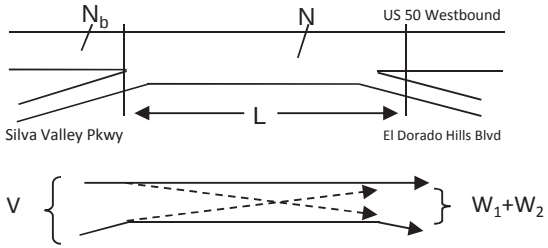
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	Lime Rock Valley EIR
Scenario	Existing + Project PM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,164	Volume (vph)*	184	Volume (vph)*	319
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	1%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	2,186	Volume (pcph)	184	Volume (pcph)	321



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

APPENDIX A.5:
TECHNICAL CALCULATIONS –
CUMULATIVE NO PROJECT CONDITIONS
INTERSECTION LOS AND QUEUEING REPORT

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	84	86	102.1%	52.3	10.9	D
	Through	707	719	101.7%	9.1	2.3	A
	Right Turn	70	74	106.3%	3.1	0.7	A
	Subtotal	861	879	102.1%	12.8	2.2	B
SB	Left Turn	30	27	91.0%	93.8	16.1	F
	Through	1,549	1,570	101.4%	34.9	3.2	C
	Right Turn	630	645	102.4%	52.1	12.7	D
	Subtotal	2,209	2,243	101.5%	40.7	5.6	D
EB	Left Turn	160	162	101.0%	69.1	8.7	E
	Through	100	104	103.5%	58.0	5.7	E
	Right Turn	38	37	97.6%	7.3	1.1	A
	Subtotal	298	302	101.4%	58.4	5.6	E
WB	Left Turn	130	132	101.2%	48.9	5.1	D
	Through	310	322	103.8%	59.3	5.1	E
	Right Turn	60	62	103.2%	6.4	2.0	A
	Subtotal	500	515	103.0%	50.8	4.0	D
Total		3,868	3,939	101.8%	37.1	3.6	D

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	930	919	98.8%	83.4	36.5	F
	Through	671	684	101.9%	24.4	5.4	C
	Right Turn	39	41	105.9%	4.4	1.8	A
	Subtotal	1,640	1,645	100.3%	56.4	19.9	E
SB	Left Turn	50	49	97.8%	54.6	9.4	D
	Through	1,117	1,132	101.4%	18.5	2.6	B
	Right Turn	550	556	101.1%	7.4	0.9	A
	Subtotal	1,717	1,737	101.2%	16.1	2.3	B
EB	Left Turn	150	150	100.1%	59.8	6.5	E
	Through	60	63	104.3%	57.7	8.6	E
	Right Turn	400	403	100.6%	4.6	0.3	A
	Subtotal	610	615	100.9%	22.8	3.1	C
WB	Left Turn	89	93	104.5%	61.0	9.7	E
	Through	20	20	97.5%	64.9	23.0	E
	Right Turn	40	45	112.5%	6.5	3.7	A
	Subtotal	149	158	105.7%	45.7	7.4	D
Total		4,116	4,154	100.9%	34.3	8.9	C

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	1,450	1,469	101.3%	13.5	15.9	B
	Right Turn	220	223	101.4%	6.1	0.7	A
	Subtotal	1,670	1,692	101.3%	12.7	14.2	B
SB	Left Turn	310	315	101.7%	33.9	4.3	C
	Through	1,296	1,278	98.6%	66.0	41.4	E
	Right Turn						
	Subtotal	1,606	1,593	99.2%	59.7	33.2	E
EB	Left Turn						
	Through						
	Right Turn	1,143	1,150	100.6%	35.7	12.8	D
	Subtotal	1,143	1,150	100.6%	35.7	12.8	D
WB	Left Turn						
	Through						
	Right Turn	190	191	100.3%	0.6	0.1	A
	Subtotal	190	191	100.3%	0.6	0.1	A
Total		4,609	4,626	100.4%	33.5	12.3	C

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	70	68	96.7%	37.1	17.1	D
	Through	1,407	1,435	102.0%	16.0	2.6	B
	Right Turn	48	48	99.6%	2.1	0.6	A
	Subtotal	1,525	1,550	101.6%	16.4	2.4	B
SB	Left Turn	463	475	102.6%	55.1	3.4	E
	Through	1,906	1,856	97.4%	48.0	13.5	D
	Right Turn	70	71	101.9%	14.5	10.2	B
	Subtotal	2,439	2,403	98.5%	48.4	11.1	D
EB	Left Turn	10	9	92.0%	42.6	37.1	D
	Through	9	9	95.6%	56.2	31.1	E
	Right Turn	10	12	115.0%	42.3	24.6	D
	Subtotal	29	29	101.0%	48.9	18.1	D
WB	Left Turn	116	118	101.9%	68.4	7.4	E
	Through	26	27	103.8%	67.7	13.3	E
	Right Turn	253	253	100.1%	25.8	9.3	C
	Subtotal	395	399	100.9%	41.2	8.6	D
Total		4,388	4,380	99.8%	36.2	5.7	D

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	160	132	82.7%	318.1	36.2	F
	Through	1,109	1,126	101.6%	29.3	2.3	C
	Right Turn	228	235	103.2%	11.6	3.7	B
	Subtotal	1,497	1,494	99.8%	51.7	3.7	D
SB	Left Turn	116	120	103.3%	51.4	9.2	D
	Through	1,088	1,082	99.5%	21.8	3.0	C
	Right Turn	828	775	93.6%	103.8	11.6	F
	Subtotal	2,032	1,977	97.3%	55.5	4.9	E
EB	Left Turn	249	252	101.3%	78.7	17.7	E
	Through	167	169	101.1%	42.7	6.5	D
	Right Turn	110	121	110.0%	21.2	10.2	C
	Subtotal	526	542	103.0%	54.7	10.0	D
WB	Left Turn	343	329	95.9%	164.5	75.4	F
	Through	572	583	101.9%	62.0	20.7	E
	Right Turn	167	173	103.5%	5.4	1.3	A
	Subtotal	1,082	1,085	100.3%	83.8	29.2	F
Total		5,137	5,097	99.2%	60.4	7.8	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	447	230	308	1282	10	80	10	69	10	10	10
Future Volume (veh/h)	0	447	230	308	1282	10	80	10	69	10	10	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	0.98		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1875	1900	1900	1863	1900	1845	1852	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	471	203	324	1349	11	84	11	5	11	11	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	0	2	2	3	0	0	0	0	0
Cap, veh/h	2	1290	552	360	2869	23	186	98	44	184	156	0
Arrive On Green	0.00	0.53	0.53	0.20	0.80	0.80	0.08	0.08	0.08	0.08	0.08	0.00
Sat Flow, veh/h	1810	2411	1031	1810	3598	29	1360	1191	542	1395	1900	0
Grp Volume(v), veh/h	0	347	327	324	663	697	84	0	16	11	11	0
Grp Sat Flow(s),veh/h/ln	1810	1781	1661	1810	1770	1857	1360	0	1733	1395	1900	0
Q Serve(g_s), s	0.0	9.9	10.0	15.4	10.7	10.7	5.3	0.0	0.8	0.6	0.5	0.0
Cycle Q Clear(g_c), s	0.0	9.9	10.0	15.4	10.7	10.7	5.8	0.0	0.8	1.4	0.5	0.0
Prop In Lane	1.00		0.62	1.00		0.02	1.00		0.31	1.00		0.00
Lane Grp Cap(c), veh/h	2	953	889	360	1411	1481	186	0	142	184	156	0
V/C Ratio(X)	0.00	0.36	0.37	0.90	0.47	0.47	0.45	0.00	0.11	0.06	0.07	0.00
Avail Cap(c_a), veh/h	64	953	889	915	1779	1866	499	0	540	505	593	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	11.8	11.8	34.4	2.9	2.9	39.9	0.0	37.4	38.0	37.2	0.0
Incr Delay (d2), s/veh	0.0	1.1	1.2	3.4	0.3	0.3	0.6	0.0	0.1	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.1	4.8	8.0	5.1	5.3	2.0	0.0	0.4	0.3	0.3	0.0
LnGrp Delay(d),s/veh	0.0	12.9	13.0	37.7	3.2	3.2	40.6	0.0	37.5	38.1	37.3	0.0
LnGrp LOS		B	B	D	A	A	D		D	D	D	
Approach Vol, veh/h		674			1684			100			22	
Approach Delay, s/veh		12.9			9.8			40.1			37.7	
Approach LOS		B			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.1	53.0		11.8	0.0	76.1		11.8
Change Period (Y+Rc), s	5.6	6.0		4.6	5.6	6.0		4.6
Max Green Setting (Gmax), s	44.4	47.0		27.4	3.1	88.3		27.4
Max Q Clear Time (g_c+I1), s	17.4	12.0		3.4	0.0	12.7		7.8
Green Ext Time (p_c), s	0.1	21.6		0.1	0.0	31.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	146	295	10	20	784	198	50	9	10	42	9	108
Future Volume (veh/h)	146	295	10	20	784	198	50	9	10	42	9	108
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	154	311	7	21	825	186	53	9	0	44	9	7
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	2212	965	41	1442	325	100	77	0	68	33	26
Arrive On Green	0.13	0.63	0.63	0.02	0.51	0.47	0.06	0.04	0.00	0.04	0.03	0.03
Sat Flow, veh/h	1774	3539	1544	1774	2854	644	1774	1863	0	1774	948	738
Grp Volume(v), veh/h	154	311	7	21	511	500	53	9	0	44	0	16
Grp Sat Flow(s),veh/h/ln	1774	1770	1544	1774	1770	1728	1774	1863	0	1774	0	1686
Q Serve(g_s), s	5.1	2.2	0.1	0.7	12.3	12.5	1.8	0.3	0.0	1.5	0.0	0.6
Cycle Q Clear(g_c), s	5.1	2.2	0.1	0.7	12.3	12.5	1.8	0.3	0.0	1.5	0.0	0.6
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.00	1.00		0.44
Lane Grp Cap(c), veh/h	230	2212	965	41	894	873	100	77	0	68	0	59
V/C Ratio(X)	0.67	0.14	0.01	0.52	0.57	0.57	0.53	0.12	0.00	0.65	0.00	0.27
Avail Cap(c_a), veh/h	347	2212	965	231	894	873	231	729	0	202	0	632
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.4	4.7	4.3	29.6	10.6	10.9	28.2	28.3	0.0	29.1	0.0	29.0
Incr Delay (d2), s/veh	1.3	0.1	0.0	3.7	2.7	2.7	1.6	0.7	0.0	9.8	0.0	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.1	0.0	0.4	6.6	6.6	0.9	0.2	0.0	0.9	0.0	0.3
LnGrp Delay(d),s/veh	26.7	4.9	4.3	33.4	13.2	13.6	29.8	29.0	0.0	38.9	0.0	31.4
LnGrp LOS	C	A	A	C	B	B	C	C		D		C
Approach Vol, veh/h		472			1032			62			60	
Approach Delay, s/veh		12.0			13.8			29.7			36.9	
Approach LOS		B			B			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	42.4	6.4	7.2	12.8	35.0	7.5	6.1
Change Period (Y+Rc), s	4.5	6.0	4.5	* 5.2	6.0	* 6	5.2	* 4.5
Max Green Setting (Gmax), s	7.5	33.0	6.5	* 24	10.8	* 29	6.8	* 23
Max Q Clear Time (g_c+I1), s	2.7	4.2	3.5	2.3	7.1	14.5	3.8	2.6
Green Ext Time (p_c), s	0.0	2.0	0.0	0.0	0.2	6.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.7
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	265	42	120	828	83	130	29	360	4	5	4
Future Volume (veh/h)	10	265	42	120	828	83	130	29	360	4	5	4
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	279	12	126	872	82	137	31	66	4	5	0
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	1399	608	144	1499	141	264	78	165	59	62	0
Arrive On Green	0.00	0.40	0.40	0.08	0.46	0.43	0.15	0.15	0.14	0.03	0.03	0.00
Sat Flow, veh/h	1774	3539	1539	1774	3261	307	1774	522	1111	1774	1863	0
Grp Volume(v), veh/h	11	279	12	126	473	481	137	0	97	4	5	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1539	1774	1770	1798	1774	0	1633	1774	1863	0
Q Serve(g_s), s	0.1	2.4	0.2	3.3	9.2	9.3	3.3	0.0	2.5	0.1	0.1	0.0
Cycle Q Clear(g_c), s	0.1	2.4	0.2	3.3	9.2	9.3	3.3	0.0	2.5	0.1	0.1	0.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.68	1.00		0.00
Lane Grp Cap(c), veh/h	4	1399	608	144	813	826	264	0	243	59	62	0
V/C Ratio(X)	2.90	0.20	0.02	0.87	0.58	0.58	0.52	0.00	0.40	0.07	0.08	0.00
Avail Cap(c_a), veh/h	303	3174	1380	379	1663	1690	985	0	907	985	1034	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.4	9.3	8.6	21.3	9.3	9.4	18.4	0.0	18.1	21.9	22.0	0.0
Incr Delay (d2), s/veh	911.3	0.1	0.0	6.2	0.7	0.7	2.0	0.0	1.3	0.6	0.7	0.0
Initial Q Delay(d3),s/veh	82.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.2	0.1	1.9	4.6	4.7	1.8	0.0	1.2	0.1	0.1	0.0
LnGrp Delay(d),s/veh	1017.4	9.4	8.6	27.5	10.0	10.1	20.4	0.0	19.4	22.5	22.6	0.0
LnGrp LOS	F	A	A	C	A	B	C		B	C	C	
Approach Vol, veh/h		302			1080			234			9	
Approach Delay, s/veh		46.1			12.1			20.0			22.6	
Approach LOS		D			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.1	26.2		11.0	7.8	22.5		5.6
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	8.5	* 43		* 26	10.5	40.0		25.8
Max Q Clear Time (g_c+I1), s	2.1	11.3		5.3	5.3	4.4		2.1
Green Ext Time (p_c), s	0.0	8.7		1.1	0.1	8.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.6
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	13.1
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	236	134	130	0	8	128	30	0	140	57	86
Future Vol, veh/h	0	236	134	130	0	8	128	30	0	140	57	86
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	3	0	4	2	0	2	0	2	1	2	0
Mvmt Flow	0	248	141	137	0	8	135	32	0	147	60	91
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	13.5	13.4	12.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	40%	0%	100%	0%	0%	81%	0%	35%
Vol Right, %	0%	60%	0%	0%	100%	0%	19%	0%	65%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	143	236	134	130	8	158	10	88
LT Vol	140	0	236	0	0	8	0	10	0
Through Vol	0	57	0	134	0	0	128	0	31
RT Vol	0	86	0	0	130	0	30	0	57
Lane Flow Rate	147	151	248	141	137	8	166	11	93
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.311	0.279	0.484	0.253	0.221	0.018	0.333	0.024	0.184
Departure Headway (Hd)	7.593	6.679	7.131	6.572	5.931	7.81	7.2	8.133	7.163
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	476	542	509	550	609	460	501	442	502
Service Time	5.293	4.379	4.831	4.272	3.631	5.534	4.923	5.856	4.885
HCM Lane V/C Ratio	0.309	0.279	0.487	0.256	0.225	0.017	0.331	0.025	0.185
HCM Control Delay	13.7	11.9	16.3	11.5	10.3	10.7	13.5	11.1	11.5
HCM Lane LOS	B	B	C	B	B	B	B	B	B
HCM 95th-tile Q	1.3	1.1	2.6	1	0.8	0.1	1.4	0.1	0.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	10	31	57
Future Vol, veh/h	0	10	31	57
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	0	0	4
Mvmt Flow	0	11	33	60
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	11.5
HCM LOS	B

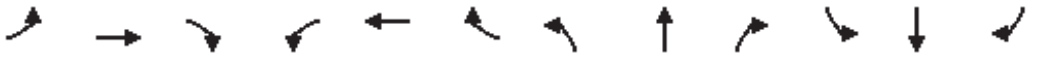
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	734	0	500	0	520	80	0	587	890
Future Volume (veh/h)	0	0	0	734	0	500	0	520	80	0	587	890
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h				773	0	408	0	547	0	0	618	388
Adj No. of Lanes				2	0	1	0	2	1	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	0	2	2	0	2	2
Cap, veh/h				1200	0	526	0	1634	731	0	1634	712
Arrive On Green				0.34	0.00	0.34	0.00	0.92	0.00	0.00	0.46	0.46
Sat Flow, veh/h				3548	0	1555	0	3632	1583	0	3632	1541
Grp Volume(v), veh/h				773	0	408	0	547	0	0	618	388
Grp Sat Flow(s),veh/h/ln				1774	0	1555	0	1770	1583	0	1770	1541
Q Serve(g_s), s				7.4	0.0	9.4	0.0	0.7	0.0	0.0	4.6	7.2
Cycle Q Clear(g_c), s				7.4	0.0	9.4	0.0	0.7	0.0	0.0	4.6	7.2
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				1200	0	526	0	1634	731	0	1634	712
V/C Ratio(X)				0.64	0.00	0.78	0.00	0.33	0.00	0.00	0.38	0.55
Avail Cap(c_a), veh/h				1419	0	622	0	1634	731	0	1634	712
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.99	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				11.2	0.0	11.9	0.0	0.8	0.0	0.0	7.0	7.7
Incr Delay (d2), s/veh				0.8	0.0	5.2	0.0	0.5	0.0	0.0	0.7	3.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.7	0.0	4.7	0.0	0.4	0.0	0.0	2.3	3.6
LnGrp Delay(d),s/veh				12.0	0.0	17.1	0.0	1.4	0.0	0.0	7.7	10.7
LnGrp LOS				B		B		A			A	B
Approach Vol, veh/h					1181			547			1006	
Approach Delay, s/veh					13.7			1.4			8.9	
Approach LOS					B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		22.5				22.5		17.5
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		16.0				16.0		16.0
Max Q Clear Time (g_c+I1), s		2.7				9.2		11.4
Green Ext Time (p_c), s		7.1				4.3		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	0	40	0	0	0	0	460	356	0	1011	310
Future Volume (veh/h)	140	0	40	0	0	0	0	460	356	0	1011	310
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h	147	0	18				0	484	0	0	1064	0
Adj No. of Lanes	2	0	1				0	2	1	0	2	1
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	289	0	133				0	2534	1134	0	2534	1134
Arrive On Green	0.08	0.00	0.08				0.00	0.72	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3442	0	1583				0	3632	1583	0	3632	1583
Grp Volume(v), veh/h	147	0	18				0	484	0	0	1064	0
Grp Sat Flow(s),veh/h/ln	1721	0	1583				0	1770	1583	0	1770	1583
Q Serve(g_s), s	1.6	0.0	0.4				0.0	1.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.6	0.0	0.4				0.0	1.8	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	289	0	133				0	2534	1134	0	2534	1134
V/C Ratio(X)	0.51	0.00	0.14				0.00	0.19	0.00	0.00	0.42	0.00
Avail Cap(c_a), veh/h	1377	0	633				0	2534	1134	0	2534	1134
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.86	0.00
Uniform Delay (d), s/veh	17.5	0.0	17.0				0.0	1.9	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.5				0.0	0.2	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2				0.0	0.9	0.0	0.0	0.2	0.0
LnGrp Delay(d),s/veh	18.9	0.0	17.4				0.0	2.0	0.0	0.0	0.4	0.0
LnGrp LOS	B		B					A			A	
Approach Vol, veh/h		165						484			1064	
Approach Delay, s/veh		18.7						2.0			0.4	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		32.6		7.4		32.6		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		16.0		16.0		16.0		
Max Q Clear Time (g_c+I1), s		3.8		3.6		2.0		
Green Ext Time (p_c), s		7.4		0.4		8.1		

Intersection Summary	
HCM 2010 Ctrl Delay	2.7
HCM 2010 LOS	A

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	3,275	100	10	175	17	250	194	0%	0%
	Left/Through	3,275	125	18	225	82	325	239	0%	0%
	Right Turn	325	25	13	50	80	100	161	1%	0%
NB	Left Turn	675	400	68	575	100	650	99	0%	1%
	Through	675	125	14	200	17	225	34	0%	0%
	Right Turn	675	25	3	50	12	75	42	0%	0%
SB	Left Turn	275	50	7	125	26	200	83	0%	0%
	Through	325	125	12	250	27	300	38	2%	1%
	Through/Right	325	100	13	200	26	250	51	0%	0%
	Right Turn	325	25	11	75	48	175	87	0%	0%
WB	Left Turn	175	50	6	100	14	125	24	0%	0%
	Through	1,025	25	3	50	7	75	14	0%	0%
	Right Turn	175	25	1	50	4	50	8	0%	0%

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Right Turn	3,725	275	57	475	127	550	187	0%	0%
NB	Through	725	150	13	225	21	250	43	0%	0%
	Right Turn	725	25	4	50	40	75	118	0%	0%
SB	Left Turn	600	100	21	200	102	350	254	0%	0%
	Through	675	275	86	525	206	600	221	0%	3%
WB	Right Turn	1,325	25	0	25	0	25	0	0%	0%

Lane Group	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	386	387	526	547	84	618	937
v/c Ratio	0.64	0.65	0.79	0.35	0.05	0.40	0.78
Control Delay	15.8	15.8	17.7	7.1	0.1	9.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	15.8	17.7	7.1	0.1	9.2	7.7
Queue Length 50th (ft)	66	66	57	36	0	49	0
Queue Length 95th (ft)	131	131	#189	53	0	80	#190
Internal Link Dist (ft)		1297		584		1247	
Turn Bay Length (ft)			400				400
Base Capacity (vph)	670	670	727	1562	1547	1562	1202
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.58	0.72	0.35	0.05	0.40	0.78

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	147	42	484	375	1064	326
v/c Ratio	0.24	0.14	0.20	0.24	0.44	0.21
Control Delay	14.7	9.0	3.6	0.4	2.7	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	9.0	3.6	0.4	2.7	1.1
Queue Length 50th (ft)	14	2	18	0	11	0
Queue Length 95th (ft)	29	19	36	0	24	0
Internal Link Dist (ft)			1371		584	
Turn Bay Length (ft)		300		425		475
Base Capacity (vph)	1373	640	2443	1561	2443	1547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.07	0.20	0.24	0.44	0.21

Intersection Summary

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	37	35	95.4%	69.0	11.7	E
	Through	1,609	1,572	97.7%	48.2	5.9	D
	Right Turn	170	163	95.6%	7.9	1.1	A
	Subtotal	1,816	1,770	97.4%	44.7	5.4	D
SB	Left Turn	110	110	100.4%	63.7	9.6	E
	Through	908	908	100.0%	24.9	2.3	C
	Right Turn	190	188	98.8%	6.4	1.0	A
	Subtotal	1,208	1,206	99.8%	25.3	1.7	C
EB	Left Turn	600	583	97.2%	120.4	41.5	F
	Through	190	190	100.0%	48.4	10.8	D
	Right Turn	415	418	100.6%	22.4	9.1	C
	Subtotal	1,205	1,191	98.8%	76.4	22.5	E
WB	Left Turn	110	109	99.4%	64.2	10.3	E
	Through	170	169	99.6%	55.9	7.7	E
	Right Turn	200	205	102.4%	17.6	3.2	B
	Subtotal	480	483	100.7%	42.4	4.6	D
Total		4,709	4,649	98.7%	48.2	6.7	D

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	1,167	1,119	95.8%	107.8	16.0	F
	Through	1,526	1,487	97.4%	27.7	4.5	C
	Right Turn	189	190	100.4%	6.4	1.0	A
	Subtotal	2,882	2,795	97.0%	59.0	7.5	E
SB	Left Turn	40	45	113.0%	74.6	22.6	E
	Through	1,123	1,123	100.0%	39.1	5.7	D
	Right Turn	270	266	98.6%	6.1	1.2	A
	Subtotal	1,433	1,434	100.1%	34.0	4.2	C
EB	Left Turn	215	219	102.0%	60.1	9.1	E
	Through	40	41	102.0%	59.2	14.4	E
	Right Turn	290	293	100.9%	3.5	0.6	A
	Subtotal	545	553	101.4%	28.8	5.2	C
WB	Left Turn	129	128	99.1%	58.8	5.4	E
	Through	60	63	104.7%	59.2	12.6	E
	Right Turn	80	78	97.5%	18.1	6.8	B
	Subtotal	269	269	99.9%	48.6	4.5	D
Total		5,129	5,051	98.5%	48.2	4.6	D

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	2,162	2,112	97.7%	28.9	24.7	C
	Right Turn	440	426	96.8%	11.3	1.0	B
	Subtotal	2,602	2,538	97.5%	26.0	20.8	C
SB	Left Turn	180	179	99.4%	30.5	3.5	C
	Through	1,362	1,360	99.8%	23.7	14.2	C
	Right Turn						
	Subtotal	1,542	1,539	99.8%	24.5	12.9	C
EB	Left Turn						
	Through						
	Right Turn	677	669	98.8%	24.9	3.3	C
	Subtotal	677	669	98.8%	24.9	3.3	C
WB	Left Turn						
	Through						
	Right Turn	720	710	98.7%	1.8	0.2	A
	Subtotal	720	710	98.7%	1.8	0.2	A
Total		5,541	5,456	98.5%	22.2	9.1	C

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	10	9	93.0%	141.7	42.2	F
	Through	1,774	1,717	96.8%	111.3	42.9	F
	Right Turn	35	35	98.6%	8.3	4.6	A
	Subtotal	1,819	1,761	96.8%	109.6	41.9	F
SB	Left Turn	490	481	98.1%	107.2	35.7	F
	Through	1,539	1,535	99.7%	19.3	4.4	B
	Right Turn	10	11	110.0%	1.8	1.6	A
	Subtotal	2,039	2,026	99.4%	40.6	11.6	D
EB	Left Turn	190	192	100.9%	52.5	3.6	D
	Through	27	27	98.1%	53.8	9.9	D
	Right Turn	90	93	103.1%	28.2	6.6	C
	Subtotal	307	311	101.3%	45.5	3.4	D
WB	Left Turn	58	59	101.0%	79.3	25.5	E
	Through	8	8	95.0%	73.8	37.1	E
	Right Turn	638	646	101.2%	31.8	19.6	C
	Subtotal	704	712	101.1%	36.3	19.9	D
Total		4,869	4,810	98.8%	65.7	16.0	E

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	160	165	102.8%	75.8	12.4	E
	Through	888	878	98.8%	59.1	26.5	E
	Right Turn	405	400	98.8%	33.6	22.0	C
	Subtotal	1,453	1,442	99.3%	54.1	22.2	D
SB	Left Turn	249	244	98.0%	46.0	3.7	D
	Through	979	983	100.4%	34.7	2.6	C
	Right Turn	459	462	100.6%	24.0	4.1	C
	Subtotal	1,687	1,689	100.1%	33.4	2.5	C
EB	Left Turn	727	701	96.4%	93.6	34.7	F
	Through	553	553	99.9%	43.9	2.3	D
	Right Turn	240	242	101.0%	38.3	6.8	D
	Subtotal	1,520	1,496	98.4%	67.1	17.4	E
WB	Left Turn	288	287	99.6%	68.4	6.4	E
	Through	406	406	100.1%	62.2	7.8	E
	Right Turn	204	200	98.0%	5.1	0.7	A
	Subtotal	898	893	99.4%	51.7	5.8	D
Total		5,558	5,520	99.3%	50.8	8.8	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1312	180	99	966	20	390	10	238	0	10	0
Future Volume (veh/h)	20	1312	180	99	966	20	390	10	238	0	10	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1883	1900	1881	1900	1900	1900	1882	1900	1900	1900	1900
Adj Flow Rate, veh/h	21	1381	181	104	1017	20	411	11	134	0	11	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	1	1	0	0	0	0	0	0	0	0
Cap, veh/h	26	1583	206	127	2010	40	482	37	448	56	579	0
Arrive On Green	0.01	0.50	0.50	0.07	0.56	0.56	0.30	0.30	0.30	0.00	0.30	0.00
Sat Flow, veh/h	1810	3175	412	1792	3619	71	1419	121	1470	1263	1900	0
Grp Volume(v), veh/h	21	773	789	104	507	530	411	0	145	0	11	0
Grp Sat Flow(s),veh/h/ln	1810	1789	1798	1792	1805	1885	1419	0	1590	1263	1900	0
Q Serve(g_s), s	1.5	49.2	50.7	7.4	22.4	22.4	36.8	0.0	9.0	0.0	0.5	0.0
Cycle Q Clear(g_c), s	1.5	49.2	50.7	7.4	22.4	22.4	37.3	0.0	9.0	0.0	0.5	0.0
Prop In Lane	1.00		0.23	1.00		0.04	1.00		0.92	1.00		0.00
Lane Grp Cap(c), veh/h	26	892	896	127	1002	1047	482	0	485	56	579	0
V/C Ratio(X)	0.81	0.87	0.88	0.82	0.51	0.51	0.85	0.00	0.30	0.00	0.02	0.00
Avail Cap(c_a), veh/h	135	929	933	172	1002	1047	483	0	486	57	580	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	63.4	28.5	28.9	59.1	17.7	17.7	44.4	0.0	34.3	0.0	31.4	0.0
Incr Delay (d2), s/veh	19.3	8.6	9.7	14.5	0.5	0.5	13.0	0.0	0.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	26.4	27.4	4.2	11.3	11.8	16.1	0.0	4.0	0.0	0.3	0.0
LnGrp Delay(d),s/veh	82.8	37.1	38.6	73.6	18.3	18.2	57.4	0.0	34.4	0.0	31.4	0.0
LnGrp LOS	F	D	D	E	B	B	E		C		C	
Approach Vol, veh/h		1583			1141			556			11	
Approach Delay, s/veh		38.5			23.3			51.4			31.4	
Approach LOS		D			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	70.3		43.9	7.4	77.7		43.9
Change Period (Y+Rc), s	5.6	6.0		4.6	5.6	6.0		4.6
Max Green Setting (Gmax), s	12.4	67.0		39.4	9.6	69.8		39.4
Max Q Clear Time (g_c+I1), s	9.4	52.7		2.5	3.5	24.4		39.3
Green Ext Time (p_c), s	0.0	11.7		0.4	0.0	33.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.4
HCM 2010 LOS	D

Notes

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	957	20	10	603	114	30	9	20	186	10	245
Future Volume (veh/h)	260	957	20	10	603	114	30	9	20	186	10	245
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	274	1007	10	11	635	103	32	9	0	196	11	35
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	374	1880	819	30	1058	171	206	28	0	263	22	71
Arrive On Green	0.21	0.53	0.53	0.02	0.35	0.32	0.12	0.02	0.00	0.15	0.06	0.05
Sat Flow, veh/h	1774	3539	1542	1774	3036	492	1774	1863	0	1774	377	1200
Grp Volume(v), veh/h	274	1007	10	11	370	368	32	9	0	196	0	46
Grp Sat Flow(s),veh/h/ln	1774	1770	1542	1774	1770	1758	1774	1863	0	1774	0	1578
Q Serve(g_s), s	8.7	11.2	0.0	0.4	10.4	10.5	1.0	0.3	0.0	6.4	0.0	1.7
Cycle Q Clear(g_c), s	8.7	11.2	0.0	0.4	10.4	10.5	1.0	0.3	0.0	6.4	0.0	1.7
Prop In Lane	1.00		1.00	1.00		0.28	1.00		0.00	1.00		0.76
Lane Grp Cap(c), veh/h	374	1880	819	30	617	613	206	28	0	263	0	93
V/C Ratio(X)	0.73	0.54	0.01	0.37	0.60	0.60	0.16	0.32	0.00	0.75	0.00	0.50
Avail Cap(c_a), veh/h	559	1880	819	236	617	613	236	464	0	559	0	681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.2	9.3	0.4	29.3	16.2	16.4	24.0	29.4	0.0	24.6	0.0	27.7
Incr Delay (d2), s/veh	1.0	1.1	0.0	2.9	4.3	4.3	0.1	6.2	0.0	4.2	0.0	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	5.7	0.1	0.2	5.8	5.8	0.5	0.2	0.0	3.4	0.0	0.8
LnGrp Delay(d),s/veh	23.2	10.4	0.5	32.2	20.4	20.8	24.1	35.6	0.0	28.8	0.0	31.7
LnGrp LOS	C	B	A	C	C	C	C	D		C		C
Approach Vol, veh/h		1291			749			41			242	
Approach Delay, s/veh		13.0			20.8			26.6			29.3	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	36.0	12.9	5.6	16.7	25.0	11.0	7.5
Change Period (Y+Rc), s	5.2	* 6	4.5	* 5.2	5.2	* 6	5.2	* 4.5
Max Green Setting (Gmax), s	7.5	* 30	18.5	* 15	17.8	* 19	6.8	* 26
Max Q Clear Time (g_c+I1), s	2.4	13.2	8.4	2.3	10.7	12.5	3.0	3.7
Green Ext Time (p_c), s	0.1	7.3	0.4	0.0	0.1	2.7	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	717	126	320	484	99	90	56	300	139	108	43
Future Volume (veh/h)	50	717	126	320	484	99	90	56	300	139	108	43
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	53	755	32	337	509	91	95	59	139	146	114	31
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	1044	453	369	1382	246	299	82	193	234	185	50
Arrive On Green	0.03	0.30	0.30	0.21	0.46	0.45	0.17	0.17	0.17	0.13	0.13	0.13
Sat Flow, veh/h	1774	3539	1535	1774	2989	532	1774	485	1143	1774	1402	381
Grp Volume(v), veh/h	53	755	32	337	300	300	95	0	198	146	0	145
Grp Sat Flow(s),veh/h/ln	1774	1770	1535	1774	1770	1751	1774	0	1629	1774	0	1783
Q Serve(g_s), s	2.4	15.6	1.2	15.1	9.0	9.1	3.8	0.0	9.4	6.3	0.0	6.3
Cycle Q Clear(g_c), s	2.4	15.6	1.2	15.1	9.0	9.1	3.8	0.0	9.4	6.3	0.0	6.3
Prop In Lane	1.00		1.00	1.00		0.30	1.00		0.70	1.00		0.21
Lane Grp Cap(c), veh/h	58	1044	453	369	818	809	299	0	274	234	0	236
V/C Ratio(X)	0.92	0.72	0.07	0.91	0.37	0.37	0.32	0.00	0.72	0.62	0.00	0.62
Avail Cap(c_a), veh/h	196	1128	489	566	933	923	566	0	519	566	0	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.4	25.8	20.7	31.6	14.2	14.4	29.8	0.0	32.2	33.5	0.0	33.5
Incr Delay (d2), s/veh	19.0	2.3	0.1	10.4	0.3	0.3	0.8	0.0	4.4	3.4	0.0	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	7.9	0.5	8.5	4.4	4.4	1.9	0.0	4.6	3.3	0.0	3.3
LnGrp Delay(d),s/veh	58.4	28.1	20.8	42.0	14.5	14.7	30.5	0.0	36.6	36.8	0.0	36.7
LnGrp LOS	E	C	C	D	B	B	C		D	D		D
Approach Vol, veh/h		840			937			293			291	
Approach Delay, s/veh		29.7			24.4			34.6			36.8	
Approach LOS		C			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.6	42.4		17.7	21.0	28.1		14.8
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	9.5	* 42		* 26	26.5	24.0		25.8
Max Q Clear Time (g_c+I1), s	4.4	11.1		11.4	17.1	17.6		8.3
Green Ext Time (p_c), s	0.0	11.3		1.5	0.3	4.2		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	73
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	319	193	150	0	115	240	20	0	180	93	120
Future Vol, veh/h	0	319	193	150	0	115	240	20	0	180	93	120
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	0	0	3	2	0	0	0	2	1	0	0
Mvmt Flow	0	336	203	158	0	121	253	21	0	189	98	126
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	53.3	42.6	32.5
HCM LOS	F	E	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	44%	0%	100%	0%	0%	92%	0%	28%
Vol Right, %	0%	56%	0%	0%	100%	0%	8%	0%	72%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	213	319	193	150	115	260	20	410
LT Vol	180	0	319	0	0	115	0	20	0
Through Vol	0	93	0	193	0	0	240	0	116
RT Vol	0	120	0	0	150	0	20	0	294
Lane Flow Rate	189	224	336	203	158	121	274	21	432
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.6	0.653	0.993	0.573	0.417	0.382	0.822	0.068	1.273
Departure Headway (Hd)	12.26	11.297	11.536	11.008	10.323	12.336	11.745	11.65	10.621
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	296	323	316	329	351	294	309	308	345
Service Time	9.96	8.997	9.236	8.708	8.023	10.036	9.445	9.419	8.389
HCM Lane V/C Ratio	0.639	0.693	1.063	0.617	0.45	0.412	0.887	0.068	1.252
HCM Control Delay	31.8	33	84.5	27.5	20.2	22.5	51.5	15.3	174.3
HCM Lane LOS	D	D	F	D	C	C	F	C	F
HCM 95th-tile Q	3.6	4.3	10.6	3.4	2	1.7	6.9	0.2	19.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	20	116	294
Future Vol, veh/h	0	20	116	294
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	0	1	0
Mvmt Flow	0	21	122	309
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	166.9
HCM LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	771	0	580	0	1056	80	0	402	240
Future Volume (veh/h)	0	0	0	771	0	580	0	1056	80	0	402	240
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h				812	0	594	0	1112	0	0	423	102
Adj No. of Lanes				2	0	1	0	2	1	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	0	2	2	0	2	2
Cap, veh/h				1500	0	658	0	1571	703	0	1571	684
Arrive On Green				0.42	0.00	0.42	0.00	0.15	0.00	0.00	0.44	0.44
Sat Flow, veh/h				3548	0	1557	0	3632	1583	0	3632	1540
Grp Volume(v), veh/h				812	0	594	0	1112	0	0	423	102
Grp Sat Flow(s),veh/h/ln				1774	0	1557	0	1770	1583	0	1770	1540
Q Serve(g_s), s				10.3	0.0	21.4	0.0	18.0	0.0	0.0	4.5	2.4
Cycle Q Clear(g_c), s				10.3	0.0	21.4	0.0	18.0	0.0	0.0	4.5	2.4
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				1500	0	658	0	1571	703	0	1571	684
V/C Ratio(X)				0.54	0.00	0.90	0.00	0.71	0.00	0.00	0.27	0.15
Avail Cap(c_a), veh/h				1597	0	701	0	1571	703	0	1571	684
HCM Platoon Ratio				1.00	1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.92	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				13.0	0.0	16.2	0.0	21.9	0.0	0.0	10.5	9.9
Incr Delay (d2), s/veh				0.3	0.0	14.4	0.0	2.5	0.0	0.0	0.4	0.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.0	0.0	11.7	0.0	9.4	0.0	0.0	2.3	1.1
LnGrp Delay(d),s/veh				13.3	0.0	30.6	0.0	24.4	0.0	0.0	11.0	10.4
LnGrp LOS				B		C		C			B	B
Approach Vol, veh/h					1406			1112			525	
Approach Delay, s/veh					20.6			24.4			10.9	
Approach LOS					C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		30.6				30.6		29.4
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		25.0				25.0		27.0
Max Q Clear Time (g_c+I1), s		20.0				6.5		23.4
Green Ext Time (p_c), s		3.7				10.0		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.3
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	0	80	0	0	0	0	816	579	0	993	180
Future Volume (veh/h)	320	0	80	0	0	0	0	816	579	0	993	180
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h	337	0	12				0	859	0	0	1045	0
Adj No. of Lanes	2	0	1				0	2	1	0	2	1
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	484	0	223				0	2570	1150	0	2570	1150
Arrive On Green	0.14	0.00	0.14				0.00	0.73	0.00	0.00	0.24	0.00
Sat Flow, veh/h	3442	0	1583				0	3632	1583	0	3632	1583
Grp Volume(v), veh/h	337	0	12				0	859	0	0	1045	0
Grp Sat Flow(s),veh/h/ln	1721	0	1583				0	1770	1583	0	1770	1583
Q Serve(g_s), s	5.6	0.0	0.4				0.0	5.3	0.0	0.0	14.9	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.4				0.0	5.3	0.0	0.0	14.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	484	0	223				0	2570	1150	0	2570	1150
V/C Ratio(X)	0.70	0.00	0.05				0.00	0.33	0.00	0.00	0.41	0.00
Avail Cap(c_a), veh/h	1032	0	475				0	2570	1150	0	2570	1150
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.91	0.00
Uniform Delay (d), s/veh	24.6	0.0	22.3				0.0	3.0	0.0	0.0	11.9	0.0
Incr Delay (d2), s/veh	1.8	0.0	0.1				0.0	0.4	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.2				0.0	2.6	0.0	0.0	7.5	0.0
LnGrp Delay(d),s/veh	26.4	0.0	22.4				0.0	3.3	0.0	0.0	12.4	0.0
LnGrp LOS	C		C					A			B	
Approach Vol, veh/h		349						859			1045	
Approach Delay, s/veh		26.2						3.3			12.4	
Approach LOS		C						A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		47.6		12.4		47.6		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		34.0		18.0		34.0		
Max Q Clear Time (g_c+I1), s		7.3		7.6		16.9		
Green Ext Time (p_c), s		14.9		0.9		11.2		

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 LOS	B

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	U/Left Turns	3,275	125	8	200	20	225	33	0%	0%
	Left/Through	3,275	150	7	225	17	250	20	0%	0%
	Right Turn	325	25	0	25	0	25	0	0%	0%
NB	Left Turn	675	600	80	800	67	750	28	0%	28%
	Through	675	300	25	450	48	475	88	0%	0%
	Right Turn	675	75	18	150	92	300	191	0%	0%
SB	Left Turn	275	50	14	150	34	275	1	0%	0%
	Through	325	275	16	400	24	375	13	12%	6%
	Through/Right	325	175	11	275	17	325	32	0%	0%
	Right Turn	325	25	14	125	46	225	67	0%	0%
WB	Left Turn	175	75	7	125	13	150	23	0%	0%
	Through	1,025	50	6	100	22	150	51	0%	0%
	Right Turn	175	25	3	75	13	125	43	0%	0%

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Right Turn	3,025	300	36	475	115	525	169	0%	0%
NB	Through	725	225	92	675	193	800	184	0%	1%
	Right Turn	725	25	16	75	124	150	291	0%	0%
SB	Left Turn	600	50	5	75	12	100	32	0%	0%
	Through	675	200	33	325	139	450	253	0%	0%
WB	Right Turn	1,325	25	0	25	0	25	0	0%	0%

Lane Group	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	406	406	611	1112	84	423	253
v/c Ratio	0.56	0.56	0.89	0.72	0.05	0.28	0.31
Control Delay	16.0	16.0	32.6	18.6	0.1	11.9	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	16.0	32.6	18.6	0.1	11.9	3.0
Queue Length 50th (ft)	106	106	178	160	0	51	0
Queue Length 95th (ft)	183	183	#367	217	0	79	35
Internal Link Dist (ft)		1297		584		1247	
Turn Bay Length (ft)			400				400
Base Capacity (vph)	752	752	714	1534	1547	1534	808
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.54	0.86	0.72	0.05	0.28	0.31

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

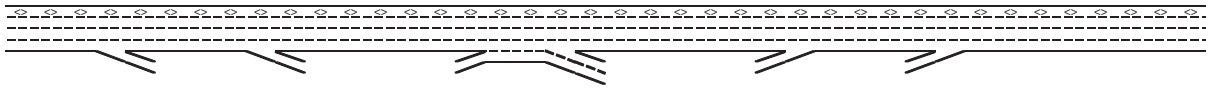
Lane Group	EBL	EBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	337	84	859	609	1045	189
v/c Ratio	0.53	0.24	0.36	0.39	0.43	0.12
Control Delay	24.8	7.2	4.8	0.7	3.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	7.2	4.8	0.7	3.5	0.4
Queue Length 50th (ft)	57	0	54	0	54	0
Queue Length 95th (ft)	86	29	95	0	73	4
Internal Link Dist (ft)			1371		584	
Turn Bay Length (ft)		300		425		475
Base Capacity (vph)	1029	524	2411	1561	2411	1547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.16	0.36	0.39	0.43	0.12

Intersection Summary

APPENDIX A.6:
TECHNICAL CALCULATIONS –
CUMULATIVE NO PROJECT CONDITIONS
FREEWAY LOS

Project: EDH Town Center Apartments EIR **Alternative:** Cumulative No Project
Freeway Corridor: Eastbound US 50 **Time Period:** AM Peak Hour

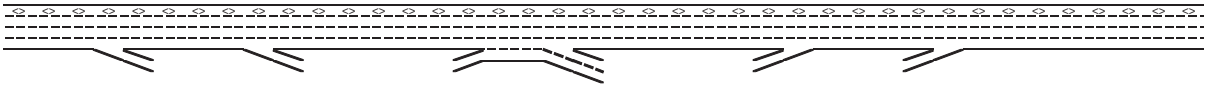
Data Entry Value
Calculated Value



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5	6	7	8
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment								
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	800	1,500	2,125
Accel Length						550	150	
Decel Length	150	150						
Mainline Volume	4,153	3,010	2,820	2,820	3,140	3,140	3,440	3,806
On Ramp Volume				530		300	366	
Off Ramp Volume	1,143	190		210				
Express Lane Volume	457	331	310	310	440	440	482	533
EL On Ramp Volume								
EL Off Ramp Volume								
Calculate Flow Rate in General Purpose Lanes (GP)								
GP Volume (vph)	3,696	2,679	2,510	3,040	2,700	3,000	3,324	3,273
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
GP Lanes	3	3	3	4	3	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	5.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.862
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,098	2,970	2,783	3,370	2,994	3,327	3,686	4,127
GP Flow (pcphpl)	1,366	990	928	843	998	1,109	1,229	1,376
Calculate Speed in General Purpose Lanes								
Lane Width (ft)	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes								
v/c ratio	0.58	0.42	0.39	0.36	0.42	0.47	0.52	0.59
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	21.0	15.2	14.3	13.0	15.4	17.1	18.9	21.2
LOS	C	B	B	B	B	B	C	C
Calculate Operations for Entering GP Lanes								
GP_{IN} Vol (pcph)				2,807		3,008	3,297	
GP_{IN} Cap (pcph)				7,050		7,050	7,050	
GP_{IN} v/c ratio				0.40		0.43	0.47	
Calculate Operations for Exiting GP Lanes								
GP_{OUT} Vol (pcph)	2,883	2,768		3,146				
GP_{OUT} Cap (pcph)	7,050	7,050		7,050				
GP_{OUT} v/c ratio	0.41	0.39		0.45				
Calculate Flow Rate in Express Lanes (EL)								
EL Volume (vph)	457	331	310	310	440	440	482	533
PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Express Lanes	1	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	543	393	369	369	522	522	572	683

Location	1	2	3	4	5	6	7	8



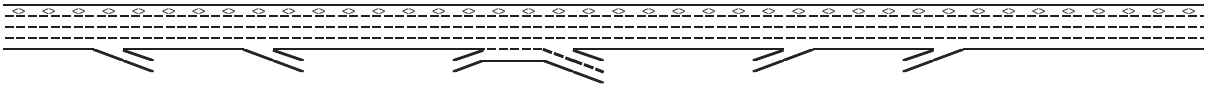
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
EL Flow (pcphpl)	543	393	369	369	522	522	572	683
Calculate Speed in Express Lanes								
Lane Width (ft)								
Shoulder Width								
TRD								
f_{LW}								
f_{LC}								
Calc'd FFS								
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in Express Lanes								
EL_{IN} v/c ratio	0.31	0.22	0.21	0.21	0.30	0.30	0.33	0.39
Calculate On Ramp Flow Rate								
On Volume (vph)				530		300	366	
PHF				0.95		0.95	0.95	
Total Lanes				1		1	1	
Terrain				Level		Level	Level	
Grade %				0.0%		0.0%	0.0%	
Grade Length (mi)				0.00		0.00	0.00	
Truck & Bus %				2.0%		2.0%	2.0%	
RV %				0.0%		0.0%	0.0%	
E_T				1.5		1.5	1.5	
E_R				1.2		1.2	1.2	
f_{HV}				0.990		0.990	0.990	
f_P				1.00		1.00	1.00	
On Flow (pcph)				563		319	389	
On Flow (pcphpl)				563		319	389	
Calculate On Ramp Roadway Operations								
On Ramp Type				Right		Right	Right	
On Ramp Speed (mph)				45		25	45	
On Ramp Cap (pcph)				2,100		1,900	2,100	
On Ramp v/c ratio				0.27		0.17	0.19	
Calculate Off Ramp Flow Rate								
Off Volume (vph)	1,143	190		210				
PHF	0.95	0.95		0.95				
Total Lanes	1	1		2				
Terrain	Level	Level		Level				
Grade %	0.0%	0.0%		0.0%				
Grade Length (mi)	0.00	0.00		0.00				
Truck & Bus %	2.0%	2.0%		3.0%				
RV %	0.0%	0.0%		0.0%				
E_T	1.5	1.5		1.5				
E_R	1.2	1.2		1.2				
f_{HV}	0.990	0.990		0.985				
f_P	1.00	1.00		1.00				
Off Flow (pcph)	1,215	202		224				
Off Flow (pcphpl)	1,215	202		112				
Calculate Off Ramp Roadway Operations								
Off Ramp Type	Right	Right		Right				
Off Ramp Speed	45	25		45				
Off Ramp Cap (pcph)	2,100	1,900		4,200				
Off Ramp v/c ratio	0.58	0.11		0.05				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps								
Up Type		Off				No	On	
Up Distance		2,350					800	
Up Flow (pcph)		1,215					319	
Down Type	Off	On				On	On	
Down Distance	850	1,975				2,900	1,500	
Down Flow (pcph)	202	563				340	340	
Calculate Merge Influence Area Operations								
Effective v_P (pcph)						3,008	3,297	

Location	1	2	3	4	5	6	7	8



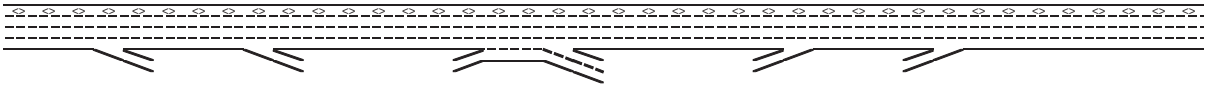
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Up Ramp L_{EQ}							807	
Down Ramp L_{EQ}						2,020	2,708	
P_{FM} (Eqn 13-3)						0.593	0.582	
P_{FM} (Eqn 13-4)		#VALUE!						
P_{FM} (Eqn 13-5)	0.611							
P_{FM}						0.593	0.582	
v_{12} (pcph)						1,783	1,918	
v_3 (pcph)						1,224	1,379	
v_{34} (pcph)								
v_{12a} (pcph)						1,783	1,918	
v_{R12a} (pcph)						2,102	2,307	
Merge Speed Index						0.33	0.35	
Merge Area Speed						57.5	57.0	
Outer Lanes Volume						1,224	1,379	
Outer Lanes Speed						62.4	61.8	
Segment Speed						59.2	58.7	
Merge v/c ratio						0.46	0.50	
Merge Density						18.3	22.3	
Merge LOS						B	C	
Calculate Diverge Influence Area Operations								
Effective v_P (pcph)	4,098	2,970						
Up Ramp L_{EQ}		9,803						
Down Ramp L_{EQ}	354	575						
P_{FD} (Eqn 13-9)	0.602	0.676						
P_{FD} (Eqn 13-10)								
P_{FD} (Eqn 13-11)	0.560							
P_{FD}	0.602	0.676						
v_{12} (pcph)	2,950	2,074						
v_3 (pcph)	1,148	896						
v_{34} (pcph)								
v_{12a} (pcph)	2,950	2,074						
Diverge Speed Index	0.41	0.58						
Diverge Area Speed	55.6	51.7						
Outer Lanes Volume	1,148	896						
Outer Lanes Speed	70.7	71.3						
Segment Speed	59.2	56.4						
Diverge v/c ratio	0.67	0.47						
Diverge Density	28.3	20.7						
Diverge LOS	D	C						
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments								
On to Off Volume (vph)				50				
PHF				0.92				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				4.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.980				
f_P				1.00				
On to Off Flow (pcph)				55				
Calculate On Ramp to Mainline Flow Rate for Weave Segments								
On to ML Volume (vph)				480				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				2.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.990				
f_P				1.00				
On to ML Flow (pcph)				510				

Location	1	2	3	4	5	6	7	8



Key
<> Express Lane (HOV)
No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Calculate Mainline to Off Ramp Flow Rate for Weave Segments								
ML to Off Volume (vph)				160				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				3.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.985				
f_P				1.00				
ML to Off Flow (pcph)				171				
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments								
GP to GP Volume (vph)				2,350				
PHF				0.92				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				4.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.980				
f_P				1.00				
GP to GP Flow (pcph)				2,605				
Calculate Weave Segment Operations								
Weave Type				One-sided				
Weave Length				2,000				
Segment Lanes				3				
Weave Lanes				2				
Weave Flow (pcph)				681				
Non-Weave Flow				2,661				
Segment Flow				3,342				
Max Weave Length				4,576				
Length Check				OK				
Ideal Weave Capacity				2,153				
f_{HV}				0.982				
f_P				0.998				
Capacity Condition 1				6,334				
Capacity Condition 2				11,545				
Weave v/c ratio				0.52				
Interchange Density				2				
Lane Changes On to ML				1				
Lane Changes ML to Off				0				
Lane Changes On to Off				0				
Min Lane Change Rate				510				
Weave LC Rate				1,144				
Non-Weave LC Rate 1				1,054				
Non-Weave LC Rate 2				2,282				
Non-Weave LC Rate 3				609				
Segment LC Rate				2,198				
Weave Intensity Factor				0.243				
Weave Speed				55.2				
Non-Weave Speed				56.0				
Segment Speed				55.8				
Weave Density				20.0				
Weave LOS				B				
Summarize Segment Operations								
Segment v/c ratio	0.67	0.47	0.39	0.52	0.42	0.46	0.50	0.59
Segment Density	28.3	20.7	14.3	20.0	15.4	18.3	22.3	21.2
Segment LOS	D	C	B	B	B	B	C	C
Over Capacity								

Leisch Method for Weaving Analysis

Data Input

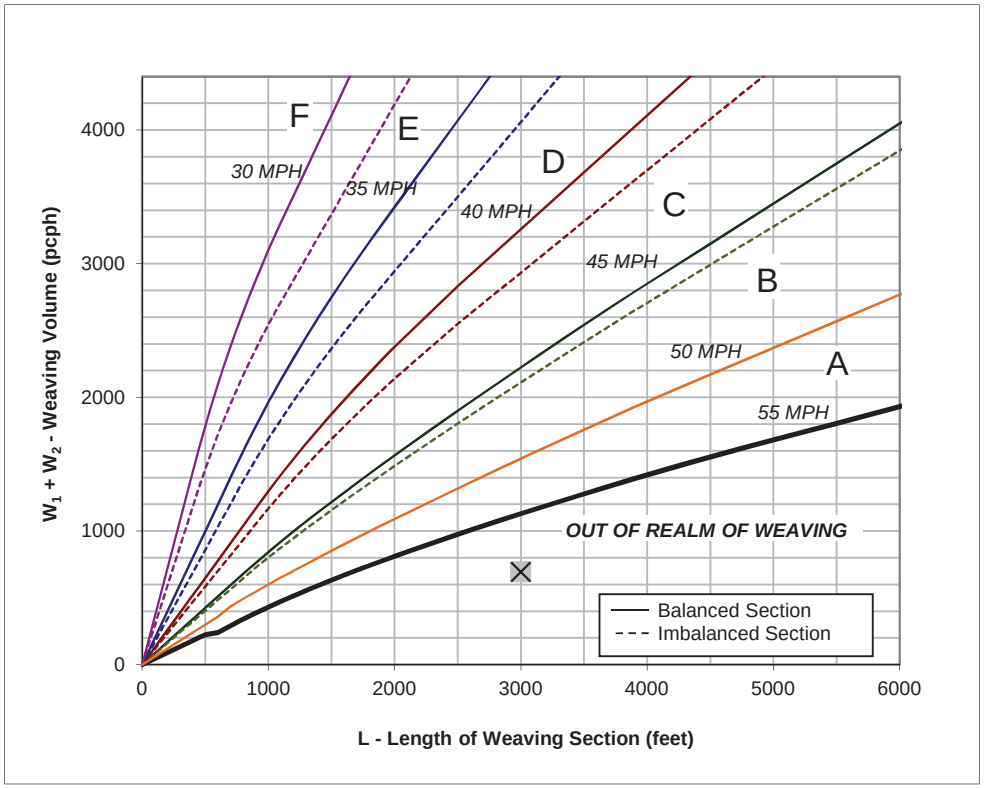
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,350	Volume (vph)*	504	Volume (vph)*	184
Truck Percentage	4%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,417	Volume (pcph)	509	Volume (pcph)	186

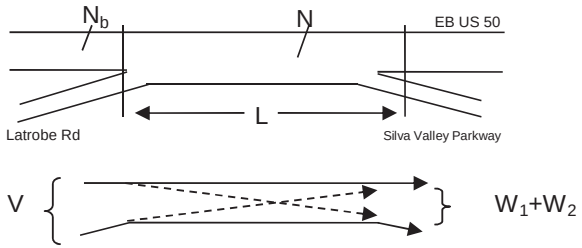
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project AM Peak Hour
Freeway	EB US 50
On-ramp	Latrobe Rd
Off-ramp	Silva Valley Parkway

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and - -
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) -
4. Weaving Intensity Factor (k) -
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ -
6. Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

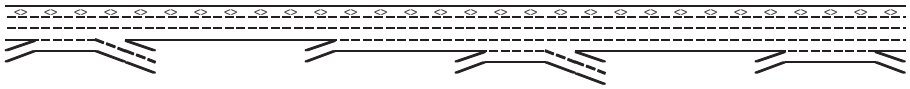
* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Project: EDH Town Center Apartments EIR **Alternative:** Cumulative No Project
Freeway Corridor: Westbound US 50 **Time Period:** AM Peak Hour

Data Entry Value
Calculated Value

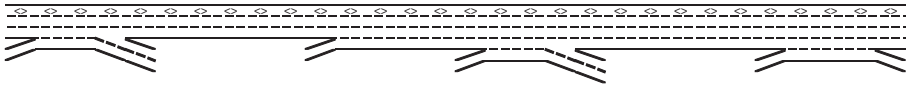
Location	5	6	7	8	9	10



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Define Freeway Segment						
Type	Weave	Basic	Basic	Weave	Basic	Weave
Length (ft)	6,500	2,350	800	2,800	2,300	4,775
Accel Length						
Decel Length						
Mainline Volume	3,910	4,200	4,200	4,280	4,560	4,560
On Ramp Volume	1,524		80	890		1,530
Off Ramp Volume	1,234			610		1,870
Express Lane Volume	626	672	672	642	821	821
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	4,808	3,528	3,608	4,528	3,739	5,269
PHF	0.94	0.94	0.94	0.94	0.94	0.94
GP Lanes	3	2	4	4	3	4
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	5,141	3,772	3,857	4,841	3,998	5,634
GP Flow (pcphpl)	1,714	1,886	964	1,210	1,333	1,408
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	2.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	69.6
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes						
v/c ratio	0.73	0.80	0.41	0.52	0.57	0.60
Speed (mph)	63.6	61.7	65.0	65.0	65.0	65.0
Density (pcphpl)	26.9	30.6	14.8	18.6	20.5	21.7
LOS	D	D	B	C	C	C
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)	3,513		3,772	3,895		4,007
GP_{IN} Cap (pcph)	4,700		4,700	7,050		7,050
GP_{IN} v/c ratio	0.75		0.80	0.55		0.57
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)	3,829			4,189		3,636
GP_{OUT} Cap (pcph)	4,700			7,050		7,050
GP_{OUT} v/c ratio	0.81			0.59		0.52
Calculate Flow Rate in Express Lanes (EL)						
EL Volume (vph)	626	672	672	642	821	821
PHF	0.89	0.89	0.89	0.89	0.89	0.89
Express Lanes	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	710	763	763	729	931	931

Location	5	6	7	8	9	10



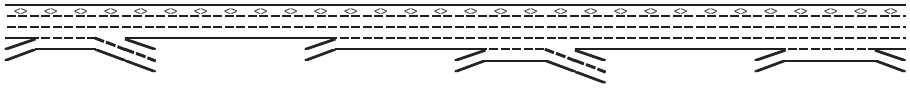
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
EL Flow (pcphpl)	710	763	763	729	931	931
Calculate Speed in Express Lanes						
Lane Width (ft)						
Shoulder Width						
TRD						
f_{LW}						
f_{LC}						
Calc'd FFS						
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in Express Lanes						
EL_{IN} v/c ratio	0.41	0.44	0.44	0.42	0.53	0.53
Calculate On Ramp Flow Rate						
On Volume (vph)	1,524		80	890		1,530
PHF	0.95		0.95	0.95		0.95
Total Lanes	1		1	1		1
Terrain	Level		Level	Level		Level
Grade %	0.0%		0.0%	0.0%		0.0%
Grade Length (mi)	0.00		0.00	0.00		0.00
Truck & Bus %	3.0%		2.0%	2.0%		2.0%
RV %	0.0%		0.0%	0.0%		0.0%
E_T	1.5		1.5	1.5		1.5
E_R	1.2		1.2	1.2		1.2
f_{HV}	0.985		0.990	0.990		0.990
f_P	1.00		1.00	1.00		1.00
On Flow (pcph)	1,628		85	946		1,627
On Flow (pcphpl)	1,628		85	946		1,627
Calculate On Ramp Roadway Operations						
On Ramp Type			Right	Right		Right
On Ramp Speed (mph)			25	45		45
On Ramp Cap (pcph)			1,900	2,100		2,100
On Ramp v/c ratio			0.04	0.45		0.77
Calculate Off Ramp Flow Rate						
Off Volume (vph)	1,234			610		1,870
PHF	0.95			0.95		0.95
Total Lanes	2			2		1
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
Off Flow (pcph)	1,312			652		1,998
Off Flow (pcphpl)	656			326		1,998
Calculate Off Ramp Roadway Operations						
Off Ramp Type	Right			Right		Right
Off Ramp Speed	45			25		45
Off Ramp Cap (pcph)	4,200			3,800		2,100
Off Ramp v/c ratio	0.31			0.17		0.95
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type	Off					
Up Distance	2,350					
Up Flow (pcph)	299					
Down Type	On					
Down Distance	8,850					
Down Flow (pcph)	85					
Calculate Merge Influence Area Operations						
Calculate Diverge Influence Area Operations						

Location	5	6	7	8	9	10



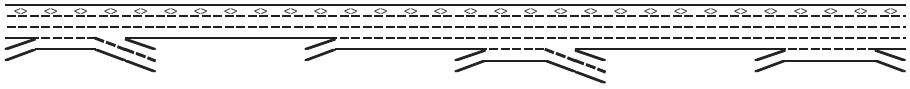
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments						
On to Off Volume (vph)	785			164		830
PHF	0.95			0.95		0.95
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to Off Flow (pcph)	839			174		882
Calculate On Ramp to Mainline Flow Rate for Weave Segments						
On to ML Volume (vph)	739			726		700
PHF	0.95			0.95		0.95
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to ML Flow (pcph)	790			772		744
Calculate Mainline to Off Ramp Flow Rate for Weave Segments						
ML to Off Volume (vph)	449			446		1,040
PHF	0.95			0.95		0.95
Terrain	Level			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
ML to Off Flow (pcph)	477			477		1,111
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments						
GP to GP Volume (vph)	2,835			3,192		2,699
PHF	0.94			0.94		0.94
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	1.0%			1.0%		1.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.995			0.995		0.995
f_P	1.00			1.00		1.00
GP to GP Flow (pcph)	3,031			3,413		2,886
Calculate Weave Segment Operations						
Weave Type	One-sided			One-sided		One-sided
Weave Length	5,500			1,800		3,775
Segment Lanes	2			3		3
Weave Lanes	3			3		3
Weave Flow (pcph)	1,267			1,248		1,855
Non-Weave Flow	3,870			3,587		3,768
Segment Flow	5,137			4,835		5,624
Max Weave Length	3,452			3,574		4,341
Length Check	Not a Weave			OK		OK
Ideal Weave Capacity	2,507			2,214		2,307
f_{HV}	0.991			0.993		0.992
f_P	0.998			0.998		0.999

Location	5	6	7	8	9	10



Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Capacity Condition 1	4,959			6,587		6,853
Capacity Condition 2	14,039			13,442		10,506
Weave v/c ratio	1.02			0.73		0.81
Interchange Density	5			4		3
Lane Changes On to ML	1			1		1
Lane Changes ML to Off	1			1		1
Lane Changes On to Off	0			0		0
Min Lane Change Rate	1,267			1,248		1,855
Weave LC Rate	3,299			1,730		3,143
Non-Weave LC Rate 1	3,393			1,137		2,245
Non-Weave LC Rate 2	2,552			2,489		2,529
Non-Weave LC Rate 3	-8,695			3,805		3,545
Segment LC Rate	5,851			4,219		5,673
Weave Intensity Factor	0.237			0.443		0.312
Weave Speed	55.4			49.7		53.1
Non-Weave Speed	43.5			48.3		42.6
Segment Speed	46.0			48.6		45.6
Weave Density	-			33.1		41.1
Weave LOS	Basic			D		E
Summarize Segment Operations						
Segment v/c ratio	0.73	0.80	0.41	0.73	0.57	0.81
Segment Density	26.9	30.6	14.8	33.1	20.5	41.1
Segment LOS	D	D	B	D	C	E
Over Capacity						

Leisch Method for Weaving Analysis

Data Input

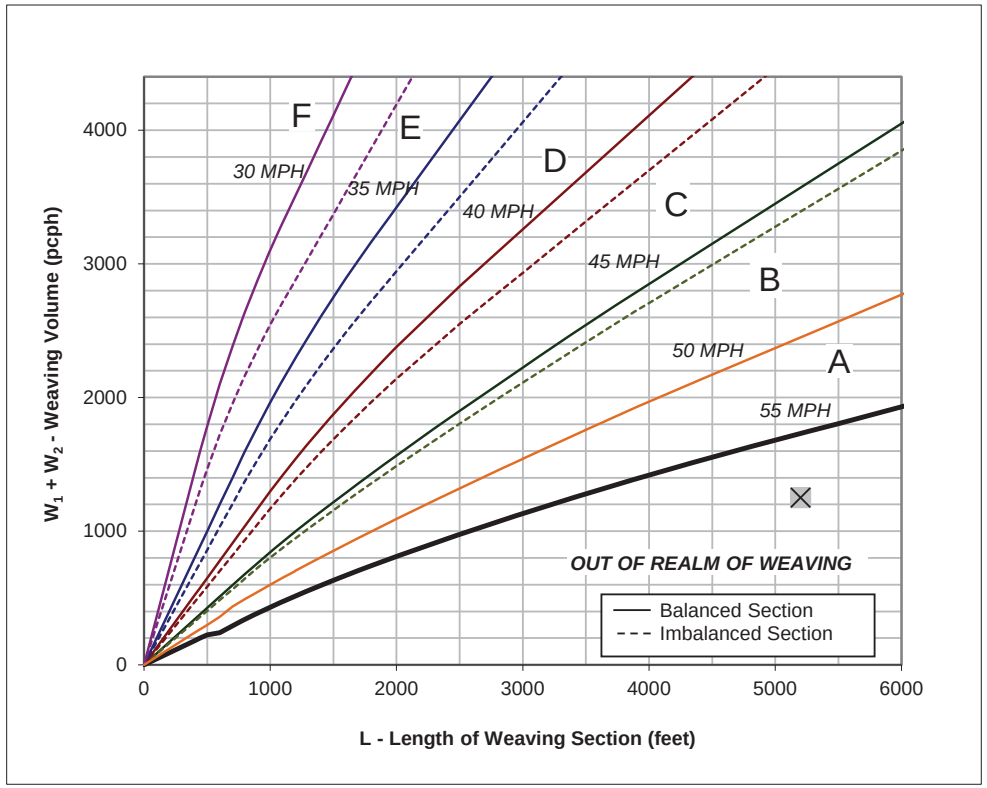
Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	5,200

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,434	Volume (vph)*	762	Volume (vph)*	472
Truck Percentage	1%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,461	Volume (pcph)	773	Volume (pcph)	477

Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project AM Peak Hour
Freeway	WB US 50
On-ramp	Bass Lake Rd
Off-ramp	Silva Valley Pkwy

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



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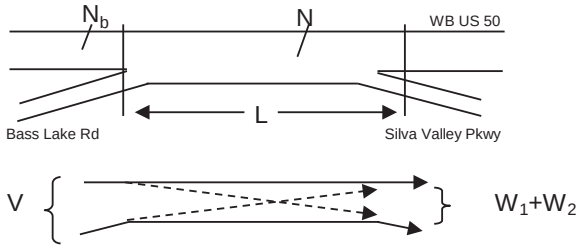


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and ____ -
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

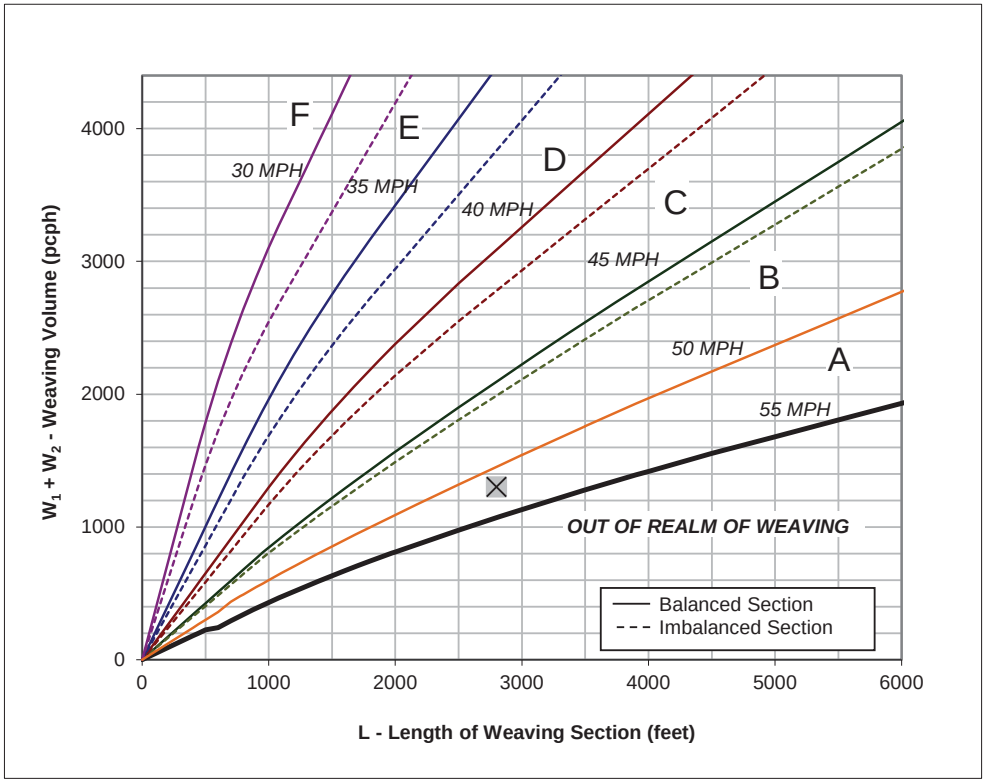
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,800

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,170	Volume (vph)*	783	Volume (vph)*	503
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,196	Volume (pcph)	791	Volume (pcph)	511

Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project AM Peak Hour
Freeway	WB US 50
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



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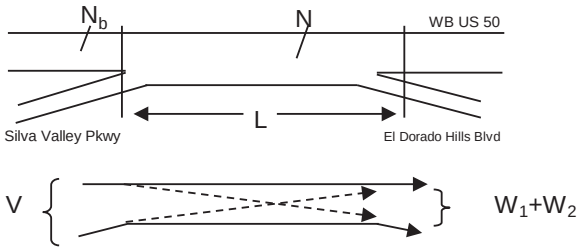


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   50 MPH and **55 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **52.0**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,299**
6. Level of Service (LOS) **C**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

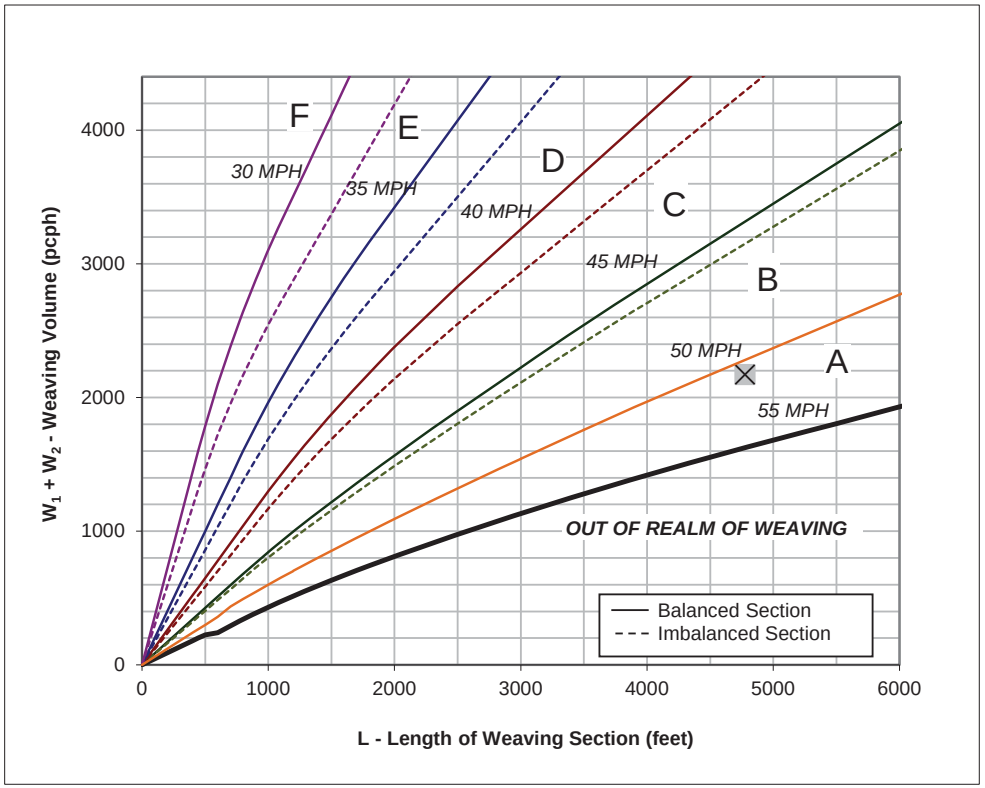
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,775

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,090	Volume (vph)*	903	Volume (vph)*	1,243
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,120	Volume (pcph)	912	Volume (pcph)	1,261

Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project AM Peak Hour
Freeway	WB US 50
On-ramp	El Dorado Hills Blvd
Off-ramp	Empire Ranch Rd

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



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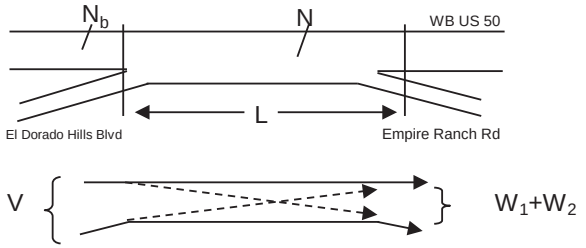


Capacity Analysis

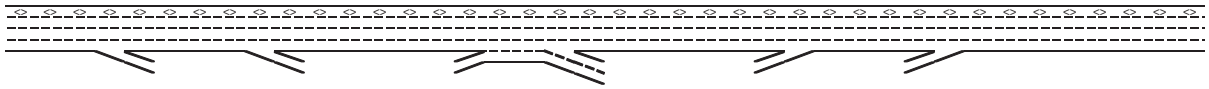
1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   50 MPH and **55 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **50.8**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] **1,530**
6. Level of Service (LOS) **D**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

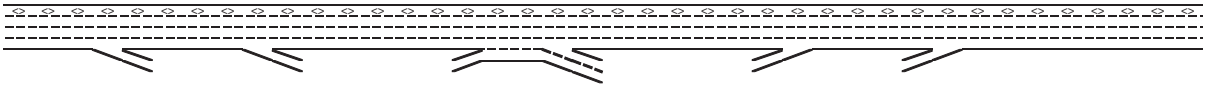
Project: EDH Town Center Apartments EIR **Alternative:** Cumulative No Project
Freeway Corridor: Eastbound US 50 **Time Period:** PM Peak Hour



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5	6	7	8
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment								
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	800	1,500	2,125
Accel Length						550	150	
Decel Length	150	150						
Mainline Volume	6,007	5,330	4,610	4,610	4,810	4,810	4,990	5,579
On Ramp Volume				620		180	589	
Off Ramp Volume	677	720		420				
Express Lane Volume	901	800	692	599	625	625	649	837
EL On Ramp Volume								
EL Off Ramp Volume								
Calculate Flow Rate in General Purpose Lanes (GP)								
GP Volume (vph)	5,106	4,531	3,919	4,631	4,185	4,365	4,930	4,742
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
GP Lanes	3	3	3	4	3	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	6.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	5,290	4,694	4,060	4,798	4,336	4,522	5,108	5,133
GP Flow (pcphpl)	1,763	1,565	1,353	1,199	1,445	1,507	1,703	1,711
Calculate Speed in General Purpose Lanes								
Lane Width (ft)	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes								
v/c ratio	0.75	0.67	0.58	0.51	0.61	0.64	0.72	0.73
Speed (mph)	63.1	64.6	65.0	65.0	65.0	64.8	63.7	63.6
Density (pcphpl)	27.9	24.2	20.8	18.5	22.2	23.2	26.7	26.9
LOS	D	C	C	C	C	C	D	D
Calculate Operations for Entering GP Lanes								
GP_{IN} Vol (pcph)				4,139		4,331	4,482	
GP_{IN} Cap (pcph)				7,050		7,050	7,050	
GP_{IN} v/c ratio				0.59		0.61	0.64	
Calculate Operations for Exiting GP Lanes								
GP_{OUT} Vol (pcph)	4,570	3,928		4,349				
GP_{OUT} Cap (pcph)	7,050	7,050		7,050				
GP_{OUT} v/c ratio	0.65	0.56		0.62				
Calculate Flow Rate in Express Lanes (EL)								
EL Volume (vph)	901	800	692	599	625	625	649	837
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	1,011	897	776	673	702	702	728	1,014

Location	1	2	3	4	5	6	7	8



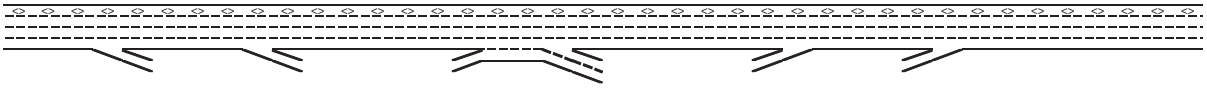
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
EL Flow (pcphpl)	1,011	897	776	673	702	702	728	1,014
Calculate Speed in Express Lanes								
Lane Width (ft)								
Shoulder Width								
TRD								
f_{LW}								
f_{LC}								
Calc'd FFS								
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in Express Lanes								
EL_{IN} v/c ratio	0.58	0.51	0.44	0.38	0.40	0.40	0.42	0.58
Calculate On Ramp Flow Rate								
On Volume (vph)				620		180	589	
PHF				0.95		0.95	0.95	
Total Lanes				1		1	1	
Terrain				Level		Level	Level	
Grade %				0.0%		0.0%	0.0%	
Grade Length (mi)				0.00		0.00	0.00	
Truck & Bus %				2.0%		2.0%	2.0%	
RV %				0.0%		0.0%	0.0%	
E_T				1.5		1.5	1.5	
E_R				1.2		1.2	1.2	
f_{HV}				0.990		0.990	0.990	
f_P				1.00		1.00	1.00	
On Flow (pcph)				659		191	626	
On Flow (pcphpl)				659		191	626	
Calculate On Ramp Roadway Operations								
On Ramp Type				Right		Right	Right	
On Ramp Speed (mph)				45		25	45	
On Ramp Cap (pcph)				2,100		1,900	2,100	
On Ramp v/c ratio				0.31		0.10	0.30	
Calculate Off Ramp Flow Rate								
Off Volume (vph)	677	720		420				
PHF	0.95	0.95		0.95				
Total Lanes	1	1		2				
Terrain	Level	Level		Level				
Grade %	0.0%	0.0%		0.0%				
Grade Length (mi)	0.00	0.00		0.00				
Truck & Bus %	2.0%	2.0%		3.0%				
RV %	0.0%	0.0%		0.0%				
E_T	1.5	1.5		1.5				
E_R	1.2	1.2		1.2				
f_{HV}	0.990	0.990		0.985				
f_P	1.00	1.00		1.00				
Off Flow (pcph)	720	765		449				
Off Flow (pcphpl)	720	765		224				
Calculate Off Ramp Roadway Operations								
Off Ramp Type	Right	Right		Right				
Off Ramp Speed	45	25		45				
Off Ramp Cap (pcph)	2,100	1,900		4,200				
Off Ramp v/c ratio	0.34	0.40		0.11				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps								
Calculate Merge Influence Area Operations								
Calculate Diverge Influence Area Operations								
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments								
On to Off Volume (vph)				419				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				2.0%				

Location	1	2	3	4	5	6	7	8



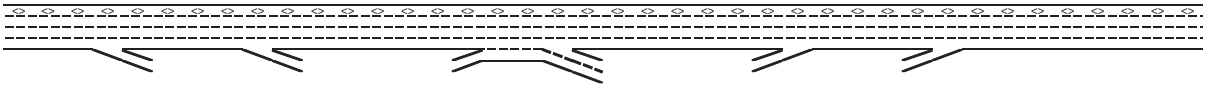
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.990				
f_P				1.00				
On to Off Flow (pcph)				445				
Calculate On Ramp to Mainline Flow Rate for Weave Segments								
On to ML Volume (vph)				201				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				2.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.990				
f_P				1.00				
On to ML Flow (pcph)				214				
Calculate Mainline to Off Ramp Flow Rate for Weave Segments								
ML to Off Volume (vph)				1				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				3.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.985				
f_P				1.00				
ML to Off Flow (pcph)				1				
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments								
GP to GP Volume (vph)				4,010				
PHF				0.97				
Terrain				Grade				
Grade %				3.0%				
Grade Length (mi)				0.41				
Truck & Bus %				1.0%				
RV %				0.0%				
E_T				2.0				
E_R				2.5				
f_{HV}				0.990				
f_P				1.00				
GP to GP Flow (pcph)				4,175				
Calculate Weave Segment Operations								
Weave Type				One-sided				
Weave Length				2,000				
Segment Lanes				3				
Weave Lanes				2				
Weave Flow (pcph)				215				
Non-Weave Flow				4,621				
Segment Flow				4,835				
Max Weave Length				3,008				
Length Check				OK				
Ideal Weave Capacity				2,273				
f_{HV}				0.990				
f_P				1.000				
Capacity Condition 1				6,748				
Capacity Condition 2				53,476				
Weave v/c ratio				0.71				
Interchange Density				3				
Lane Changes On to ML				1				
Lane Changes ML to Off				0				
Lane Changes On to Off				0				

Location	1	2	3	4	5	6	7	8



Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Min Lane Change Rate				214				
Weave LC Rate				809				
Non-Weave LC Rate 1				1,458				
Non-Weave LC Rate 2				2,719				
Non-Weave LC Rate 3				4,315				
Segment LC Rate				3,529				
Weave Intensity Factor				0.354				
Weave Speed				51.9				
Non-Weave Speed				55.7				
Segment Speed				55.5				
Weave Density				29.0				
Weave LOS				D				
Summarize Segment Operations								
Segment v/c ratio	0.80	0.72	0.58	0.71	0.61	0.60	0.70	0.73
Segment Density	33.4	30.0	20.8	29.0	22.2	23.5	29.5	26.9
Segment LOS	D	D	C	D	C	C	D	D
Over Capacity								

Leisch Method for Weaving Analysis

Data Input

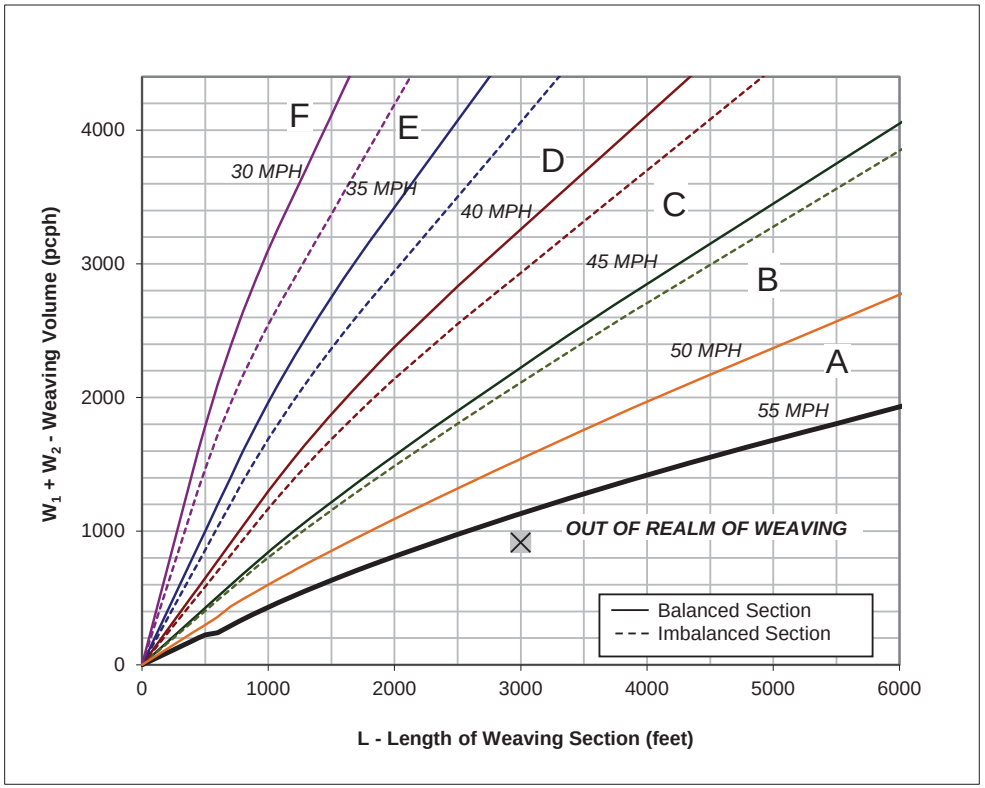
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,230	Volume (vph)*	552	Volume (vph)*	352
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,256	Volume (pcph)	557	Volume (pcph)	357

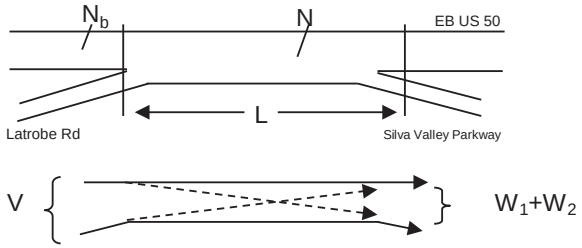
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project PM Peak Hour
Freeway	EB US 50
On-ramp	Latrobe Rd
Off-ramp	Silva Valley Parkway

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? [If optional exit lane, then "Y". Otherwise "N".]	Y
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?	**55 MPH** and -
If below the 55 MPH curve, out of the realm of weaving. If left of the 30 MPH curve, LOS is F.	
3. Interpolated Weaving Speed (S_w, mph)	-
4. Weaving Intensity Factor (k)	-
5. Service Volume (SV, pcph) SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	-
6. Level of Service (LOS)	F

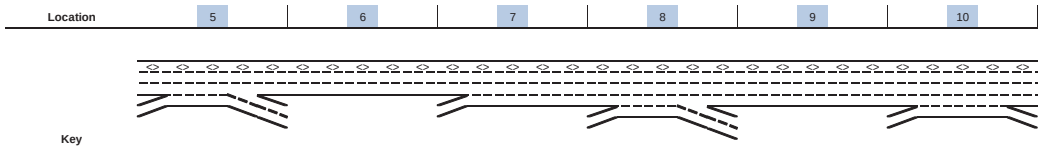
The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Project: EDH Town Center Apartments EIR **Alternative:** Cumulative No Project
Freeway Corridor: Westbound US 50 **Time Period:** PM Peak Hour

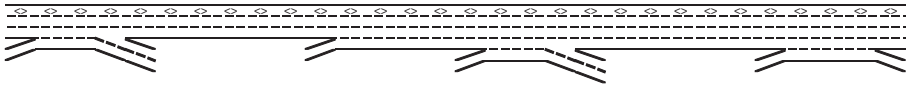
Data Entry Value
Calculated Value



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Define Freeway Segment						
Type	Weave	Basic	Basic	Weave	Basic	Weave
Length (ft)	6,500	2,350	800	2,800	2,300	4,775
Accel Length						
Decel Length						
Mainline Volume	3,780	3,580	3,580	3,660	3,355	3,355
On Ramp Volume	1,151		80	240		1,502
Off Ramp Volume	1,351			545		1,690
Express Lane Volume	567	537	501	512	470	470
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	4,364	3,043	3,159	3,388	2,885	4,387
PHF	0.96	0.96	0.96	0.96	0.96	0.96
GP Lanes	3	2	4	4	3	4
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,569	3,186	3,307	3,546	3,021	4,593
GP Flow (pcphpl)	1,523	1,593	827	887	1,007	1,148
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	2.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	69.6
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes						
v/c ratio	0.65	0.68	0.35	0.38	0.43	0.49
Speed (mph)	64.8	64.5	65.0	65.0	65.0	65.0
Density (pcphpl)	23.5	24.7	12.7	13.6	15.5	17.7
LOS	C	C	B	B	B	B
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)	3,352		3,222	3,291		2,996
GP_{IN} Cap (pcph)	4,700		4,700	7,050		7,050
GP_{IN} v/c ratio	0.71		0.69	0.47		0.42
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)	3,132			2,964		2,787
GP_{OUT} Cap (pcph)	4,700			7,050		7,050
GP_{OUT} v/c ratio	0.67			0.42		0.40
Calculate Flow Rate in Express Lanes (EL)						
EL Volume (vph)	567	537	501	512	470	470
PHF	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	636	603	562	575	527	527

Location	5	6	7	8	9	10



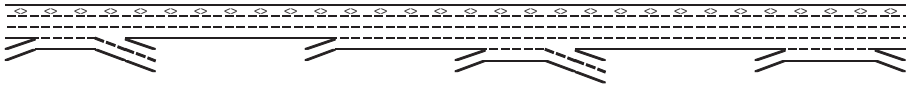
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
EL Flow (pcphpl)	636	603	562	575	527	527
Calculate Speed in Express Lanes						
Lane Width (ft)						
Shoulder Width						
TRD						
f_{LW}						
f_{LC}						
Calc'd FFS						
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in Express Lanes						
EL_{IN} v/c ratio	0.36	0.34	0.32	0.33	0.30	0.30
Calculate On Ramp Flow Rate						
On Volume (vph)	1,151		80	240		1,502
PHF	0.96		0.95	0.95		0.95
Total Lanes	1		1	1		1
Terrain	Level		Level	Level		Level
Grade %	0.0%		0.0%	0.0%		0.0%
Grade Length (mi)	0.00		0.00	0.00		0.00
Truck & Bus %	3.0%		2.0%	2.0%		2.0%
RV %	0.0%		0.0%	0.0%		0.0%
E_T	1.5		1.5	1.5		1.5
E_R	1.2		1.2	1.2		1.2
f_{HV}	0.985		0.990	0.990		0.990
f_P	1.00		1.00	1.00		1.00
On Flow (pcph)	1,217		85	255		1,597
On Flow (pcphpl)	1,217		85	255		1,597
Calculate On Ramp Roadway Operations						
On Ramp Type	Right		Right	Right		Right
On Ramp Speed (mph)	45		45	45		45
On Ramp Cap (pcph)	2,100		2,100	2,100		2,100
On Ramp v/c ratio	0.58		0.04	0.12		0.76
Calculate Off Ramp Flow Rate						
Off Volume (vph)	1,351			545		1,690
PHF	0.95			0.95		0.95
Total Lanes	2			2		1
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
Off Flow (pcph)	1,436			582		1,806
Off Flow (pcphpl)	718			291		1,806
Calculate Off Ramp Roadway Operations						
Off Ramp Type	Right			Right		Right
Off Ramp Speed	45			25		45
Off Ramp Cap (pcph)	4,200			3,800		2,100
Off Ramp v/c ratio	0.34			0.15		0.86
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type	Off					
Up Distance	2,350					
Up Flow (pcph)	556					
Down Type	On					
Down Distance	8,850					
Down Flow (pcph)	85					
Calculate Merge Influence Area Operations						
Calculate Diverge Influence Area Operations						

Location	5	6	7	8	9	10



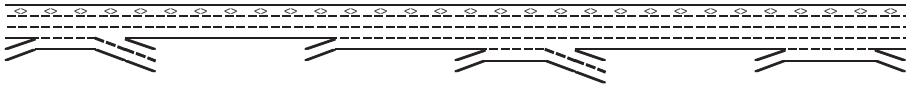
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments						
On to Off Volume (vph)	400			83		686
PHF	0.96			0.95		0.95
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to Off Flow (pcph)	423			88		729
Calculate On Ramp to Mainline Flow Rate for Weave Segments						
On to ML Volume (vph)	751			157		816
PHF	0.96			0.95		0.95
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to ML Flow (pcph)	794			167		868
Calculate Mainline to Off Ramp Flow Rate for Weave Segments						
ML to Off Volume (vph)	951			462		1,004
PHF	0.95			0.95		0.95
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
ML to Off Flow (pcph)	1,011			494		1,073
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments						
GP to GP Volume (vph)	2,262			2,686		1,881
PHF	0.96			0.96		0.96
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	1.0%			1.0%		1.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.995			0.995		0.995
f_P	1.00			1.00		1.00
GP to GP Flow (pcph)	2,368			2,811		1,969
Calculate Weave Segment Operations						
Weave Type	One-sided			One-sided		One-sided
Weave Length	5,500			1,800		3,775
Segment Lanes	2			3		3
Weave Lanes	3			3		3
Weave Flow (pcph)	1,805			661		1,940
Non-Weave Flow	2,791			2,900		2,699
Segment Flow	4,596			3,560		4,639
Max Weave Length	5,034			2,823		5,320
Length Check	Not a Weave			OK		OK
Ideal Weave Capacity	2,386			2,272		2,232
f_{HV}	0.991			0.993		0.991
f_P	0.997			1.000		0.998

Location	5	6	7	8	9	10



Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Capacity Condition 1	4,718			6,767		6,623
Capacity Condition 2	8,812			18,730		8,278
Weave v/c ratio	0.96			0.52		0.69
Interchange Density	5			4		3
Lane Changes On to ML	1			1		1
Lane Changes ML to Off	1			1		1
Lane Changes On to Off	0			0		0
Min Lane Change Rate	1,805			661		1,940
Weave LC Rate	3,837			1,142		3,228
Non-Weave LC Rate 1	3,171			995		2,024
Non-Weave LC Rate 2	2,311			2,336		2,291
Non-Weave LC Rate 3	-5,258			2,620		2,745
Segment LC Rate	6,148			3,478		5,519
Weave Intensity Factor	0.247			0.380		0.305
Weave Speed	55.1			51.2		53.3
Non-Weave Speed	41.0			54.5		43.6
Segment Speed	45.6			53.9		47.2
Weave Density	-			22.0		32.8
Weave LOS	Basic			C		D
Summarize Segment Operations						
Segment v/c ratio	0.65	0.68	0.35	0.52	0.43	0.69
Segment Density	23.5	24.7	12.7	22.0	15.5	32.8
Segment LOS	C	C	B	C	B	D
Over Capacity						

Leisch Method for Weaving Analysis

Data Input

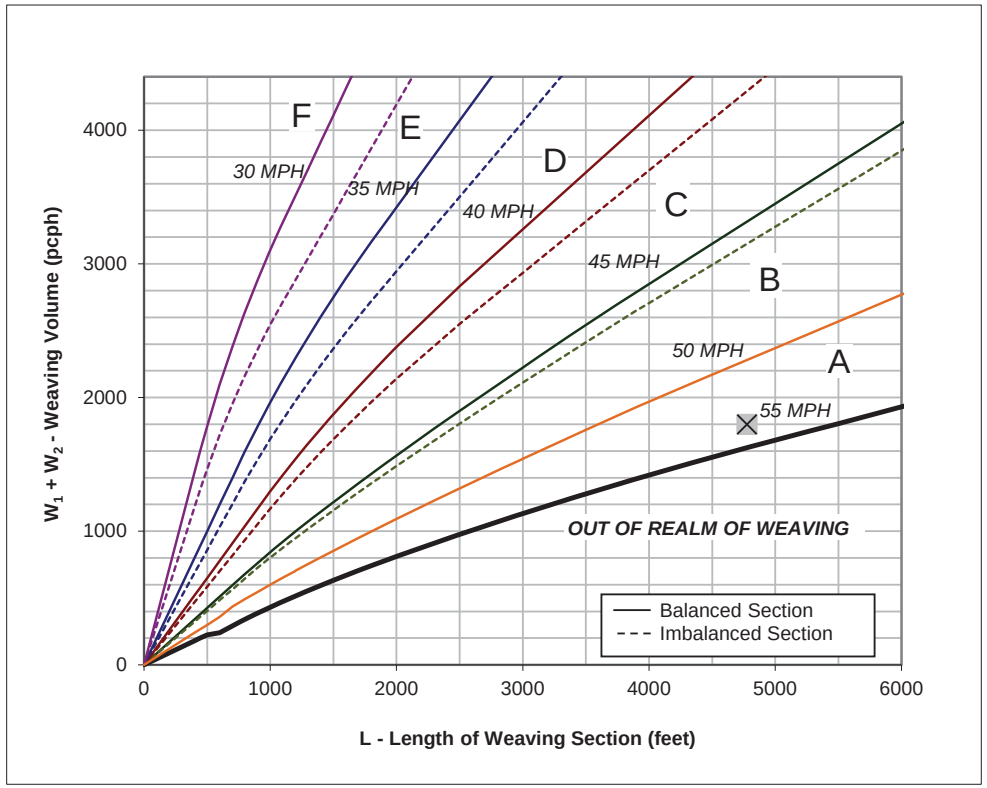
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,775

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,857	Volume (vph)*	796	Volume (vph)*	984
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,881	Volume (pcph)	804	Volume (pcph)	994

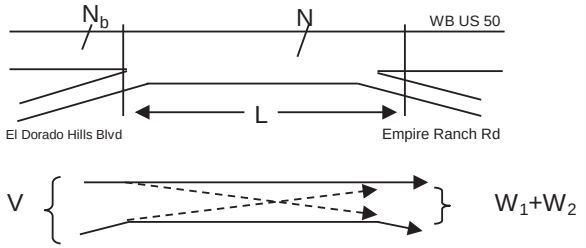
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project PM Peak Hour
Freeway	WB US 50
On-ramp	El Dorado Hills Blvd
Off-ramp	Empire Ranch Rd

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   50 MPH and **55 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) 53.7
4. Weaving Intensity Factor (k) 1.00
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ 1,220
6. Level of Service (LOS) C

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

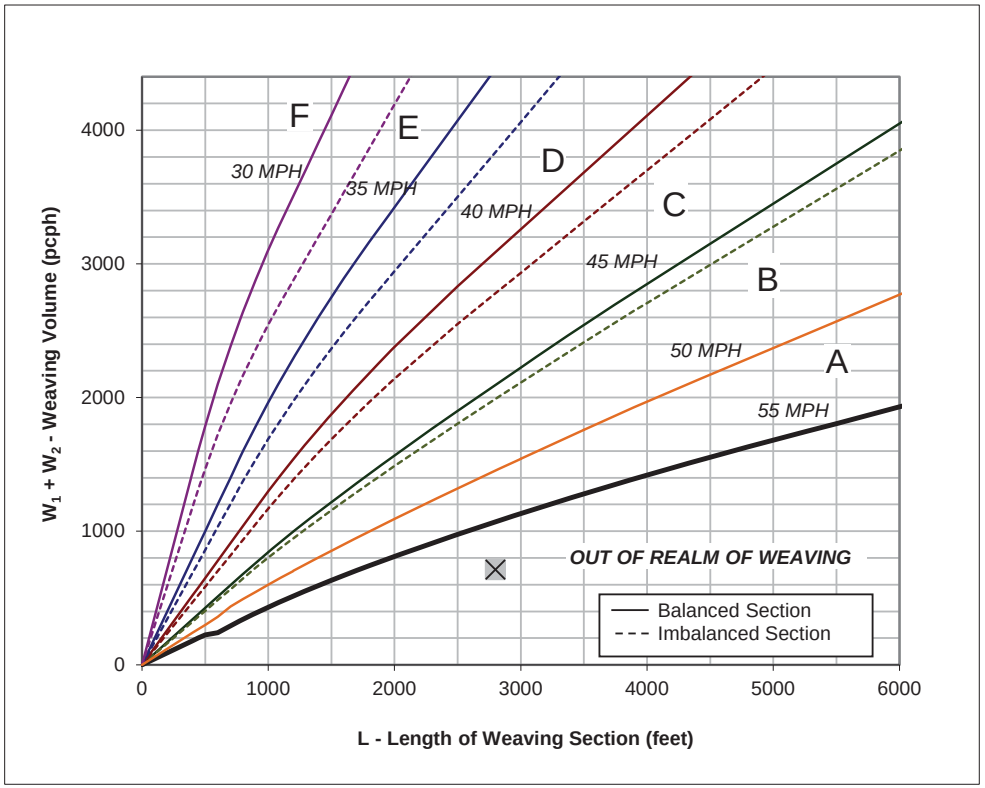
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,800

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,900	Volume (vph)*	199	Volume (vph)*	504
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,920	Volume (pcph)	201	Volume (pcph)	512

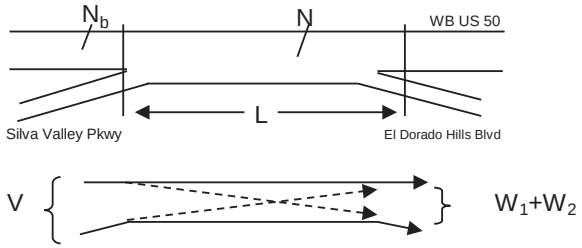
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project PM Peak Hour
Freeway	WB US 50
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and **-**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

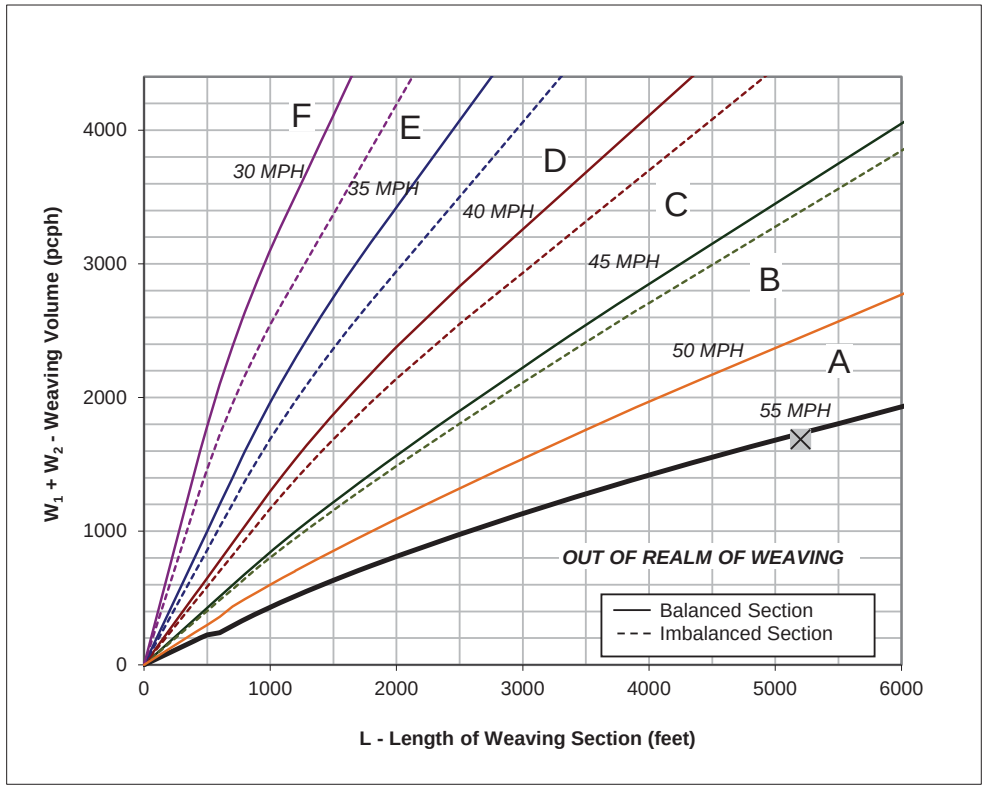
Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	5,200

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,931	Volume (vph)*	737	Volume (vph)*	930
Truck Percentage	1%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,956	Volume (pcph)	748	Volume (pcph)	939

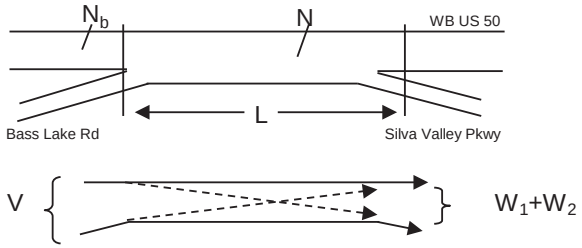
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative No Project PM Peak Hour
Freeway	WB US 50
On-ramp	Bass Lake Rd
Off-ramp	Silva Valley Pkwy

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and _____ -
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) -
4. Weaving Intensity Factor (k) -
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] -
6. Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

APPENDIX A.7:
TECHNICAL CALCULATIONS –
CUMULATIVE PLUS PROJECT CONDITIONS
INTERSECTION LOS AND QUEUEING REPORT

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	90	94	103.9%	47.7	9.7	D
	Through	710	714	100.6%	8.7	1.9	A
	Right Turn	70	72	102.9%	2.9	0.4	A
	Subtotal	870	880	101.1%	12.0	2.1	B
SB	Left Turn	30	30	99.0%	98.1	18.9	F
	Through	1,550	1,568	101.2%	36.1	9.9	D
	Right Turn	630	639	101.4%	53.2	24.7	D
	Subtotal	2,210	2,237	101.2%	41.7	13.8	D
EB	Left Turn	160	160	99.9%	66.2	6.2	E
	Through	100	101	100.5%	59.5	8.6	E
	Right Turn	40	47	116.5%	7.9	1.5	A
	Subtotal	300	307	102.3%	55.0	5.5	E
WB	Left Turn	130	130	99.7%	43.9	4.1	D
	Through	310	314	101.3%	58.2	7.7	E
	Right Turn	60	62	103.7%	4.8	1.9	A
	Subtotal	500	506	101.2%	47.6	5.1	D
Total		3,880	3,929	101.3%	36.9	7.8	D

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	960	924	96.2%	133.5	23.4	F
	Through	680	695	102.2%	22.5	4.3	C
	Right Turn	40	43	107.0%	3.6	1.0	A
	Subtotal	1,680	1,662	98.9%	83.7	13.0	F
SB	Left Turn	50	49	98.8%	56.7	6.9	E
	Through	1,120	1,144	102.2%	20.8	4.4	C
	Right Turn	550	546	99.3%	8.0	2.2	A
	Subtotal	1,720	1,740	101.1%	17.8	3.5	B
EB	Left Turn	150	145	96.6%	56.2	8.9	E
	Through	60	60	100.0%	58.7	16.3	E
	Right Turn	400	406	101.5%	15.6	24.4	B
	Subtotal	610	611	100.1%	28.2	17.5	C
WB	Left Turn	90	91	101.1%	63.4	7.2	E
	Through	20	20	99.0%	67.0	14.4	E
	Right Turn	40	39	98.3%	6.6	2.2	A
	Subtotal	150	150	100.1%	49.6	5.0	D
Total		4,160	4,162	100.1%	46.8	7.6	D

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	1,490	1,494	100.3%	36.3	31.2	D
	Right Turn	220	234	106.2%	6.6	0.9	A
	Subtotal	1,710	1,728	101.0%	32.0	26.8	C
SB	Left Turn	310	310	100.1%	34.1	2.9	C
	Through	1,300	1,288	99.0%	98.8	46.3	F
	Right Turn						
	Subtotal	1,610	1,598	99.2%	85.7	37.7	F
EB	Left Turn						
	Through						
	Right Turn	1,150	1,165	101.3%	56.2	25.5	E
	Subtotal	1,150	1,165	101.3%	56.2	25.5	E
WB	Left Turn						
	Through						
	Right Turn	190	192	100.9%	0.6	0.2	A
	Subtotal	190	192	100.9%	0.6	0.2	A
Total		4,660	4,682	100.5%	54.1	22.1	D

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	70	63	89.6%	34.0	8.0	C
	Through	1,420	1,449	102.0%	16.9	4.3	B
	Right Turn	50	50	100.8%	3.2	1.7	A
	Subtotal	1,540	1,562	101.4%	17.2	4.0	B
SB	Left Turn	470	486	103.4%	56.3	3.9	E
	Through	1,910	1,869	97.9%	56.5	4.1	E
	Right Turn	70	72	103.1%	20.2	7.1	C
	Subtotal	2,450	2,428	99.1%	55.3	3.6	E
EB	Left Turn	10	9	90.0%	65.2	39.0	E
	Through	10	11	107.0%	52.3	21.1	D
	Right Turn	10	12	122.0%	35.2	26.1	D
	Subtotal	30	32	106.3%	51.1	11.8	D
WB	Left Turn	120	121	100.8%	90.8	61.2	F
	Through	30	31	102.0%	89.1	67.2	F
	Right Turn	280	289	103.1%	39.9	40.4	D
	Subtotal	430	440	102.4%	57.0	48.8	E
Total		4,450	4,461	100.3%	41.5	4.6	D

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	160	134	83.6%	264.9	101.5	F
	Through	1,110	1,123	101.2%	29.7	0.8	C
	Right Turn	230	233	101.1%	10.2	3.5	B
	Subtotal	1,500	1,490	99.3%	48.0	9.5	D
SB	Left Turn	120	122	101.3%	55.4	6.0	E
	Through	1,090	1,092	100.2%	22.0	2.8	C
	Right Turn	830	777	93.6%	108.1	5.5	F
	Subtotal	2,040	1,991	97.6%	58.1	2.7	E
EB	Left Turn	250	261	104.4%	103.5	33.3	F
	Through	170	170	100.1%	45.1	3.6	D
	Right Turn	110	116	105.5%	27.6	4.1	C
	Subtotal	530	547	103.2%	69.7	17.7	E
WB	Left Turn	350	339	96.7%	237.7	50.6	F
	Through	580	594	102.4%	62.4	10.0	E
	Right Turn	180	180	100.2%	4.7	1.0	A
	Subtotal	1,110	1,113	100.3%	105.7	18.9	F
Total		5,180	5,141	99.2%	66.8	5.5	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	450	230	310	1290	10	80	10	70	10	10	10
Future Volume (veh/h)	0	450	230	310	1290	10	80	10	70	10	10	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	0.98		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1875	1900	1900	1863	1900	1845	1852	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	474	203	326	1358	11	84	11	3	11	11	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	2	0	2	2	3	0	0	0	0	0
Cap, veh/h	2	1292	549	362	2871	23	185	113	31	186	155	0
Arrive On Green	0.00	0.53	0.53	0.20	0.80	0.80	0.08	0.08	0.08	0.08	0.08	0.00
Sat Flow, veh/h	1810	2416	1027	1810	3598	29	1360	1389	379	1397	1900	0
Grp Volume(v), veh/h	0	348	329	326	668	701	84	0	14	11	11	0
Grp Sat Flow(s),veh/h/ln	1810	1781	1662	1810	1770	1857	1360	0	1768	1397	1900	0
Q Serve(g_s), s	0.0	10.0	10.1	15.5	10.8	10.8	5.3	0.0	0.6	0.6	0.5	0.0
Cycle Q Clear(g_c), s	0.0	10.0	10.1	15.5	10.8	10.8	5.8	0.0	0.6	1.3	0.5	0.0
Prop In Lane	1.00		0.62	1.00		0.02	1.00		0.21	1.00		0.00
Lane Grp Cap(c), veh/h	2	952	888	362	1412	1482	185	0	144	186	155	0
V/C Ratio(X)	0.00	0.37	0.37	0.90	0.47	0.47	0.45	0.00	0.10	0.06	0.07	0.00
Avail Cap(c_a), veh/h	64	952	888	914	1777	1865	498	0	551	507	592	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	11.8	11.9	34.3	2.9	2.9	40.0	0.0	37.4	38.0	37.3	0.0
Incr Delay (d2), s/veh	0.0	1.1	1.2	3.4	0.3	0.3	0.6	0.0	0.1	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.1	4.9	8.0	5.1	5.4	2.0	0.0	0.3	0.3	0.3	0.0
LnGrp Delay(d),s/veh	0.0	12.9	13.1	37.7	3.2	3.2	40.6	0.0	37.5	38.0	37.4	0.0
LnGrp LOS		B	B	D	A	A	D		D	D	D	
Approach Vol, veh/h		677			1695			98			22	
Approach Delay, s/veh		13.0			9.8			40.2			37.7	
Approach LOS		B			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.2	53.0		11.8	0.0	76.2		11.8
Change Period (Y+Rc), s	5.6	6.0		4.6	5.6	6.0		4.6
Max Green Setting (Gmax), s	44.4	47.0		27.4	3.1	88.3		27.4
Max Q Clear Time (g_c+I1), s	17.5	12.1		3.3	0.0	12.8		7.8
Green Ext Time (p_c), s	0.1	21.7		0.1	0.0	31.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Notes

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	300	10	20	800	200	50	10	10	50	10	120
Future Volume (veh/h)	150	300	10	20	800	200	50	10	10	50	10	120
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	158	316	6	21	842	188	53	11	0	53	11	10
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	234	2209	963	40	1436	321	100	70	0	80	33	30
Arrive On Green	0.13	0.62	0.62	0.02	0.50	0.47	0.06	0.04	0.00	0.05	0.04	0.03
Sat Flow, veh/h	1774	3539	1544	1774	2860	639	1774	1863	0	1774	876	796
Grp Volume(v), veh/h	158	316	6	21	521	509	53	11	0	53	0	21
Grp Sat Flow(s),veh/h/ln	1774	1770	1544	1774	1770	1729	1774	1863	0	1774	0	1672
Q Serve(g_s), s	5.2	2.3	0.1	0.7	12.8	13.0	1.8	0.4	0.0	1.8	0.0	0.8
Cycle Q Clear(g_c), s	5.2	2.3	0.1	0.7	12.8	13.0	1.8	0.4	0.0	1.8	0.0	0.8
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.00	1.00		0.48
Lane Grp Cap(c), veh/h	234	2209	963	40	888	868	100	70	0	80	0	63
V/C Ratio(X)	0.67	0.14	0.01	0.52	0.59	0.59	0.53	0.16	0.00	0.66	0.00	0.33
Avail Cap(c_a), veh/h	345	2209	963	230	888	868	230	724	0	201	0	623
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.5	4.8	4.4	29.8	10.9	11.2	28.4	28.8	0.0	29.0	0.0	29.1
Incr Delay (d2), s/veh	1.3	0.1	0.0	3.8	2.8	2.9	1.6	1.0	0.0	9.0	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.1	0.0	0.4	6.9	6.8	0.9	0.2	0.0	1.1	0.0	0.4
LnGrp Delay(d),s/veh	26.8	4.9	4.4	33.6	13.7	14.1	30.0	29.8	0.0	38.0	0.0	32.1
LnGrp LOS	C	A	A	C	B	B	C	C		D		C
Approach Vol, veh/h		480			1051			64			74	
Approach Delay, s/veh		12.1			14.3			29.9			36.3	
Approach LOS		B			B			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	42.5	6.8	7.0	13.0	35.0	7.5	6.3
Change Period (Y+Rc), s	4.5	6.0	4.5	* 5.2	6.0	* 6	5.2	* 4.5
Max Green Setting (Gmax), s	7.5	33.0	6.5	* 24	10.8	* 29	6.8	* 23
Max Q Clear Time (g_c+I1), s	2.7	4.3	3.8	2.4	7.2	15.0	3.8	2.8
Green Ext Time (p_c), s	0.0	2.1	0.0	0.0	0.2	6.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	15.2
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	270	50	120	830	90	130	30	360	30	10	20
Future Volume (veh/h)	10	270	50	120	830	90	130	30	360	30	10	20
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	284	14	126	874	89	137	32	65	32	11	1
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	5	1365	593	145	1458	148	258	79	160	116	110	10
Arrive On Green	0.00	0.39	0.39	0.08	0.45	0.42	0.15	0.15	0.14	0.07	0.07	0.06
Sat Flow, veh/h	1774	3539	1539	1774	3234	329	1774	540	1096	1774	1678	153
Grp Volume(v), veh/h	11	284	14	126	478	485	137	0	97	32	0	12
Grp Sat Flow(s),veh/h/ln	1774	1770	1539	1774	1770	1794	1774	0	1636	1774	0	1830
Q Serve(g_s), s	0.1	2.7	0.3	3.5	10.1	10.2	3.6	0.0	2.7	0.9	0.0	0.3
Cycle Q Clear(g_c), s	0.1	2.7	0.3	3.5	10.1	10.2	3.6	0.0	2.7	0.9	0.0	0.3
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.67	1.00		0.08
Lane Grp Cap(c), veh/h	5	1365	593	145	798	809	258	0	238	116	0	120
V/C Ratio(X)	2.28	0.21	0.02	0.87	0.60	0.60	0.53	0.00	0.41	0.27	0.00	0.10
Avail Cap(c_a), veh/h	285	2983	1297	356	1563	1584	926	0	854	926	0	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.8	10.2	9.5	22.6	10.3	10.4	19.7	0.0	19.4	22.2	0.0	21.9
Incr Delay (d2), s/veh	625.3	0.1	0.0	5.9	0.7	0.7	2.1	0.0	1.4	1.6	0.0	0.4
Initial Q Delay(d3),s/veh	114.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.3	0.1	2.0	5.1	5.2	1.9	0.0	1.3	0.5	0.0	0.2
LnGrp Delay(d),s/veh	764.9	10.3	9.5	28.5	11.0	11.1	21.8	0.0	20.8	23.7	0.0	22.4
LnGrp LOS	F	B	A	C	B	B	C		C	C		C
Approach Vol, veh/h		309			1089			234			44	
Approach Delay, s/veh		37.1			13.1			21.4			23.3	
Approach LOS		D			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.1	27.2		11.3	8.1	23.2		7.3
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	8.5	* 43		* 26	10.5	40.0		25.8
Max Q Clear Time (g_c+I1), s	2.1	12.2		5.6	5.5	4.7		2.9
Green Ext Time (p_c), s	0.0	8.8		1.1	0.1	9.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	14.1
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	240	140	130	0	20	150	30	0	140	60	90
Future Vol, veh/h	0	240	140	130	0	20	150	30	0	140	60	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	3	0	4	2	0	2	0	2	1	2	0
Mvmt Flow	0	253	147	137	0	21	158	32	0	147	63	95
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	14.6	14.6	13.6
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	40%	0%	100%	0%	0%	83%	0%	36%
Vol Right, %	0%	60%	0%	0%	100%	0%	17%	0%	64%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	150	240	140	130	20	180	10	110
LT Vol	140	0	240	0	0	20	0	10	0
Through Vol	0	60	0	140	0	0	150	0	40
RT Vol	0	90	0	0	130	0	30	0	70
Lane Flow Rate	147	158	253	147	137	21	189	11	116
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.323	0.306	0.519	0.28	0.236	0.047	0.393	0.025	0.24
Departure Headway (Hd)	7.892	6.976	7.4	6.839	6.197	8.058	7.462	8.421	7.457
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	455	515	488	526	579	444	481	425	482
Service Time	5.638	4.722	5.14	4.58	3.937	5.808	5.212	6.174	5.209
HCM Lane V/C Ratio	0.323	0.307	0.518	0.279	0.237	0.047	0.393	0.026	0.241
HCM Control Delay	14.4	12.8	17.9	12.2	10.9	11.2	15	11.4	12.6
HCM Lane LOS	B	B	C	B	B	B	B	B	B
HCM 95th-tile Q	1.4	1.3	2.9	1.1	0.9	0.1	1.8	0.1	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	10	40	70
Future Vol, veh/h	0	10	40	70
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	0	0	4
Mvmt Flow	0	11	42	74
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	12.5
HCM LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	740	0	500	0	530	80	0	590	890
Future Volume (veh/h)	0	0	0	740	0	500	0	530	80	0	590	890
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h				779	0	412	0	558	0	0	621	384
Adj No. of Lanes				2	0	1	0	2	1	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	0	2	2	0	2	2
Cap, veh/h				1207	0	529	0	1628	728	0	1628	708
Arrive On Green				0.34	0.00	0.34	0.00	0.92	0.00	0.00	0.46	0.46
Sat Flow, veh/h				3548	0	1555	0	3632	1583	0	3632	1541
Grp Volume(v), veh/h				779	0	412	0	558	0	0	621	384
Grp Sat Flow(s),veh/h/ln				1774	0	1555	0	1770	1583	0	1770	1541
Q Serve(g_s), s				7.4	0.0	9.5	0.0	0.7	0.0	0.0	4.6	7.2
Cycle Q Clear(g_c), s				7.4	0.0	9.5	0.0	0.7	0.0	0.0	4.6	7.2
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				1207	0	529	0	1628	728	0	1628	708
V/C Ratio(X)				0.65	0.00	0.78	0.00	0.34	0.00	0.00	0.38	0.54
Avail Cap(c_a), veh/h				1419	0	622	0	1628	728	0	1628	708
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.99	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				11.2	0.0	11.8	0.0	0.9	0.0	0.0	7.1	7.8
Incr Delay (d2), s/veh				0.8	0.0	5.3	0.0	0.6	0.0	0.0	0.7	3.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.7	0.0	4.8	0.0	0.4	0.0	0.0	2.4	3.6
LnGrp Delay(d),s/veh				11.9	0.0	17.2	0.0	1.5	0.0	0.0	7.8	10.7
LnGrp LOS				B		B		A			A	B
Approach Vol, veh/h					1191			558			1005	
Approach Delay, s/veh					13.8			1.5			8.9	
Approach LOS					B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		22.4				22.4		17.6
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		16.0				16.0		16.0
Max Q Clear Time (g_c+I1), s		2.7				9.2		11.5
Green Ext Time (p_c), s		7.1				4.4		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	0	40	0	0	0	0	470	380	0	1020	310
Future Volume (veh/h)	140	0	40	0	0	0	0	470	380	0	1020	310
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h	147	0	17				0	495	0	0	1074	0
Adj No. of Lanes	2	0	1				0	2	1	0	2	1
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	289	0	133				0	2535	1134	0	2535	1134
Arrive On Green	0.08	0.00	0.08				0.00	0.72	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3442	0	1583				0	3632	1583	0	3632	1583
Grp Volume(v), veh/h	147	0	17				0	495	0	0	1074	0
Grp Sat Flow(s),veh/h/ln	1721	0	1583				0	1770	1583	0	1770	1583
Q Serve(g_s), s	1.6	0.0	0.4				0.0	1.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.6	0.0	0.4				0.0	1.8	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	289	0	133				0	2535	1134	0	2535	1134
V/C Ratio(X)	0.51	0.00	0.13				0.00	0.20	0.00	0.00	0.42	0.00
Avail Cap(c_a), veh/h	1377	0	633				0	2535	1134	0	2535	1134
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.86	0.00
Uniform Delay (d), s/veh	17.5	0.0	17.0				0.0	1.9	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.4				0.0	0.2	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2				0.0	1.0	0.0	0.0	0.2	0.0
LnGrp Delay(d),s/veh	18.9	0.0	17.4				0.0	2.0	0.0	0.0	0.4	0.0
LnGrp LOS	B		B					A			A	
Approach Vol, veh/h		164						495			1074	
Approach Delay, s/veh		18.8						2.0			0.4	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		32.6		7.4		32.6		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		16.0		16.0		16.0		
Max Q Clear Time (g_c+I1), s		3.8		3.6		2.0		
Green Ext Time (p_c), s		7.5		0.4		8.2		

Intersection Summary	
HCM 2010 Ctrl Delay	2.6
HCM 2010 LOS	A

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	3,275	100	13	175	72	275	240	0%	0%
	Left/Through	3,275	125	28	250	119	350	244	0%	0%
	Right Turn	325	25	20	75	102	150	168	2%	0%
NB	Left Turn	675	575	111	775	101	750	14	0%	23%
	Through	675	125	15	200	15	225	35	0%	0%
	Right Turn	675	25	3	50	5	75	16	0%	0%
SB	Left Turn	1,275	50	10	100	26	150	60	0%	0%
	Through	325	125	13	250	32	325	65	1%	0%
	Through/Right	325	75	11	175	29	225	49	0%	0%
	Right Turn	325	25	8	50	44	125	95	0%	0%
WB	Left Turn	175	50	4	100	10	125	19	0%	0%
	Left/Through	1,025	75	4	125	9	125	27	0%	0%
	Through/Right	175	25	3	50	14	75	53	0%	0%

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Right Turn	3,725	325	92	625	235	775	350	0%	0%
NB	Through	725	250	136	425	256	450	281	0%	0%
	Right Turn	725	25	3	25	34	75	99	0%	0%
SB	Left Turn	600	75	8	150	57	250	204	0%	0%
	Through	675	275	61	550	165	650	166	0%	3%
WB	Right Turn	1,325	25	0	25	0	25	0	0%	0%

Lane Group	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	389	390	526	558	84	621	937
v/c Ratio	0.65	0.65	0.79	0.36	0.05	0.40	0.78
Control Delay	15.9	15.9	18.1	7.2	0.1	9.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	15.9	18.1	7.2	0.1	9.2	7.7
Queue Length 50th (ft)	66	67	58	36	0	49	0
Queue Length 95th (ft)	132	132	#191	54	0	80	#190
Internal Link Dist (ft)		1297		584		1247	
Turn Bay Length (ft)			400				400
Base Capacity (vph)	670	670	724	1560	1547	1560	1202
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.58	0.73	0.36	0.05	0.40	0.78

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	147	42	495	400	1074	326
v/c Ratio	0.24	0.14	0.20	0.26	0.44	0.21
Control Delay	14.7	9.2	3.6	0.4	2.7	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	9.2	3.6	0.4	2.7	1.0
Queue Length 50th (ft)	14	3	19	0	11	0
Queue Length 95th (ft)	29	19	37	0	24	0
Internal Link Dist (ft)			1371		584	
Turn Bay Length (ft)		300		425		475
Base Capacity (vph)	1373	639	2443	1561	2443	1547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.07	0.20	0.26	0.44	0.21

Intersection Summary

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	40	40	100.0%	74.7	12.5	E
	Through	1,610	1,586	98.5%	52.9	6.0	D
	Right Turn	170	172	101.1%	8.5	1.8	A
	Subtotal	1,820	1,798	98.8%	49.6	5.5	D
SB	Left Turn	110	112	101.4%	69.9	14.0	E
	Through	910	909	99.8%	26.2	3.8	C
	Right Turn	190	198	104.2%	6.6	1.3	A
	Subtotal	1,210	1,218	100.7%	27.0	4.1	C
EB	Left Turn	600	588	98.1%	128.0	31.3	F
	Through	190	190	100.1%	45.9	6.7	D
	Right Turn	420	413	98.4%	17.8	2.9	B
	Subtotal	1,210	1,192	98.5%	77.3	17.1	E
WB	Left Turn	110	112	102.0%	64.5	9.6	E
	Through	170	171	100.5%	58.7	9.4	E
	Right Turn	200	192	96.0%	17.8	3.4	B
	Subtotal	480	475	99.0%	43.3	5.3	D
Total		4,720	4,682	99.2%	50.1	5.2	D

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	1,180	1,121	95.0%	106.7	15.5	F
	Through	1,530	1,497	97.8%	30.4	4.7	C
	Right Turn	190	187	98.6%	5.8	1.1	A
	Subtotal	2,900	2,806	96.7%	60.0	5.4	E
SB	Left Turn	40	40	100.3%	56.9	10.9	E
	Through	1,130	1,129	99.9%	41.5	6.4	D
	Right Turn	270	268	99.1%	6.5	1.4	A
	Subtotal	1,440	1,437	99.8%	35.5	5.1	D
EB	Left Turn	215	210	97.5%	60.7	5.5	E
	Through	40	41	103.0%	62.1	9.6	E
	Right Turn	290	291	100.3%	3.6	0.3	A
	Subtotal	545	542	99.4%	29.1	3.1	C
WB	Left Turn	130	119	91.2%	59.0	9.5	E
	Through	60	61	100.8%	65.1	11.8	E
	Right Turn	80	85	106.4%	18.7	3.7	B
	Subtotal	270	264	97.8%	47.6	5.2	D
Total		5,155	5,048	97.9%	49.1	3.9	D

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	2,180	2,115	97.0%	20.0	18.8	C
	Right Turn	440	412	93.7%	10.8	0.8	B
	Subtotal	2,620	2,527	96.4%	18.5	15.8	B
SB	Left Turn	180	179	99.2%	28.1	4.3	C
	Through	1,370	1,351	98.6%	19.2	4.8	B
	Right Turn						
	Subtotal	1,550	1,530	98.7%	20.1	4.5	C
EB	Left Turn						
	Through						
	Right Turn	700	695	99.2%	25.9	3.4	C
	Subtotal	700	695	99.2%	25.9	3.4	C
WB	Left Turn						
	Through						
	Right Turn	720	716	99.5%	1.8	0.3	A
	Subtotal	720	716	99.5%	1.8	0.3	A
Total		5,590	5,468	97.8%	17.7	7.4	B

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	10	11	105.0%	152.2	33.9	F
	Through	1,780	1,713	96.2%	139.9	7.5	F
	Right Turn	40	37	92.8%	6.8	3.0	A
	Subtotal	1,830	1,761	96.2%	138.1	7.4	F
SB	Left Turn	510	495	97.1%	101.0	29.5	F
	Through	1,550	1,541	99.4%	22.2	5.6	C
	Right Turn	10	12	115.0%	1.8	1.8	A
	Subtotal	2,070	2,047	98.9%	41.7	11.2	D
EB	Left Turn	190	185	97.2%	51.2	6.9	D
	Through	30	28	94.7%	53.5	18.6	D
	Right Turn	90	93	103.1%	27.7	6.9	C
	Subtotal	310	306	98.7%	44.1	5.8	D
WB	Left Turn	60	60	99.8%	75.5	27.2	E
	Through	10	12	121.0%	64.2	56.0	E
	Right Turn	650	643	99.0%	35.7	25.3	D
	Subtotal	720	715	99.3%	39.6	26.1	D
Total		4,930	4,829	98.0%	76.4	8.3	E

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	160	163	101.8%	156.3	86.7	F
	Through	890	859	96.5%	196.7	120.1	F
	Right Turn	410	378	92.2%	151.2	103.0	F
	Subtotal	1,460	1,400	95.9%	180.8	112.9	F
SB	Left Turn	260	258	99.4%	56.8	22.8	E
	Through	980	984	100.4%	24.9	1.7	C
	Right Turn	460	461	100.1%	14.3	2.7	B
	Subtotal	1,700	1,703	100.2%	27.5	4.1	C
EB	Left Turn	730	736	100.8%	95.3	47.4	F
	Through	560	568	101.4%	46.7	3.5	D
	Right Turn	240	230	96.0%	40.7	9.2	D
	Subtotal	1,530	1,534	100.3%	68.7	22.5	E
WB	Left Turn	290	293	100.9%	74.8	19.5	E
	Through	410	410	100.1%	69.4	18.8	E
	Right Turn	210	209	99.6%	7.2	2.4	A
	Subtotal	910	912	100.2%	57.3	16.7	E
Total		5,600	5,549	99.1%	79.6	27.9	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1320	180	100	970	20	390	10	240	0	10	0
Future Volume (veh/h)	20	1320	180	100	970	20	390	10	240	0	10	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1883	1900	1881	1900	1900	1900	1882	1900	1900	1900	1900
Adj Flow Rate, veh/h	21	1389	181	105	1021	20	411	11	137	0	11	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	1	1	0	0	0	0	0	0	0	0
Cap, veh/h	26	1583	204	128	2011	39	482	36	448	56	579	0
Arrive On Green	0.01	0.50	0.50	0.07	0.56	0.56	0.30	0.30	0.30	0.00	0.30	0.00
Sat Flow, veh/h	1810	3177	410	1792	3619	71	1419	118	1472	1259	1900	0
Grp Volume(v), veh/h	21	776	794	105	509	532	411	0	148	0	11	0
Grp Sat Flow(s),veh/h/ln	1810	1789	1798	1792	1805	1885	1419	0	1590	1259	1900	0
Q Serve(g_s), s	1.5	49.7	51.2	7.5	22.6	22.6	36.8	0.0	9.2	0.0	0.5	0.0
Cycle Q Clear(g_c), s	1.5	49.7	51.2	7.5	22.6	22.6	37.4	0.0	9.2	0.0	0.5	0.0
Prop In Lane	1.00		0.23	1.00		0.04	1.00		0.93	1.00		0.00
Lane Grp Cap(c), veh/h	26	892	896	128	1003	1047	482	0	484	56	579	0
V/C Ratio(X)	0.81	0.87	0.89	0.82	0.51	0.51	0.85	0.00	0.31	0.00	0.02	0.00
Avail Cap(c_a), veh/h	134	928	932	172	1003	1047	483	0	485	56	579	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	63.5	28.7	29.1	59.2	17.8	17.8	44.5	0.0	34.4	0.0	31.4	0.0
Incr Delay (d2), s/veh	19.3	9.0	10.2	15.1	0.5	0.5	13.1	0.0	0.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	26.6	27.9	4.2	11.3	11.8	16.1	0.0	4.1	0.0	0.3	0.0
LnGrp Delay(d),s/veh	82.8	37.7	39.3	74.3	18.3	18.3	57.6	0.0	34.6	0.0	31.4	0.0
LnGrp LOS	F	D	D	E	B	B	E		C		C	
Approach Vol, veh/h		1591			1146			559			11	
Approach Delay, s/veh		39.1			23.4			51.5			31.4	
Approach LOS		D			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.9	70.4		44.0	7.5	77.8		44.0
Change Period (Y+Rc), s	5.6	6.0		4.6	5.6	6.0		4.6
Max Green Setting (Gmax), s	12.4	67.0		39.4	9.6	69.8		39.4
Max Q Clear Time (g_c+I1), s	9.5	53.2		2.5	3.5	24.6		39.4
Green Ext Time (p_c), s	0.0	11.2		0.4	0.0	34.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.7
HCM 2010 LOS	D

Notes

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	970	20	10	610	120	30	10	20	190	10	250
Future Volume (veh/h)	270	970	20	10	610	120	30	10	20	190	10	250
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	284	1021	10	11	642	108	32	11	0	200	11	36
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	372	1871	815	30	1047	176	211	31	0	267	22	72
Arrive On Green	0.21	0.53	0.53	0.02	0.35	0.31	0.12	0.02	0.00	0.15	0.06	0.05
Sat Flow, veh/h	1774	3539	1542	1774	3018	507	1774	1863	0	1774	369	1208
Grp Volume(v), veh/h	284	1021	10	11	376	374	32	11	0	200	0	47
Grp Sat Flow(s),veh/h/ln	1774	1770	1542	1774	1770	1755	1774	1863	0	1774	0	1577
Q Serve(g_s), s	9.1	11.6	0.0	0.4	10.7	10.8	1.0	0.4	0.0	6.5	0.0	1.8
Cycle Q Clear(g_c), s	9.1	11.6	0.0	0.4	10.7	10.8	1.0	0.4	0.0	6.5	0.0	1.8
Prop In Lane	1.00		1.00	1.00		0.29	1.00		0.00	1.00		0.77
Lane Grp Cap(c), veh/h	372	1871	815	30	614	609	211	31	0	267	0	94
V/C Ratio(X)	0.76	0.55	0.01	0.37	0.61	0.61	0.15	0.36	0.00	0.75	0.00	0.50
Avail Cap(c_a), veh/h	557	1871	815	234	614	609	234	462	0	557	0	677
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	9.4	0.5	29.4	16.4	16.7	23.9	29.4	0.0	24.6	0.0	27.8
Incr Delay (d2), s/veh	1.5	1.1	0.0	2.9	4.5	4.6	0.1	6.8	0.0	4.2	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	5.8	0.1	0.2	6.0	6.0	0.5	0.2	0.0	3.5	0.0	0.9
LnGrp Delay(d),s/veh	24.0	10.6	0.5	32.3	20.9	21.3	24.0	36.2	0.0	28.8	0.0	31.8
LnGrp LOS	C	B	A	C	C	C	C	D		C		C
Approach Vol, veh/h		1315			761			43			247	
Approach Delay, s/veh		13.4			21.2			27.1			29.4	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	36.0	13.1	5.7	16.7	25.0	11.2	7.6
Change Period (Y+Rc), s	5.2	* 6	4.5	* 5.2	5.2	* 6	5.2	* 4.5
Max Green Setting (Gmax), s	7.5	* 30	18.5	* 15	17.8	* 19	6.8	* 26
Max Q Clear Time (g_c+I1), s	2.4	13.6	8.5	2.4	11.1	12.8	3.0	3.8
Green Ext Time (p_c), s	0.1	7.3	0.4	0.0	0.1	2.6	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	730	130	320	490	120	90	60	300	150	110	50
Future Volume (veh/h)	50	730	130	320	490	120	90	60	300	150	110	50
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	53	768	33	337	516	109	95	63	152	158	116	38
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	1025	445	368	1322	278	314	84	203	244	183	60
Arrive On Green	0.03	0.29	0.29	0.21	0.46	0.44	0.18	0.18	0.17	0.14	0.14	0.14
Sat Flow, veh/h	1774	3539	1534	1774	2896	609	1774	477	1151	1774	1335	437
Grp Volume(v), veh/h	53	768	33	337	314	311	95	0	215	158	0	154
Grp Sat Flow(s),veh/h/ln	1774	1770	1534	1774	1770	1735	1774	0	1628	1774	0	1772
Q Serve(g_s), s	2.5	16.7	1.3	15.8	9.9	10.1	3.9	0.0	10.6	7.1	0.0	7.0
Cycle Q Clear(g_c), s	2.5	16.7	1.3	15.8	9.9	10.1	3.9	0.0	10.6	7.1	0.0	7.0
Prop In Lane	1.00		1.00	1.00		0.35	1.00		0.71	1.00		0.25
Lane Grp Cap(c), veh/h	57	1025	445	368	808	792	314	0	288	244	0	244
V/C Ratio(X)	0.93	0.75	0.07	0.92	0.39	0.39	0.30	0.00	0.75	0.65	0.00	0.63
Avail Cap(c_a), veh/h	188	1085	470	544	897	880	544	0	499	544	0	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.9	27.3	21.9	32.9	15.2	15.4	30.4	0.0	33.2	34.6	0.0	34.6
Incr Delay (d2), s/veh	19.7	3.0	0.1	12.2	0.3	0.3	0.7	0.0	4.8	3.6	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	8.5	0.6	8.9	4.9	4.9	2.0	0.0	5.2	3.8	0.0	3.7
LnGrp Delay(d),s/veh	60.6	30.3	21.9	45.1	15.5	15.7	31.0	0.0	38.0	38.2	0.0	37.9
LnGrp LOS	E	C	C	D	B	B	C		D	D		D
Approach Vol, veh/h		854			962			310			312	
Approach Delay, s/veh		31.8			25.9			35.8			38.1	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	43.4		19.0	21.6	28.6		15.7
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	9.5	* 42		* 26	26.5	24.0		25.8
Max Q Clear Time (g_c+I1), s	4.5	12.1		12.6	17.8	18.7		9.1
Green Ext Time (p_c), s	0.0	11.5		1.5	0.3	3.7		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	82.2
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	330	210	150	0	120	250	20	0	180	100	130
Future Vol, veh/h	0	330	210	150	0	120	250	20	0	180	100	130
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	0	0	3	2	0	0	0	2	1	0	0
Mvmt Flow	0	347	221	158	0	126	263	21	0	189	105	137
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	62.4	49.3	36.5
HCM LOS	F	E	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	43%	0%	100%	0%	0%	93%	0%	29%
Vol Right, %	0%	57%	0%	0%	100%	0%	7%	0%	71%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	230	330	210	150	120	270	20	420
LT Vol	180	0	330	0	0	120	0	20	0
Through Vol	0	100	0	210	0	0	250	0	120
RT Vol	0	130	0	0	150	0	20	0	300
Lane Flow Rate	189	242	347	221	158	126	284	21	442
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.61	0.718	1.047	0.636	0.426	0.407	0.873	0.068	1.318
Departure Headway (Hd)	12.586	11.62	11.843	11.314	10.627	12.649	12.058	12.07	11.041
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	288	312	309	321	341	287	304	299	332
Service Time	10.286	9.32	9.543	9.014	8.327	10.349	9.758	9.77	8.741
HCM Lane V/C Ratio	0.656	0.776	1.123	0.688	0.463	0.439	0.934	0.07	1.331
HCM Control Delay	33.2	39.1	100.6	31.8	21	23.8	60.7	15.6	193.3
HCM Lane LOS	D	E	F	D	C	C	F	C	F
HCM 95th-tile Q	3.7	5.2	11.9	4.1	2.1	1.9	7.8	0.2	20.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	20	120	300
Future Vol, veh/h	0	20	120	300
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	0	1	0
Mvmt Flow	0	21	126	316
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	185.2
HCM LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	790	0	580	0	1060	80	0	410	240
Future Volume (veh/h)	0	0	0	790	0	580	0	1060	80	0	410	240
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h				832	0	594	0	1116	0	0	432	102
Adj No. of Lanes				2	0	1	0	2	1	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				2	2	2	0	2	2	0	2	2
Cap, veh/h				1501	0	659	0	1570	702	0	1570	683
Arrive On Green				0.42	0.00	0.42	0.00	0.15	0.00	0.00	0.44	0.44
Sat Flow, veh/h				3548	0	1557	0	3632	1583	0	3632	1540
Grp Volume(v), veh/h				832	0	594	0	1116	0	0	432	102
Grp Sat Flow(s),veh/h/ln				1774	0	1557	0	1770	1583	0	1770	1540
Q Serve(g_s), s				10.6	0.0	21.3	0.0	18.0	0.0	0.0	4.6	2.4
Cycle Q Clear(g_c), s				10.6	0.0	21.3	0.0	18.0	0.0	0.0	4.6	2.4
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				1501	0	659	0	1570	702	0	1570	683
V/C Ratio(X)				0.55	0.00	0.90	0.00	0.71	0.00	0.00	0.28	0.15
Avail Cap(c_a), veh/h				1597	0	701	0	1570	702	0	1570	683
HCM Platoon Ratio				1.00	1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.92	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				13.0	0.0	16.1	0.0	21.9	0.0	0.0	10.6	9.9
Incr Delay (d2), s/veh				0.4	0.0	14.4	0.0	2.5	0.0	0.0	0.4	0.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.3	0.0	11.7	0.0	9.4	0.0	0.0	2.3	1.1
LnGrp Delay(d),s/veh				13.4	0.0	30.5	0.0	24.5	0.0	0.0	11.0	10.4
LnGrp LOS				B		C		C			B	B
Approach Vol, veh/h					1426			1116			534	
Approach Delay, s/veh					20.5			24.5			10.9	
Approach LOS					C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		30.6				30.6		29.4
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		25.0				25.0		27.0
Max Q Clear Time (g_c+I1), s		20.0				6.6		23.3
Green Ext Time (p_c), s		3.7				10.0		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.3
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	0	80	0	0	0	0	820	590	0	1020	180
Future Volume (veh/h)	320	0	80	0	0	0	0	820	590	0	1020	180
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				0	1863	1863	0	1863	1863
Adj Flow Rate, veh/h	337	0	12				0	863	0	0	1074	0
Adj No. of Lanes	2	0	1				0	2	1	0	2	1
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	484	0	223				0	2570	1150	0	2570	1150
Arrive On Green	0.14	0.00	0.14				0.00	0.73	0.00	0.00	0.24	0.00
Sat Flow, veh/h	3442	0	1583				0	3632	1583	0	3632	1583
Grp Volume(v), veh/h	337	0	12				0	863	0	0	1074	0
Grp Sat Flow(s),veh/h/ln	1721	0	1583				0	1770	1583	0	1770	1583
Q Serve(g_s), s	5.6	0.0	0.4				0.0	5.3	0.0	0.0	15.4	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.4				0.0	5.3	0.0	0.0	15.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	484	0	223				0	2570	1150	0	2570	1150
V/C Ratio(X)	0.70	0.00	0.05				0.00	0.34	0.00	0.00	0.42	0.00
Avail Cap(c_a), veh/h	1032	0	475				0	2570	1150	0	2570	1150
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	0.91	0.00
Uniform Delay (d), s/veh	24.6	0.0	22.3				0.0	3.0	0.0	0.0	12.1	0.0
Incr Delay (d2), s/veh	1.8	0.0	0.1				0.0	0.4	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.2				0.0	2.6	0.0	0.0	7.7	0.0
LnGrp Delay(d),s/veh	26.4	0.0	22.4				0.0	3.3	0.0	0.0	12.6	0.0
LnGrp LOS	C		C					A			B	
Approach Vol, veh/h		349						863			1074	
Approach Delay, s/veh		26.2						3.3			12.6	
Approach LOS		C						A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		47.6		12.4		47.6		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		34.0		18.0		34.0		
Max Q Clear Time (g_c+I1), s		7.3		7.6		17.4		
Green Ext Time (p_c), s		15.2		0.9		11.1		

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	U/Left Turns	3,275	125	12	175	18	200	23	0%	0%
	Left/Through	3,275	150	9	200	15	225	23	0%	0%
	Right Turn	325	25	0	25	0	25	0	0%	0%
NB	Left Turn	675	575	82	775	100	725	67	0%	20%
	Through	675	300	22	450	22	500	41	0%	0%
	Right Turn	675	50	14	125	69	250	167	0%	0%
SB	Left Turn	1,275	75	13	175	36	275	0	0%	0%
	Through	325	300	21	425	26	375	12	17%	9%
	Through/Right	325	200	9	300	16	325	23	0%	0%
	Right Turn	325	25	18	125	56	225	57	0%	0%
WB	Left Turn	175	75	7	125	12	150	24	0%	0%
	Left/Through	1,025	100	8	175	17	200	31	1%	0%
	Through/Right	175	50	6	125	16	175	21	0%	0%

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Right Turn	3,025	300	40	475	127	550	261	0%	0%
NB	Through	725	200	100	650	198	775	242	0%	1%
	Right Turn	725	25	3	25	31	50	90	0%	0%
SB	Left Turn	600	50	4	75	11	100	15	0%	0%
	Through	675	200	32	350	102	550	173	0%	0%
WB	Right Turn	1,325	25	0	25	0	25	0	0%	0%

Lane Group	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	416	416	611	1116	84	432	253
v/c Ratio	0.57	0.57	0.89	0.73	0.05	0.28	0.31
Control Delay	16.3	16.3	32.6	18.6	0.1	12.0	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	16.3	32.6	18.6	0.1	12.0	3.0
Queue Length 50th (ft)	109	109	178	161	0	52	0
Queue Length 95th (ft)	188	188	#367	218	0	81	35
Internal Link Dist (ft)		1297		584		1247	
Turn Bay Length (ft)			400				400
Base Capacity (vph)	752	752	714	1534	1547	1534	808
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.55	0.86	0.73	0.05	0.28	0.31

Intersection Summary

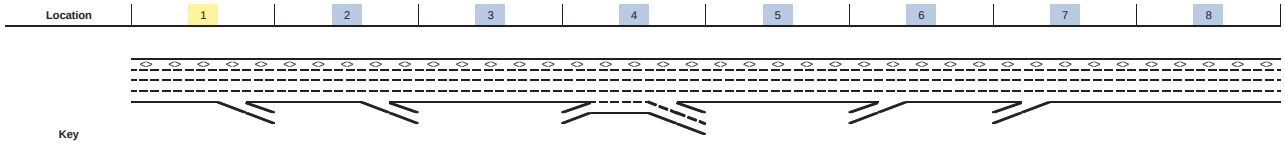
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	337	84	863	621	1074	189
v/c Ratio	0.53	0.24	0.36	0.40	0.45	0.12
Control Delay	24.8	7.2	4.9	0.8	3.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	7.2	4.9	0.8	3.6	0.4
Queue Length 50th (ft)	57	0	54	0	56	0
Queue Length 95th (ft)	86	29	96	0	75	4
Internal Link Dist (ft)			1371		584	
Turn Bay Length (ft)		300		425		475
Base Capacity (vph)	1029	524	2411	1561	2411	1547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.16	0.36	0.40	0.45	0.12

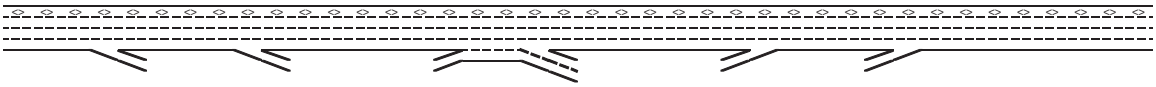
Intersection Summary

APPENDIX A.8:
TECHNICAL CALCULATIONS –
CUMULATIVE PLUS PROJECT CONDITIONS
FREEWAY LOS

Project: EDH Town Center Apartments EIR **Alternative:** Cumulative Plus Project
Freeway Corridor: Eastbound US 50 **Time Period:** AM Peak Hour



Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment								
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	800	1,500	2,125
Accel Length						550	150	
Decel Length	150	150						
Mainline Volume	4,160	3,010	2,820	2,820	3,140	3,140	3,440	3,830
On Ramp Volume				530		300	390	
Off Ramp Volume	1,150	190		210				
Express Lane Volume	458	331	310	310	440	440	482	536
EL On Ramp Volume								
EL Off Ramp Volume								
Calculate Flow Rate in General Purpose Lanes (GP)								
GP Volume (vph)	3,702	2,679	2,510	3,040	2,700	3,000	3,348	3,294
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
GP Lanes	3	3	3	4	3	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	5.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.862
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,105	2,970	2,783	3,370	2,994	3,327	3,712	4,153
GP Flow (pcphpl)	1,368	990	928	843	998	1,109	1,237	1,384
Calculate Speed in General Purpose Lanes								
Lane Width (ft)	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes								
v/c ratio	0.58	0.42	0.39	0.36	0.42	0.47	0.53	0.59
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	21.1	15.2	14.3	13.0	15.4	17.1	19.0	21.3
LOS	C	B	B	B	B	B	C	C
Calculate Operations for Entering GP Lanes								
GP_{IN} Vol (pcph)				2,807		3,008	3,298	
GP_{IN} Cap (pcph)				7,050		7,050	7,050	
GP_{IN} v/c ratio				0.40		0.43	0.47	
Calculate Operations for Exiting GP Lanes								
GP_{OUT} Vol (pcph)	2,882	2,768		3,146				
GP_{OUT} Cap (pcph)	7,050	7,050		7,050				
GP_{OUT} v/c ratio	0.41	0.39		0.45				
Calculate Flow Rate in Express Lanes (EL)								
EL Volume (vph)	458	331	310	310	440	440	482	536
PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Express Lanes	1	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	544	393	369	369	522	522	572	688
EL Flow (pcphpl)	544	393	369	369	522	522	572	688



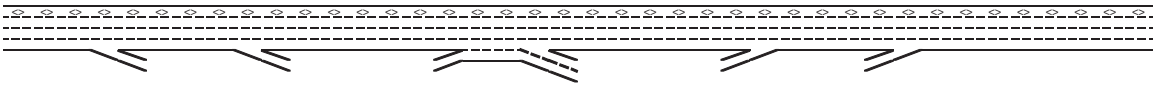
Key

<> Express Lane (HOV)

No Trucks

Location	1	2	3	4	5	6	7	8
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Calculate Speed in Express Lanes								
Lane Width (ft)								
Shoulder Width								
TRD								
f_{LW}								
f_{LC}								
Calc'd FFS								
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in Express Lanes								
EL_{IN} v/c ratio	0.31	0.22	0.21	0.21	0.30	0.30	0.33	0.39
Calculate On Ramp Flow Rate								
On Volume (vph)				530		300	390	
PHF				0.95		0.95	0.95	
Total Lanes				1		1	1	
Terrain				Level		Level	Level	
Grade %				0.0%		0.0%	0.0%	
Grade Length (mi)				0.00		0.00	0.00	
Truck & Bus %				2.0%		2.0%	2.0%	
RV %				0.0%		0.0%	0.0%	
E_T				1.5		1.5	1.5	
E_R				1.2		1.2	1.2	
f_{HV}				0.990		0.990	0.990	
f_P				1.00		1.00	1.00	
On Flow (pcph)				563		319	415	
On Flow (pcphpl)				563		319	415	
Calculate On Ramp Roadway Operations								
On Ramp Type				Right		Right	Right	
On Ramp Speed (mph)				45		25	45	
On Ramp Cap (pcph)				2,100		1,900	2,100	
On Ramp v/c ratio				0.27		0.17	0.20	
Calculate Off Ramp Flow Rate								
Off Volume (vph)	1,150	190		210				
PHF	0.95	0.95		0.95				
Total Lanes	1	1		2				
Terrain	Level	Level		Level				
Grade %	0.0%	0.0%		0.0%				
Grade Length (mi)	0.00	0.00		0.00				
Truck & Bus %	2.0%	2.0%		3.0%				
RV %	0.0%	0.0%		0.0%				
E_T	1.5	1.5		1.5				
E_R	1.2	1.2		1.2				
f_{HV}	0.990	0.990		0.985				
f_P	1.00	1.00		1.00				
Off Flow (pcph)	1,223	202		224				
Off Flow (pcphpl)	1,223	202		112				
Calculate Off Ramp Roadway Operations								
Off Ramp Type	Right	Right		Right				
Off Ramp Speed	45	25		45				
Off Ramp Cap (pcph)	2,100	1,900		4,200				
Off Ramp v/c ratio	0.58	0.11		0.05				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps								
Up Type		Off				No	On	
Up Distance		2,350					800	
Up Flow (pcph)		1,223					319	
Down Type	Off	On				On	On	
Down Distance	850	1,975				2,900	1,500	
Down Flow (pcph)	202	563				340	340	
Calculate Merge Influence Area Operations								
Effective v_P (pcph)						3,008	3,298	
Up Ramp L_{EQ}							812	
Down Ramp L_{EQ}						2,020	2,708	

Location	1	2	3	4	5	6	7	8

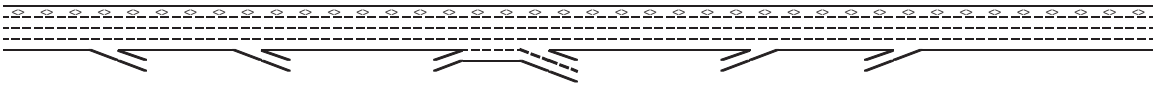


Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
P_{FM} (Eqn 13-3)						0.593	0.582	
P_{FM} (Eqn 13-4)		#VALUE!						
P_{FM} (Eqn 13-5)	0.611							
P_{FM}						0.593	0.582	
v_{12} (pcph)						1,783	1,918	
v_3 (pcph)						1,224	1,379	
v_{34} (pcph)								
v_{12a} (pcph)						1,783	1,918	
v_{R12a} (pcph)						2,102	2,333	
Merge Speed Index						0.33	0.35	
Merge Area Speed						57.5	57.0	
Outer Lanes Volume						1,224	1,379	
Outer Lanes Speed						62.4	61.8	
Segment Speed						59.2	58.7	
Merge v/c ratio						0.46	0.51	
Merge Density						18.3	22.5	
Merge LOS						B	C	
Calculate Diverge Influence Area Operations								
Effective v_P (pcph)	4,105	2,970						
Up Ramp L_{EQ}		9,863						
Down Ramp L_{EQ}	356	575						
P_{FD} (Eqn 13-9)	0.601	0.676						
P_{FD} (Eqn 13-10)								
P_{FD} (Eqn 13-11)	0.559							
P_{FD}	0.601	0.676						
v_{12} (pcph)	2,955	2,074						
v_3 (pcph)	1,150	896						
v_{34} (pcph)								
v_{12a} (pcph)	2,955	2,074						
Diverge Speed Index	0.41	0.58						
Diverge Area Speed	55.6	51.7						
Outer Lanes Volume	1,150	896						
Outer Lanes Speed	70.7	71.3						
Segment Speed	59.2	56.4						
Diverge v/c ratio	0.67	0.47						
Diverge Density	28.3	20.7						
Diverge LOS	D	C						
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments								
On to Off Volume (vph)				50				
PHF				0.92				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				4.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.980				
f_P				1.00				
On to Off Flow (pcph)				55				
Calculate On Ramp to Mainline Flow Rate for Weave Segments								
On to ML Volume (vph)				480				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				2.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.990				
f_P				1.00				
On to ML Flow (pcph)				510				
Calculate Mainline to Off Ramp Flow Rate for Weave Segments								
ML to Off Volume (vph)				160				
PHF				0.95				



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5	6	7	8
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loop on-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				3.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.985				
f_P				1.00				
ML to Off Flow (pcph)				171				
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments								
GP to GP Volume (vph)				2,350				
PHF				0.92				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				4.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.980				
f_P				1.00				
GP to GP Flow (pcph)				2,605				
Calculate Weave Segment Operations								
Weave Type				One-sided				
Weave Length				2,000				
Segment Lanes				3				
Weave Lanes				2				
Weave Flow (pcph)				681				
Non-Weave Flow				2,661				
Segment Flow				3,342				
Max Weave Length				4,576				
Length Check				OK				
Ideal Weave Capacity				2,153				
f_{HV}				0.982				
f_P				0.998				
Capacity Condition 1				6,334				
Capacity Condition 2				11,545				
Weave v/c ratio				0.52				
Interchange Density				2				
Lane Changes On to ML				1				
Lane Changes ML to Off				0				
Lane Changes On to Off				0				
Min Lane Change Rate				510				
Weave LC Rate				1,144				
Non-Weave LC Rate 1				1,054				
Non-Weave LC Rate 2				2,282				
Non-Weave LC Rate 3				609				
Segment LC Rate				2,198				
Weave Intensity Factor				0.243				
Weave Speed				55.2				
Non-Weave Speed				56.0				
Segment Speed				55.8				
Weave Density				20.0				
Weave LOS				B				
Summarize Segment Operations								
Segment v/c ratio	0.67	0.47	0.39	0.52	0.42	0.46	0.51	0.59
Segment Density	28.3	20.7	14.3	20.0	15.4	18.3	22.5	21.3
Segment LOS	D	C	B	B	B	B	C	C
Over Capacity								

Leisch Method for Weaving Analysis

Data Input

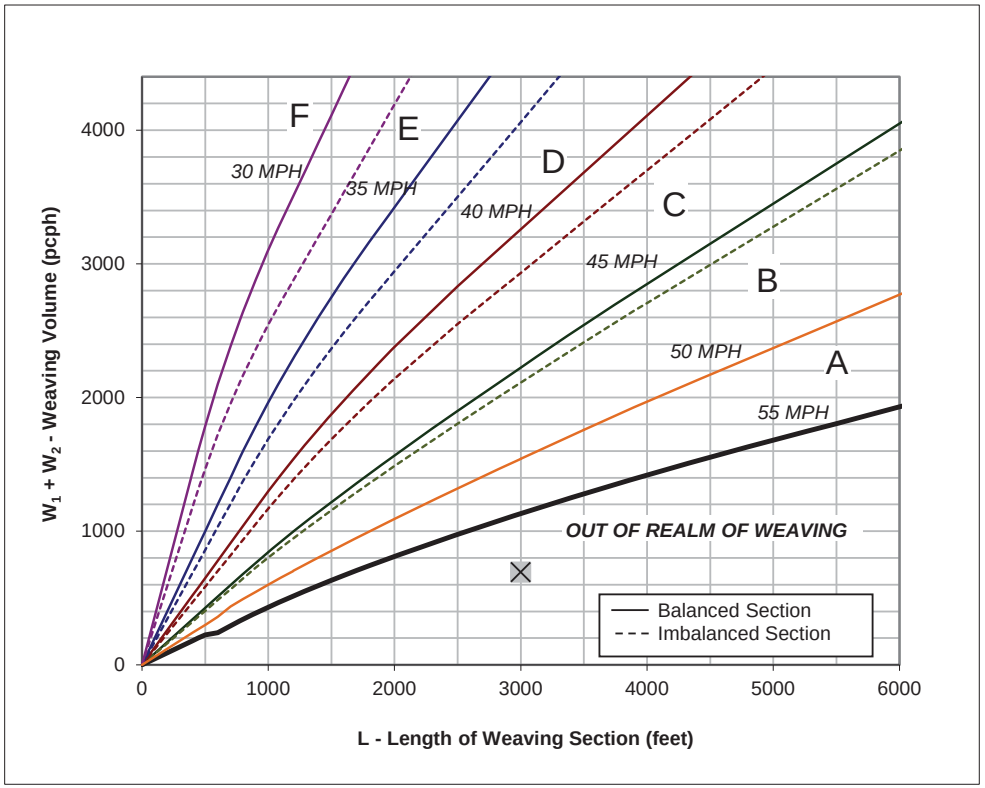
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,350	Volume (vph)*	504	Volume (vph)*	184
Truck Percentage	4%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,417	Volume (pcph)	509	Volume (pcph)	186

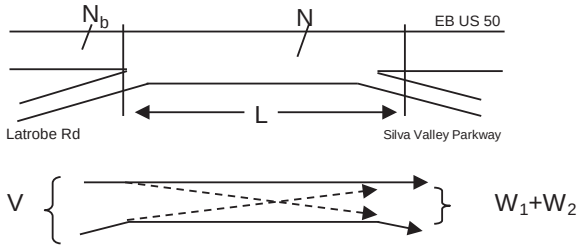
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project AM Peak Hour
Freeway	EB US 50
On-ramp	Latrobe Rd
Off-ramp	Silva Valley Parkway

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and **-**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

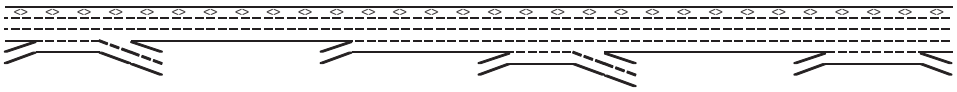
The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Project: EDH Town Center Apartments EIR **Alternative:** Cumulative Plus Project
Freeway Corridor: Westbound US 50 **Time Period:** PM Peak Hour

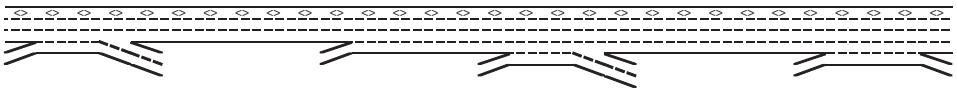
Data Entry Value
Calculated Value



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Define Freeway Segment						
Type	Weave	Basic	Basic	Weave	Basic	Weave
Length (ft)	6,500	2,350	800	2,800	2,300	4,775
Accel Length						
Decel Length						
Mainline Volume	3,910	4,200	4,200	4,280	4,560	4,560
On Ramp Volume	1,530		80	890		1,530
Off Ramp Volume	1,240			610		1,870
Express Lane Volume	626	672	672	642	821	821
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	4,814	3,528	3,608	4,528	3,739	5,269
PHF	0.94	0.94	0.94	0.94	0.94	0.94
GP Lanes	3	2	4	4	3	4
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	5,147	3,772	3,857	4,841	3,998	5,634
GP Flow (pcphpl)	1,716	1,886	964	1,210	1,333	1,408
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	2.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	69.6
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes						
v/c ratio	0.73	0.80	0.41	0.52	0.57	0.60
Speed (mph)	63.6	61.7	65.0	65.0	65.0	65.0
Density (pcphpl)	27.0	30.6	14.8	18.6	20.5	21.7
LOS	D	D	B	C	C	C
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)	3,513		3,772	3,895		4,007
GP_{IN} Cap (pcph)	4,700		4,700	7,050		7,050
GP_{IN} v/c ratio	0.75		0.80	0.55		0.57
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)	3,829			4,189		3,636
GP_{OUT} Cap (pcph)	4,700			7,050		7,050
GP_{OUT} v/c ratio	0.81			0.59		0.52
Calculate Flow Rate in Express Lanes (EL)						
EL Volume (vph)	626	672	672	642	821	821
PHF	0.89	0.89	0.89	0.89	0.89	0.89
Express Lanes	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5

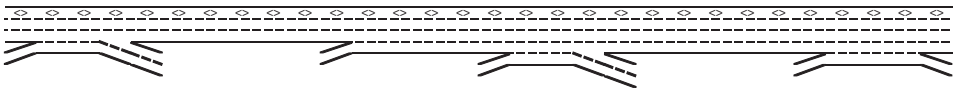
Location	5	6	7	8	9	10



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	710	763	763	729	931	931
EL Flow (pcphpl)	710	763	763	729	931	931
Calculate Speed in Express Lanes						
Lane Width (ft)						
Shoulder Width						
TRD						
f_{LW}						
f_{LC}						
Calc'd FFS						
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in Express Lanes						
EL_{IN} v/c ratio	0.41	0.44	0.44	0.42	0.53	0.53
Calculate On Ramp Flow Rate						
On Volume (vph)	1,530		80	890		1,530
PHF	0.95		0.95	0.95		0.95
Total Lanes	1		1	1		1
Terrain	Level		Level	Level		Level
Grade %	0.0%		0.0%	0.0%		0.0%
Grade Length (mi)	0.00		0.00	0.00		0.00
Truck & Bus %	3.0%		2.0%	2.0%		2.0%
RV %	0.0%		0.0%	0.0%		0.0%
E_T	1.5		1.5	1.5		1.5
E_R	1.2		1.2	1.2		1.2
f_{HV}	0.985		0.990	0.990		0.990
f_P	1.00		1.00	1.00		1.00
On Flow (pcph)	1,635		85	946		1,627
On Flow (pcphpl)	1,635		85	946		1,627
Calculate On Ramp Roadway Operations						
On Ramp Type			Right	Right		Right
On Ramp Speed (mph)			25	45		45
On Ramp Cap (pcph)			1,900	2,100		2,100
On Ramp v/c ratio			0.04	0.45		0.77
Calculate Off Ramp Flow Rate						
Off Volume (vph)	1,240			610		1,870
PHF	0.95			0.95		0.95
Total Lanes	2			2		1
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
Off Flow (pcph)	1,318			652		1,998
Off Flow (pcphpl)	659			326		1,998
Calculate Off Ramp Roadway Operations						
Off Ramp Type	Right			Right		Right
Off Ramp Speed	45			25		45
Off Ramp Cap (pcph)	4,200			3,800		2,100
Off Ramp v/c ratio	0.31			0.17		0.95
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type	Off					

Location	5	6	7	8	9	10



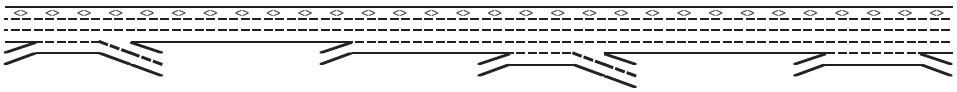
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Up Distance	2,350					
Up Flow (pcph)	299					
Down Type	On					
Down Distance	8,850					
Down Flow (pcph)	85					
Calculate Merge Influence Area Operations						
Calculate Diverge Influence Area Operations						
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments						
On to Off Volume (vph)	785			164		830
PHF	0.95			0.95		0.95
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to Off Flow (pcph)	839			174		882
Calculate On Ramp to Mainline Flow Rate for Weave Segments						
On to ML Volume (vph)	745			726		700
PHF	0.95			0.95		0.95
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to ML Flow (pcph)	796			772		744
Calculate Mainline to Off Ramp Flow Rate for Weave Segments						
ML to Off Volume (vph)	455			446		1,040
PHF	0.95			0.95		0.95
Terrain	Level			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
ML to Off Flow (pcph)	484			477		1,111
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments						
GP to GP Volume (vph)	2,829			3,192		2,699
PHF	0.94			0.94		0.94
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	1.0%			1.0%		1.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.995			0.995		0.995
f_P	1.00			1.00		1.00
GP to GP Flow (pcph)	3,025			3,413		2,886
Calculate Weave Segment Operations						

Location	5	6	7	8	9	10



Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Weave Type	One-sided			One-sided		One-sided
Weave Length	5,500			1,800		3,775
Segment Lanes	2			3		3
Weave Lanes	3			3		3
Weave Flow (pcph)	1,280			1,248		1,855
Non-Weave Flow	3,864			3,587		3,768
Segment Flow	5,143			4,835		5,624
Max Weave Length	3,475			3,574		4,341
Length Check	Not a Weave			OK		OK
Ideal Weave Capacity	2,505			2,214		2,307
f_{HV}	0.991			0.993		0.992
f_P	0.998			0.998		0.999
Capacity Condition 1	4,956			6,587		6,853
Capacity Condition 2	13,915			13,442		10,506
Weave v/c ratio	1.03			0.73		0.81
Interchange Density	5			4		3
Lane Changes On to ML	1			1		1
Lane Changes ML to Off	1			1		1
Lane Changes On to Off	0			0		0
Min Lane Change Rate	1,280			1,248		1,855
Weave LC Rate	3,311			1,730		3,143
Non-Weave LC Rate 1	3,392			1,137		2,245
Non-Weave LC Rate 2	2,551			2,489		2,529
Non-Weave LC Rate 3	-8,675			3,805		3,545
Segment LC Rate	5,862			4,219		5,673
Weave Intensity Factor	0.238			0.443		0.312
Weave Speed	55.4			49.7		53.1
Non-Weave Speed	43.4			48.3		42.6
Segment Speed	45.9			48.6		45.6
Weave Density	-			33.1		41.1
Weave LOS	Basic			D		E
Summarize Segment Operations						
Segment v/c ratio	0.73	0.80	0.41	0.73	0.57	0.81
Segment Density	27.0	30.6	14.8	33.1	20.5	41.1
Segment LOS	D	D	B	D	C	E
Over Capacity						

Leisch Method for Weaving Analysis

Data Input

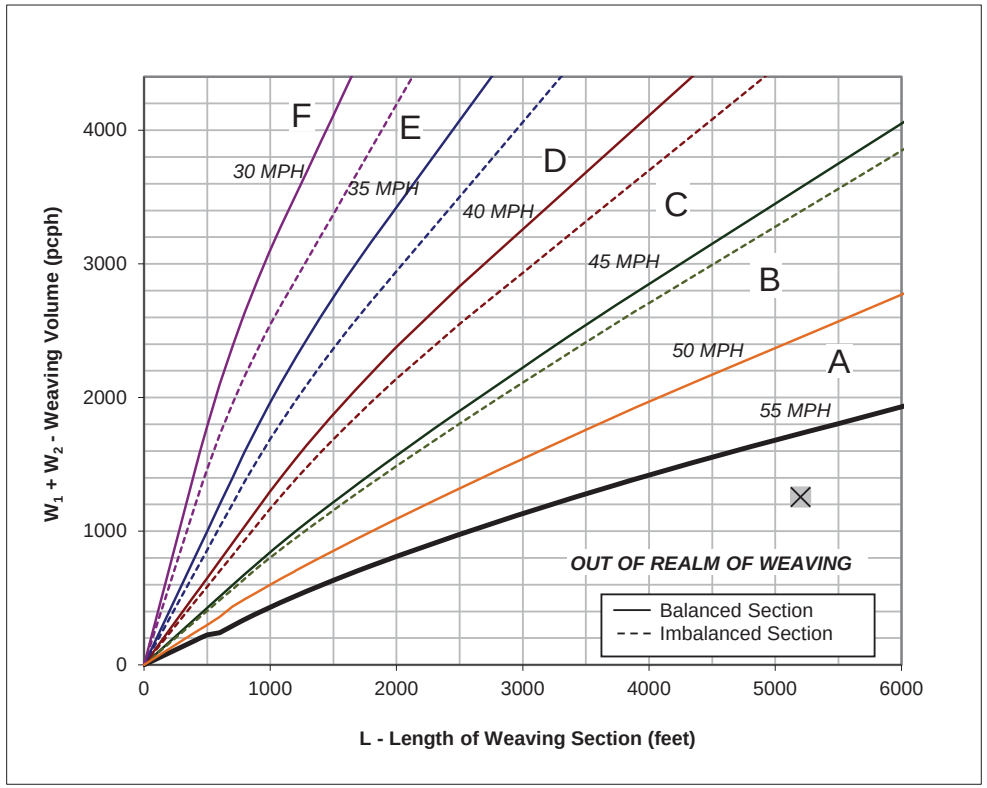
Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	5,200

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,440	Volume (vph)*	765	Volume (vph)*	475
Truck Percentage	1%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,467	Volume (pcph)	776	Volume (pcph)	480

Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project AM Peak Hour
Freeway	WB US 50
On-ramp	Bass Lake Rd
Off-ramp	Silva Valley Pkwy

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



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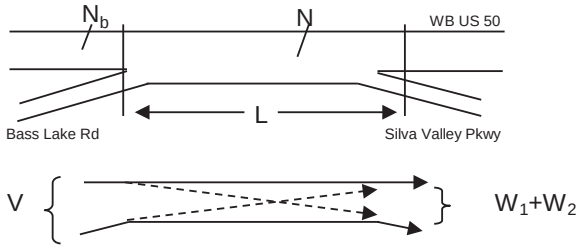


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and **-**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

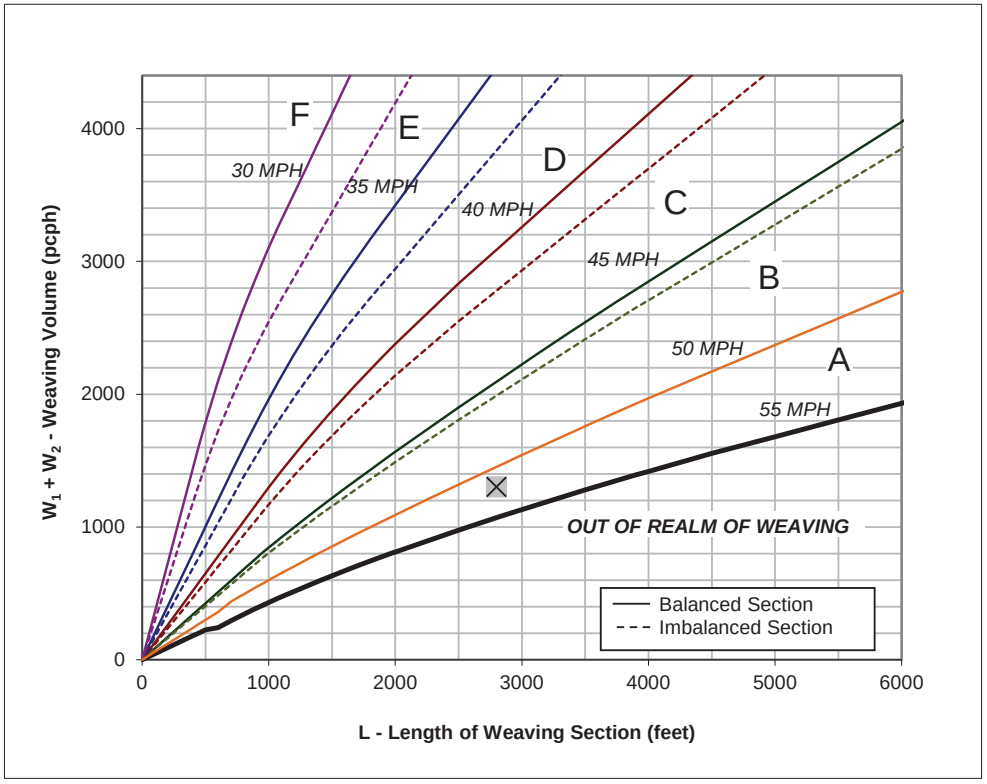
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,800

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,170	Volume (vph)*	783	Volume (vph)*	503
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,196	Volume (pcph)	791	Volume (pcph)	511

Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project AM Peak Hour
Freeway	WB US 50
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



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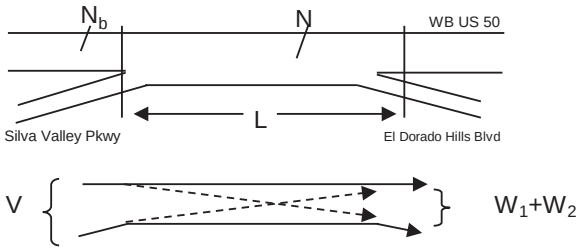


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   50 MPH and **55 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **52.0**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,299**
6. Level of Service (LOS) **C**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

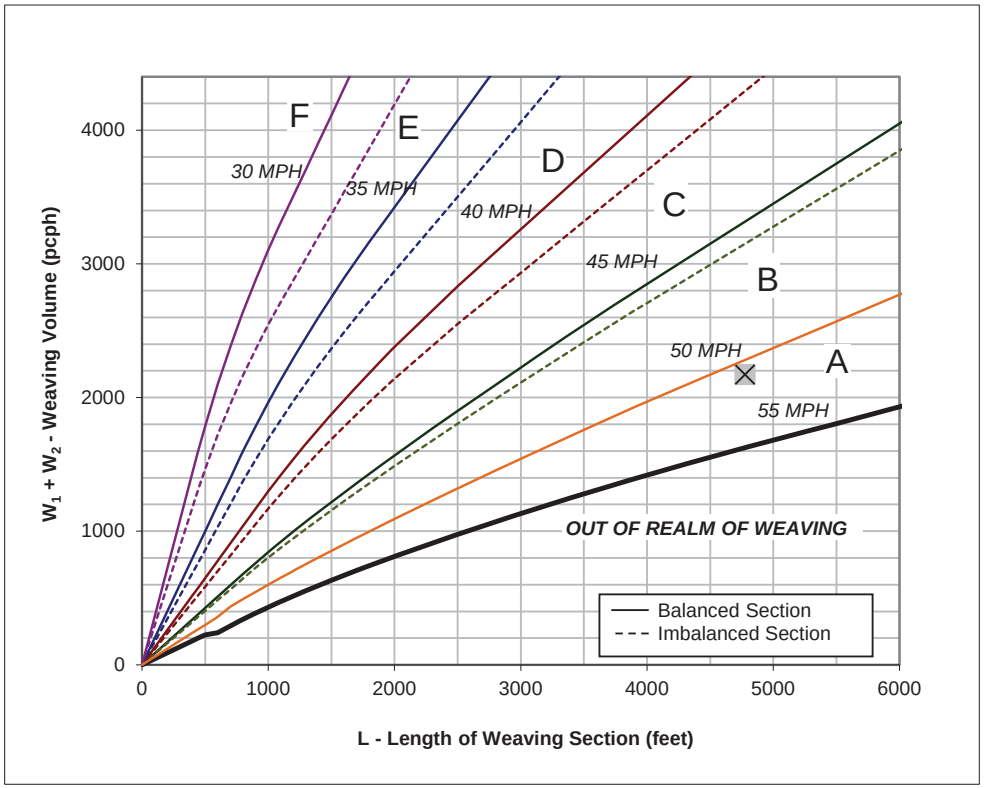
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,775

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,090	Volume (vph)*	903	Volume (vph)*	1,243
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,120	Volume (pcph)	912	Volume (pcph)	1,261

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving

Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project AM Peak Hour
Freeway	WB US 50
On-ramp	El Dorado Hills Blvd
Off-ramp	Empire Ranch Rd



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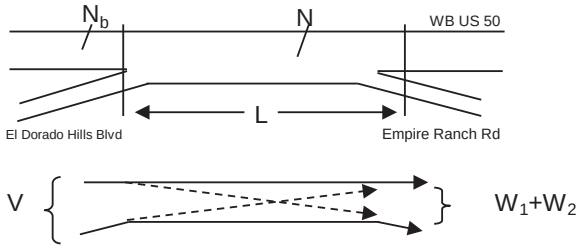


Capacity Analysis

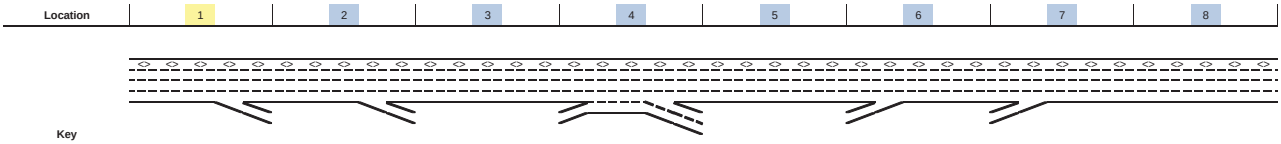
1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   50 MPH and **55 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **50.8**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] **1,530**
6. Level of Service (LOS) **D**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

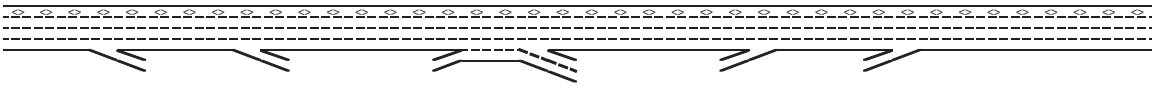
* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Project: EDH Town Center Apartments EIR **Alternative:** Cumulative Plus Project
Freeway Corridor: Eastbound US 50 **Time Period:** PM Peak Hour



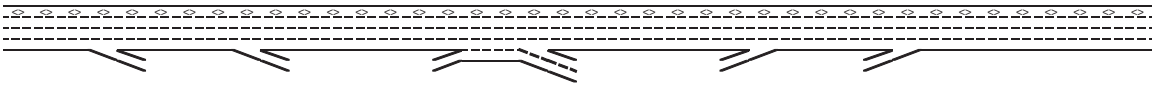
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment								
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	800	1,500	2,125
Accel Length						550	150	
Decel Length	150	150						
Mainline Volume	6,030	5,330	4,610	4,610	4,810	4,810	4,990	5,590
On Ramp Volume				620		180	600	
Off Ramp Volume	700	720		420				
Express Lane Volume	905	800	692	599	625	625	649	839
EL On Ramp Volume								
EL Off Ramp Volume								
Calculate Flow Rate in General Purpose Lanes (GP)								
GP Volume (vph)	5,126	4,531	3,919	4,631	4,185	4,365	4,941	4,752
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
GP Lanes	3	3	3	4	3	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	6.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	5,310	4,694	4,060	4,798	4,336	4,522	5,120	5,143
GP Flow (pcphpl)	1,770	1,565	1,353	1,199	1,445	1,507	1,707	1,714
Calculate Speed in General Purpose Lanes								
Lane Width (ft)	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes								
v/c ratio	0.75	0.67	0.58	0.51	0.61	0.64	0.73	0.73
Speed (mph)	63.1	64.6	65.0	65.0	65.0	64.8	63.7	63.6
Density (pcphpl)	28.1	24.2	20.8	18.5	22.2	23.2	26.8	27.0
LOS	D	C	C	C	C	C	D	D
Calculate Operations for Entering GP Lanes								
GP_{IN} Vol (pcph)				4,139		4,331	4,482	
GP_{IN} Cap (pcph)				7,050		7,050	7,050	
GP_{IN} v/c ratio				0.59		0.61	0.64	
Calculate Operations for Exiting GP Lanes								
GP_{OUT} Vol (pcph)	4,566	3,928		4,349				
GP_{OUT} Cap (pcph)	7,050	7,050		7,050				
GP_{OUT} v/c ratio	0.65	0.56		0.62				
Calculate Flow Rate in Express Lanes (EL)								
EL Volume (vph)	905	800	692	599	625	625	649	839
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	1,015	897	776	673	702	702	728	1,016
EL Flow (pcphpl)	1,015	897	776	673	702	702	728	1,016



Key
<> Express Lane (HOV)
No Trucks

Location	1	2	3	4	5	6	7	8
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Calculate Speed in Express Lanes								
Lane Width (ft)								
Shoulder Width								
TRD								
f_{LW}								
f_{LC}								
Calc'd FFS								
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in Express Lanes								
EL_{IN} v/c ratio	0.58	0.51	0.44	0.38	0.40	0.40	0.42	0.58
Calculate On Ramp Flow Rate								
On Volume (vph)				620		180	600	
PHF				0.95		0.95	0.95	
Total Lanes				1		1	1	
Terrain				Level		Level	Level	
Grade %				0.0%		0.0%	0.0%	
Grade Length (mi)				0.00		0.00	0.00	
Truck & Bus %				2.0%		2.0%	2.0%	
RV %				0.0%		0.0%	0.0%	
E_T				1.5		1.5	1.5	
E_R				1.2		1.2	1.2	
f_{HV}				0.990		0.990	0.990	
f_P				1.00		1.00	1.00	
On Flow (pcph)				659		191	638	
On Flow (pcphpl)				659		191	638	
Calculate On Ramp Roadway Operations								
On Ramp Type				Right		Right	Right	
On Ramp Speed (mph)				45		25	45	
On Ramp Cap (pcph)				2,100		1,900	2,100	
On Ramp v/c ratio				0.31		0.10	0.30	
Calculate Off Ramp Flow Rate								
Off Volume (vph)	700	720		420				
PHF	0.95	0.95		0.95				
Total Lanes	1	1		2				
Terrain	Level	Level		Level				
Grade %	0.0%	0.0%		0.0%				
Grade Length (mi)	0.00	0.00		0.00				
Truck & Bus %	2.0%	2.0%		3.0%				
RV %	0.0%	0.0%		0.0%				
E_T	1.5	1.5		1.5				
E_R	1.2	1.2		1.2				
f_{HV}	0.990	0.990		0.985				
f_P	1.00	1.00		1.00				
Off Flow (pcph)	744	765		449				
Off Flow (pcphpl)	744	765		224				
Calculate Off Ramp Roadway Operations								
Off Ramp Type	Right	Right		Right				
Off Ramp Speed	45	25		45				
Off Ramp Cap (pcph)	2,100	1,900		4,200				
Off Ramp v/c ratio	0.35	0.40		0.11				
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps								
Calculate Merge Influence Area Operations								
Calculate Diverge Influence Area Operations								
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments								
On to Off Volume (vph)				419				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				2.0%				
RV %				0.0%				
E_T				1.5				

Location	1	2	3	4	5	6	7	8



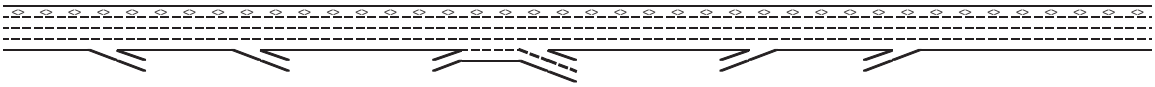
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
E_R				1.2				
f_{HV}				0.990				
f_P				1.00				
On to Off Flow (pcph)				445				
Calculate On Ramp to Mainline Flow Rate for Weave Segments								
On to ML Volume (vph)				201				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				2.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.990				
f_P				1.00				
On to ML Flow (pcph)				214				
Calculate Mainline to Off Ramp Flow Rate for Weave Segments								
ML to Off Volume (vph)				1				
PHF				0.95				
Terrain				Level				
Grade %				0.0%				
Grade Length (mi)				0.00				
Truck & Bus %				3.0%				
RV %				0.0%				
E_T				1.5				
E_R				1.2				
f_{HV}				0.985				
f_P				1.00				
ML to Off Flow (pcph)				1				
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments								
GP to GP Volume (vph)				4,010				
PHF				0.97				
Terrain				Grade				
Grade %				3.0%				
Grade Length (mi)				0.41				
Truck & Bus %				1.0%				
RV %				0.0%				
E_T				2.0				
E_R				2.5				
f_{HV}				0.990				
f_P				1.00				
GP to GP Flow (pcph)				4,175				
Calculate Weave Segment Operations								
Weave Type				One-sided				
Weave Length				2,000				
Segment Lanes				3				
Weave Lanes				2				
Weave Flow (pcph)				215				
Non-Weave Flow				4,621				
Segment Flow				4,835				
Max Weave Length				3,008				
Length Check				OK				
Ideal Weave Capacity				2,273				
f_{HV}				0.990				
f_P				1.000				
Capacity Condition 1				6,748				
Capacity Condition 2				53,476				
Weave v/c ratio				0.71				
Interchange Density				3				
Lane Changes On to ML				1				
Lane Changes ML to Off				0				
Lane Changes On to Off				0				
Min Lane Change Rate				214				
Weave LC Rate				809				
Non-Weave LC Rate 1				1,458				

Location	1	2	3	4	5	6	7	8



Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy loopon-ramp	Silva Valley Pkwy on-ramp	Silva Valley Pkwy to Bass Lake Rd
Non-Weave LC Rate 2				2,719				
Non-Weave LC Rate 3				4,315				
Segment LC Rate				3,529				
Weave Intensity Factor				0.354				
Weave Speed				51.9				
Non-Weave Speed				55.7				
Segment Speed				55.5				
Weave Density				29.0				
Weave LOS				D				
Summarize Segment Operations								
Segment v/c ratio	0.81	0.72	0.58	0.71	0.61	0.60	0.71	0.73
Segment Density	33.5	30.0	20.8	29.0	22.2	23.5	29.6	27.0
Segment LOS	D	D	C	D	C	C	D	D
Over Capacity								

Leisch Method for Weaving Analysis

Data Input

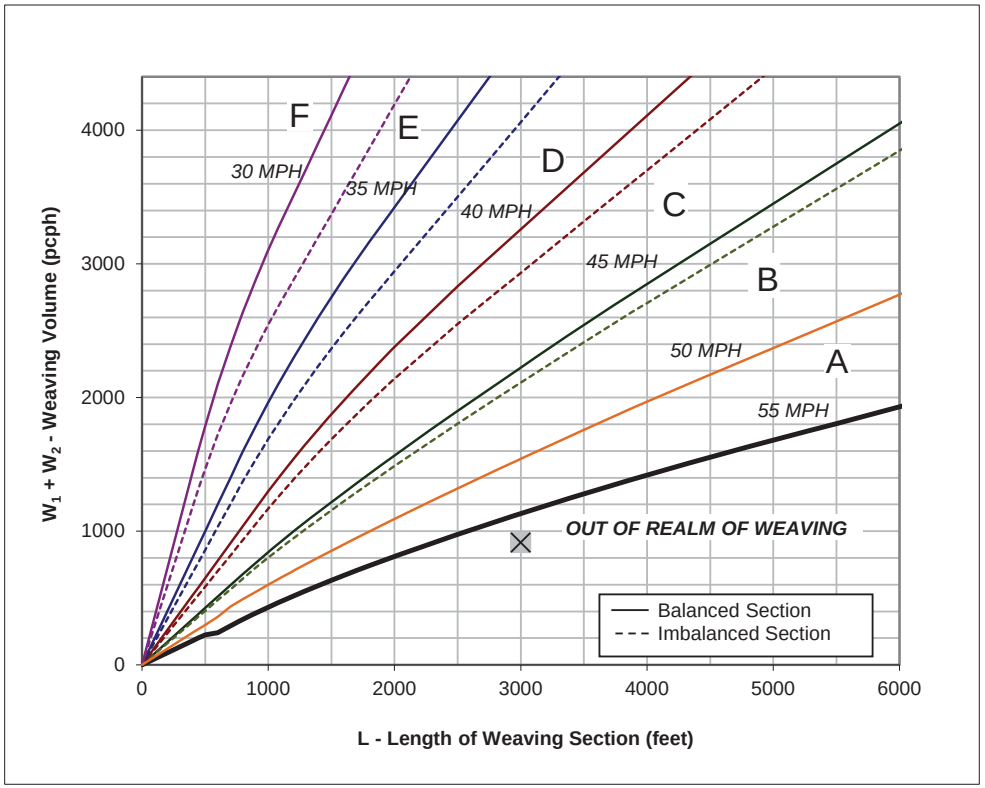
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,230	Volume (vph)*	552	Volume (vph)*	352
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,256	Volume (pcph)	557	Volume (pcph)	357

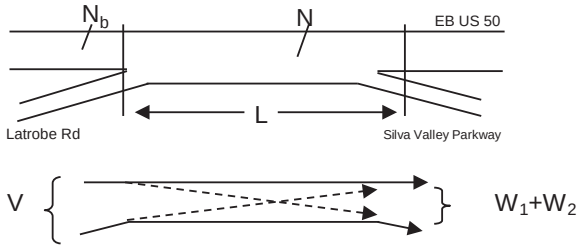
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project PM Peak Hour
Freeway	EB US 50
On-ramp	Latrobe Rd
Off-ramp	Silva Valley Parkway

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? [If optional exit lane, then "Y". Otherwise "N".]	Y
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?	**55 MPH** and -
If below the 55 MPH curve, out of the realm of weaving. If left of the 30 MPH curve, LOS is F.	
3. Interpolated Weaving Speed (S_w, mph)	-
4. Weaving Intensity Factor (k)	-
5. Service Volume (SV, pcph) SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	-
6. Level of Service (LOS)	F

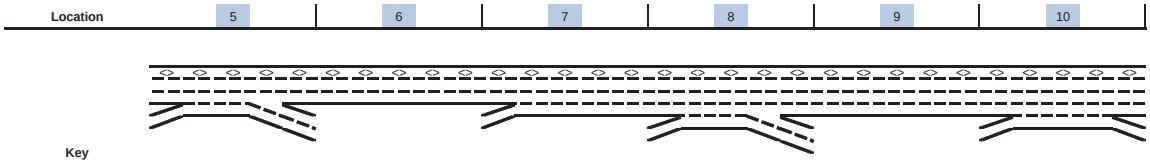
The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Project: EDH Town Center Apartments EIR **Alternative:** Cumulative Plus Project
Freeway Corridor: Westbound US 50 **Time Period:** PM Peak Hour

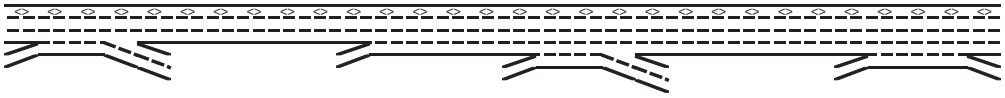
Data Entry Value
Calculated Value



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Define Freeway Segment						
Type	Weave	Basic	Basic	Weave	Basic	Weave
Length (ft)	6,500	2,350	800	2,800	2,300	4,775
Accel Length						
Decel Length						
Mainline Volume	3,780	3,580	3,580	3,660	3,355	3,355
On Ramp Volume	1,170		80	240		1,515
Off Ramp Volume	1,370			545		1,690
Express Lane Volume	567	537	501	512	470	470
EL On Ramp Volume						
EL Off Ramp Volume						
Calculate Flow Rate in General Purpose Lanes (GP)						
GP Volume (vph)	4,383	3,043	3,159	3,388	2,885	4,400
PHF	0.96	0.96	0.96	0.96	0.96	0.96
GP Lanes	3	2	4	4	3	4
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995
f_P	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,588	3,186	3,307	3,546	3,021	4,607
GP Flow (pcphpl)	1,529	1,593	827	887	1,007	1,152
Calculate Speed in General Purpose Lanes						
Lane Width (ft)	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	2.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	69.6
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes						
v/c ratio	0.65	0.68	0.35	0.38	0.43	0.49
Speed (mph)	64.8	64.5	65.0	65.0	65.0	65.0
Density (pcphpl)	23.6	24.7	12.7	13.6	15.5	17.7
LOS	C	C	B	B	B	B
Calculate Operations for Entering GP Lanes						
GP_{IN} Vol (pcph)	3,351		3,222	3,291		2,996
GP_{IN} Cap (pcph)	4,700		4,700	7,050		7,050
GP_{IN} v/c ratio	0.71		0.69	0.47		0.42
Calculate Operations for Exiting GP Lanes						
GP_{OUT} Vol (pcph)	3,132			2,964		2,801
GP_{OUT} Cap (pcph)	4,700			7,050		7,050
GP_{OUT} v/c ratio	0.67			0.42		0.40
Calculate Flow Rate in Express Lanes (EL)						
EL Volume (vph)	567	537	501	512	470	470
PHF	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1
Terrain	Grade	Level	Level	Level	Level	Level
Grade %	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Location	5	6	7	8	9	10



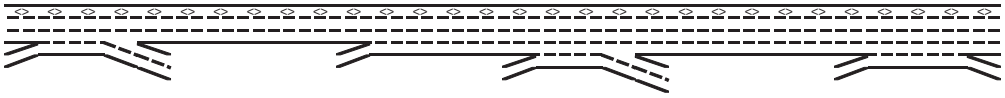
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	636	603	562	575	527	527
EL Flow (pcphpl)	636	603	562	575	527	527
Calculate Speed in Express Lanes						
Lane Width (ft)						
Shoulder Width						
TRD						
f_{LW}						
f_{LC}						
Calc'd FFS						
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65
Calculate Operations in Express Lanes						
EL_{IN} v/c ratio	0.36	0.34	0.32	0.33	0.30	0.30
Calculate On Ramp Flow Rate						
On Volume (vph)	1,170		80	240		1,515
PHF	0.96		0.95	0.95		0.95
Total Lanes	1		1	1		1
Terrain	Level		Level	Level		Level
Grade %	0.0%		0.0%	0.0%		0.0%
Grade Length (mi)	0.00		0.00	0.00		0.00
Truck & Bus %	3.0%		2.0%	2.0%		2.0%
RV %	0.0%		0.0%	0.0%		0.0%
E_T	1.5		1.5	1.5		1.5
E_R	1.2		1.2	1.2		1.2
f_{HV}	0.985		0.990	0.990		0.990
f_P	1.00		1.00	1.00		1.00
On Flow (pcph)	1,237		85	255		1,611
On Flow (pcphpl)	1,237		85	255		1,611
Calculate On Ramp Roadway Operations						
On Ramp Type	Right		Right	Right		Right
On Ramp Speed (mph)	45		45	45		45
On Ramp Cap (pcph)	2,100		2,100	2,100		2,100
On Ramp v/c ratio	0.59		0.04	0.12		0.77
Calculate Off Ramp Flow Rate						
Off Volume (vph)	1,370			545		1,690
PHF	0.95			0.95		0.95
Total Lanes	2			2		1
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
Off Flow (pcph)	1,457			582		1,806
Off Flow (pcphpl)	728			291		1,806

Location	5	6	7	8	9	10



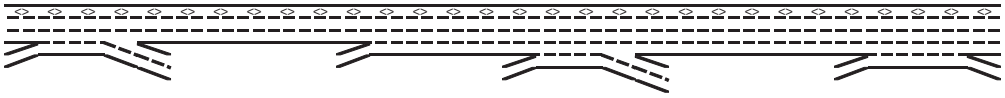
Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Calculate Off Ramp Roadway Operations						
Off Ramp Type	Right			Right		Right
Off Ramp Speed	45			25		45
Off Ramp Cap (pcph)	4,200			3,800		2,100
Off Ramp v/c ratio	0.35			0.15		0.86
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps						
Up Type	Off					
Up Distance	2,350					
Up Flow (pcph)	556					
Down Type	On					
Down Distance	8,850					
Down Flow (pcph)	85					
Calculate Merge Influence Area Operations						
Calculate Diverge Influence Area Operations						
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments						
On to Off Volume (vph)	400			83		686
PHF	0.96			0.95		0.95
Terrain	Level			Level		Level
Grade %	0.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to Off Flow (pcph)	423			88		729
Calculate On Ramp to Mainline Flow Rate for Weave Segments						
On to ML Volume (vph)	770			157		829
PHF	0.96			0.95		0.95
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	3.0%			2.0%		2.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.985			0.990		0.990
f_P	1.00			1.00		1.00
On to ML Flow (pcph)	814			167		881
Calculate Mainline to Off Ramp Flow Rate for Weave Segments						
ML to Off Volume (vph)	970			462		1,004
PHF	0.95			0.95		0.95
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	2.0%			3.0%		3.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.990			0.985		0.985
f_P	1.00			1.00		1.00
ML to Off Flow (pcph)	1,031			494		1,073
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments						
GP to GP Volume (vph)	2,243			2,686		1,881
PHF	0.96			0.96		0.96

Location	5	6	7	8	9	10



Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd to Silva Valley Pkwy	Silva Valley Pwky off to on-ramp	Silva Valley loop on-ramp	Silva Valley to El Dorado Hills	El Dorado Hills off to on-ramp	El Dorado Hills to Empire Ranch
Terrain	Grade			Level		Level
Grade %	-7.0%			0.0%		0.0%
Grade Length (mi)	0.00			0.00		0.00
Truck & Bus %	1.0%			1.0%		1.0%
RV %	0.0%			0.0%		0.0%
E_T	1.5			1.5		1.5
E_R	1.2			1.2		1.2
f_{HV}	0.995			0.995		0.995
f_P	1.00			1.00		1.00
GP to GP Flow (pcph)	2,348			2,811		1,969
Calculate Weave Segment Operations						
Weave Type	One-sided			One-sided		One-sided
Weave Length	5,500			1,800		3,775
Segment Lanes	2			3		3
Weave Lanes	3			3		3
Weave Flow (pcph)	1,845			661		1,954
Non-Weave Flow	2,771			2,900		2,699
Segment Flow	4,616			3,560		4,653
Max Weave Length	5,112			2,823		5,340
Length Check	Not a Weave			OK		OK
Ideal Weave Capacity	2,380			2,272		2,230
f_{HV}	0.991			0.993		0.991
f_P	0.997			1.000		0.998
Capacity Condition 1	4,706			6,767		6,619
Capacity Condition 2	8,657			18,730		8,244
Weave v/c ratio	0.97			0.52		0.70
Interchange Density	5			4		3
Lane Changes On to ML	1			1		1
Lane Changes ML to Off	1			1		1
Lane Changes On to Off	0			0		0
Min Lane Change Rate	1,845			661		1,954
Weave LC Rate	3,877			1,142		3,242
Non-Weave LC Rate 1	3,167			995		2,024
Non-Weave LC Rate 2	2,307			2,336		2,291
Non-Weave LC Rate 3	-5,193			2,620		2,745
Segment LC Rate	6,184			3,478		5,533
Weave Intensity Factor	0.248			0.380		0.306
Weave Speed	55.1			51.2		53.3
Non-Weave Speed	40.6			54.5		43.5
Segment Speed	45.4			53.9		47.1
Weave Density	-			22.0		32.9
Weave LOS	Basic			C		D
Summarize Segment Operations						
Segment v/c ratio	0.65	0.68	0.35	0.52	0.43	0.70
Segment Density	23.6	24.7	12.7	22.0	15.5	32.9
Segment LOS	C	C	B	C	B	D
Over Capacity						

Leisch Method for Weaving Analysis

Data Input

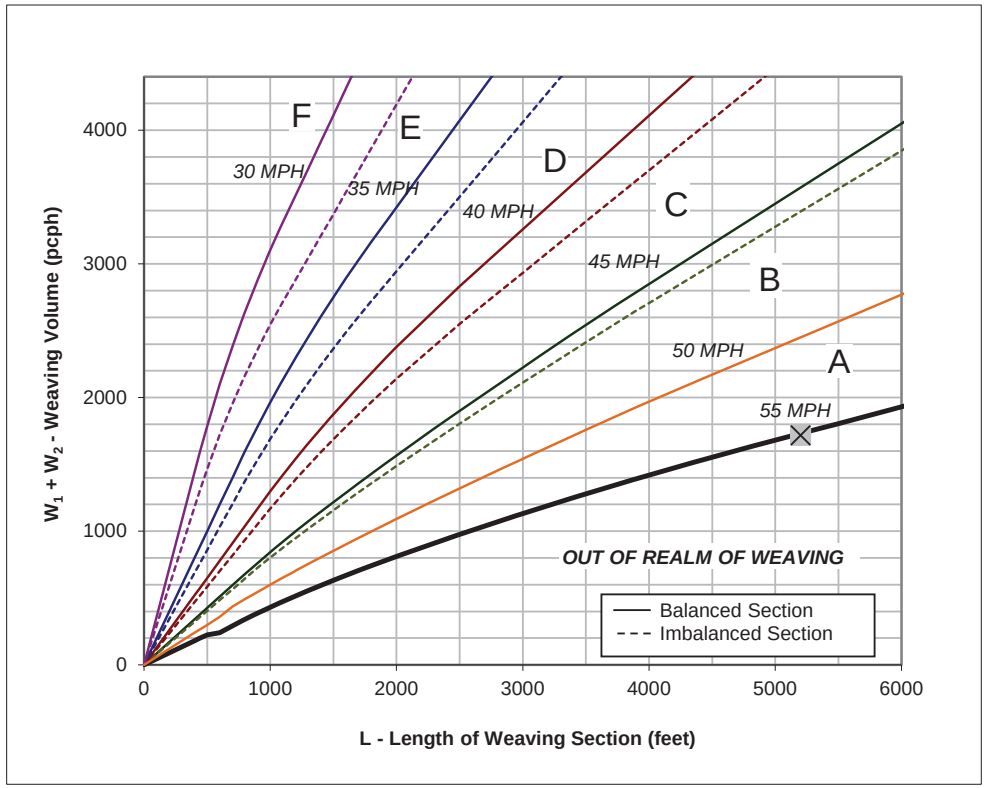
Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	5,200

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,950	Volume (vph)*	749	Volume (vph)*	949
Truck Percentage	1%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,975	Volume (pcph)	760	Volume (pcph)	958

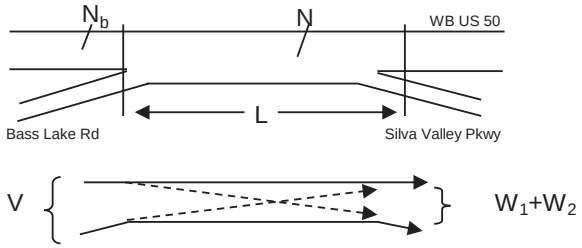
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project PM Peak Hour
Freeway	WB US 50
On-ramp	Bass Lake Rd
Off-ramp	Silva Valley Pkwy

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and _____ -
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) -
4. Weaving Intensity Factor (k) -
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] -
6. Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

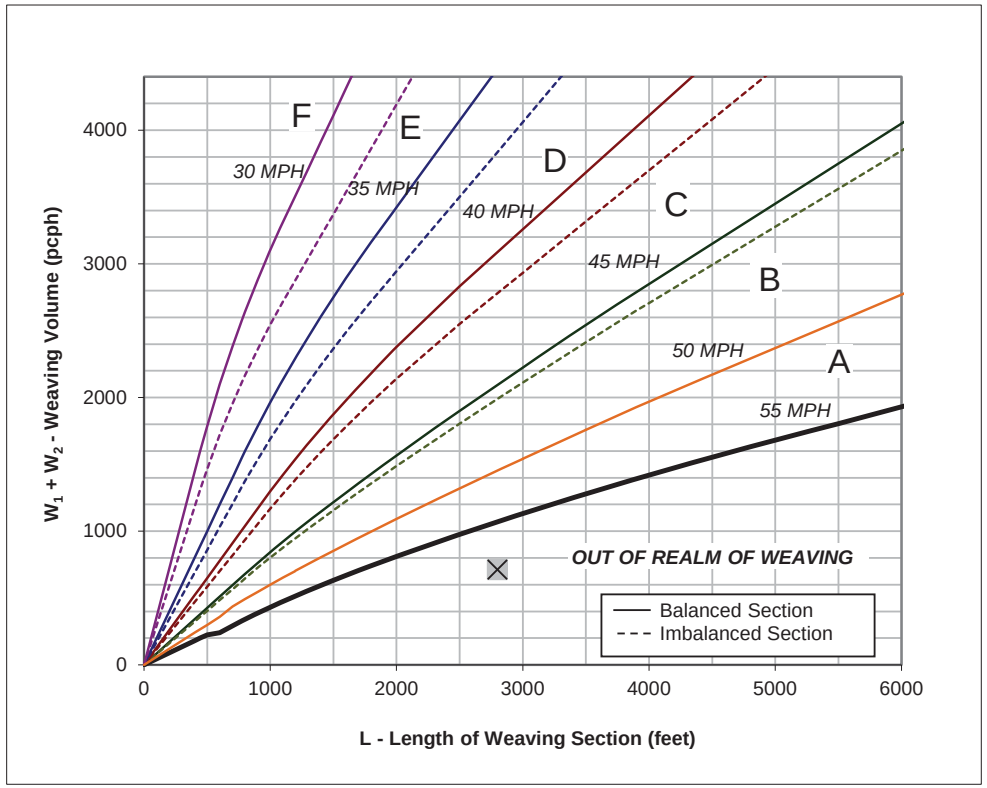
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,800

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,900	Volume (vph)*	199	Volume (vph)*	504
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	3%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,920	Volume (pcph)	201	Volume (pcph)	512

Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project PM Peak Hour
Freeway	WB US 50
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



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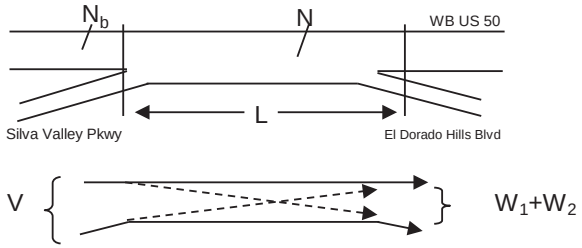


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and ____ -
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) -
4. Weaving Intensity Factor (k) -
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] -
6. Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

Leisch Method for Weaving Analysis

Data Input

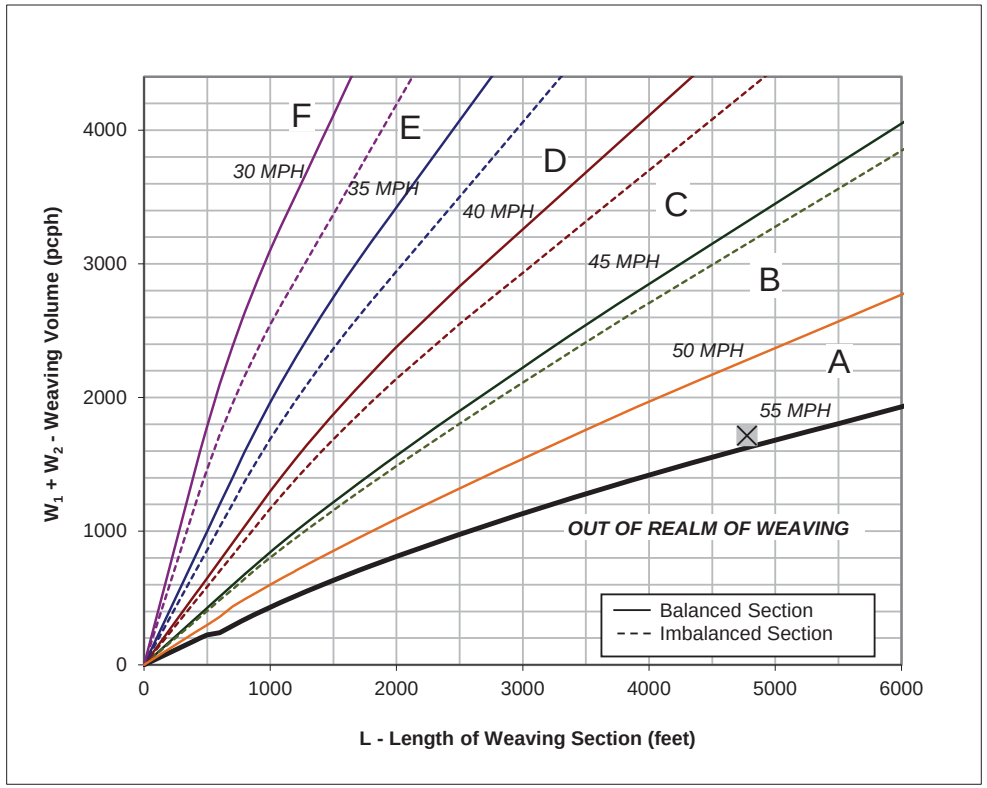
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,775

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,835	Volume (vph)*	803	Volume (vph)*	896
Truck Percentage	1%	Truck Percentage	2%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,859	Volume (pcph)	811	Volume (pcph)	905

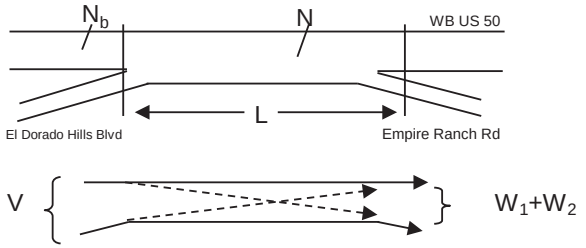
Project Information

Project	EDH Town Center Apartments EIR
Scenario	Cumulative Plus Project PM Peak Hour
Freeway	WB US 50
On-ramp	El Dorado Hills Blvd
Off-ramp	Empire Ranch Rd

*Some vehicles were assumed to continue from the on-ramp to the off-ramp without weaving



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   50 MPH and **55 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) 54.3
4. Weaving Intensity Factor (k) 1.00
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] 1,215
6. Level of Service (LOS) C

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983 and *Highway Design Manual*, California Department of Transportation, July 24, 2009

APPENDIX A.9:

TECHNICAL CALCULATIONS –

CUMULATIVE PLUS PROJECT CONDITIONS

INTERSECTION LOS -

TOWN CENTER BLVD/LATROBE RD TOWN CENTER ACCESS CHECK

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	10	10	102.0%	144.6	44.4	F
	Through	1,780	1,688	94.8%	130.5	19.6	F
	Right Turn	40	34	85.3%	7.8	3.2	A
	Subtotal	1,830	1,732	94.6%	127.7	19.0	F
SB	Left Turn	510	491	96.3%	163.7	41.8	F
	Through	1,550	1,524	98.3%	30.1	7.9	C
	Right Turn	10	11	106.0%	3.9	2.3	A
	Subtotal	2,070	2,026	97.9%	61.5	17.2	E
EB	Left Turn	190	195	102.4%	54.1	6.7	D
	Through	30	30	101.0%	40.9	9.1	D
	Right Turn	90	89	98.4%	25.1	5.4	C
	Subtotal	310	314	101.1%	45.0	5.4	D
WB	Left Turn	60	53	88.0%	60.7	14.9	E
	Through	10	10	101.0%	57.8	27.0	E
	Right Turn	650	640	98.5%	20.4	3.6	C
	Subtotal	720	703	97.7%	23.9	3.8	C
Total		4,930	4,774	96.8%	78.1	9.3	E

Intersection 9 **Post St/Town Center Blvd** **All-way Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	280	280	100.1%	56.6	39.6	F
	Through	139	139	99.9%	34.6	30.2	D
	Right Turn	60	64	107.0%	27.3	26.6	D
	Subtotal	479	484	100.9%	46.7	36.0	E
SB	Left Turn	20	21	103.0%	109.6	73.3	F
	Through	130	133	102.5%	120.6	68.4	F
	Right Turn	310	297	95.6%	120.3	66.7	F
	Subtotal	460	450	97.9%	120.6	67.3	F
EB	Left Turn	347	327	94.4%	76.1	17.9	F
	Through	240	246	102.3%	41.4	10.5	E
	Right Turn	190	181	95.2%	30.7	10.6	D
	Subtotal	777	754	97.0%	54.4	13.8	F
WB	Left Turn	30	27	91.3%	19.0	6.0	C
	Through	194	191	98.7%	36.5	10.4	E
	Right Turn	20	21	105.5%	28.0	16.2	D
	Subtotal	244	240	98.3%	34.2	10.3	D
Total		1,960	1,928	98.3%	65.7	23.0	F

APPENDIX A.10:
TECHNICAL CALCULATIONS –
NEAR TERM CONDITIONS

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	350	329	94.1%	194.3	52.1	F
	Through	700	698	99.7%	14.5	3.3	B
	Right Turn	30	28	94.0%	12.4	6.7	B
	Subtotal	1,080	1,056	97.7%	68.3	16.1	E
SB	Left Turn	110	107	97.6%	149.0	33.8	F
	Through	1,345	1,322	98.3%	136.7	36.2	F
	Right Turn	300	286	95.2%	152.0	37.2	F
	Subtotal	1,755	1,715	97.7%	140.2	35.7	F
EB	Left Turn	70	72	102.9%	80.6	18.9	F
	Through	70	72	102.6%	110.4	19.2	F
	Right Turn	20	22	112.0%	16.2	6.7	B
	Subtotal	160	166	103.9%	85.7	15.2	F
WB	Left Turn	20	21	102.5%	47.5	19.9	D
	Through	50	49	97.2%	55.4	7.3	E
	Right Turn	50	53	105.0%	26.3	9.6	C
	Subtotal	120	122	101.3%	42.1	7.2	D
Total		3,115	3,059	98.2%	107.9	17.8	F

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	774	802	103.6%	64.3	11.0	E
	Through	764	758	99.2%	35.8	28.9	D
	Right Turn	60	64	107.2%	13.3	5.8	B
	Subtotal	1,598	1,624	101.6%	48.6	15.0	D
SB	Left Turn	54	50	93.0%	64.8	14.7	E
	Through	941	935	99.4%	41.8	6.4	D
	Right Turn	390	382	97.8%	23.0	3.1	C
	Subtotal	1,385	1,367	98.7%	37.5	4.9	D
EB	Left Turn	272	268	98.4%	75.7	38.1	E
	Through	50	55	110.8%	67.7	32.3	E
	Right Turn	301	303	100.8%	11.8	20.8	B
	Subtotal	623	627	100.6%	44.0	29.9	D
WB	Left Turn	91	89	97.6%	63.4	8.4	E
	Through	40	40	99.0%	60.0	12.2	E
	Right Turn	40	43	107.3%	6.9	3.6	A
	Subtotal	171	171	100.2%	48.1	7.7	D
Total		3,777	3,789	100.3%	43.9	10.6	D

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	1,478	1,500	101.5%	13.1	3.1	B
	Right Turn	91	91	100.0%	8.0	2.2	A
	Subtotal	1,569	1,591	101.4%	12.8	3.0	B
SB	Left Turn	260	249	95.7%	37.3	12.7	D
	Through	1,075	1,085	100.9%	21.4	3.2	C
	Right Turn						
	Subtotal	1,335	1,334	99.9%	24.4	2.3	C
EB	Left Turn						
	Through						
	Right Turn	1,064	1,077	101.2%	24.7	1.7	C
	Subtotal	1,064	1,077	101.2%	24.7	1.7	C
WB	Left Turn						
	Through						
	Right Turn	120	115	95.7%	7.4	1.0	A
	Subtotal	120	115	95.7%	7.4	1.0	A
Total		4,088	4,116	100.7%	19.5	1.4	B

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	62	63	101.8%	44.4	8.6	D
	Through	1,290	1,303	101.0%	23.7	3.3	C
	Right Turn	120	122	101.3%	6.4	1.4	A
	Subtotal	1,472	1,488	101.1%	23.2	3.0	C
SB	Left Turn	409	408	99.7%	38.0	3.8	D
	Through	1,530	1,538	100.5%	14.5	1.6	B
	Right Turn	200	212	106.2%	4.6	1.0	A
	Subtotal	2,139	2,158	100.9%	17.8	1.7	B
EB	Left Turn	20	21	103.5%	40.6	16.1	D
	Through	10	11	107.0%	47.6	15.7	D
	Right Turn	10	9	92.0%	16.5	10.7	B
	Subtotal	40	41	101.5%	34.1	9.5	C
WB	Left Turn	91	88	96.8%	35.3	4.9	D
	Through	30	32	107.0%	33.7	13.2	C
	Right Turn	250	254	101.8%	15.3	1.7	B
	Subtotal	371	375	101.0%	21.3	2.6	C
Total		4,022	4,061	101.0%	20.3	1.8	C

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	80	80	99.6%	72.6	10.0	E
	Through	870	884	101.6%	26.9	2.6	C
	Right Turn	220	232	105.3%	12.3	4.0	B
	Subtotal	1,170	1,196	102.2%	27.0	3.1	C
SB	Left Turn	102	104	101.7%	62.4	10.6	E
	Through	1,070	1,069	99.9%	31.8	4.5	C
	Right Turn	460	463	100.7%	16.1	2.8	B
	Subtotal	1,632	1,636	100.2%	29.2	3.6	C
EB	Left Turn	422	427	101.2%	54.1	5.6	D
	Through	230	230	100.0%	53.5	3.9	D
	Right Turn	40	43	107.3%	36.7	8.1	D
	Subtotal	692	700	101.2%	52.9	4.0	D
WB	Left Turn	350	353	100.9%	54.5	4.4	D
	Through	160	158	98.8%	56.2	5.5	E
	Right Turn	180	184	101.9%	9.1	4.2	A
	Subtotal	690	695	100.7%	43.0	3.3	D
Total		4,184	4,226	101.0%	34.8	2.4	C

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	0	398	146	9	305	675	41	54	4	67	12	4
Future Volume (veh/h)	0	398	146	9	305	675	41	54	4	67	12	4
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.99		1.00	0.99	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1873	1900		1900	1865	1900	1845	1848	1900	1900	1900
Adj Flow Rate, veh/h	0	433	141		332	734	43	86	6	0	48	16
Adj No. of Lanes	0	2	0		1	2	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.63	0.63	0.63	0.25	0.25
Percent Heavy Veh, %	0	2	2		0	2	2	3	0	0	0	0
Cap, veh/h	0	1598	516		350	2854	167	156	152	0	166	157
Arrive On Green	0.00	0.60	0.60		0.39	1.00	1.00	0.08	0.08	0.00	0.08	0.08
Sat Flow, veh/h	0	2739	854		1810	3402	199	1369	1848	0	1422	1900
Grp Volume(v), veh/h	0	290	284		332	382	395	86	6	0	48	16
Grp Sat Flow(s),veh/h/ln	0	1779	1720		1810	1772	1829	1369	1848	0	1422	1900
Q Serve(g_s), s	0.0	10.4	10.6		24.0	0.0	0.0	8.4	0.4	0.0	4.3	1.1
Cycle Q Clear(g_c), s	0.0	10.4	10.6		24.0	0.0	0.0	9.4	0.4	0.0	4.7	1.1
Prop In Lane	0.00		0.50		1.00		0.11	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	0	1075	1039		350	1486	1535	156	152	0	166	157
V/C Ratio(X)	0.00	0.27	0.27		0.95	0.26	0.26	0.55	0.04	0.00	0.29	0.10
Avail Cap(c_a), veh/h	0	1075	1039		609	1486	1535	381	457	0	401	470
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.79	0.79	0.79	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	12.6	12.7		40.7	0.0	0.0	61.7	57.0	0.0	59.2	57.3
Incr Delay (d2), s/veh	0.0	0.6	0.7		8.9	0.3	0.3	1.1	0.0	0.0	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.3	5.2		12.8	0.1	0.1	3.2	0.2	0.0	1.7	0.6
LnGrp Delay(d),s/veh	0.0	13.3	13.3		49.7	0.3	0.3	62.8	57.0	0.0	59.5	57.4
LnGrp LOS		B	B		D	A	A	E	E		E	E
Approach Vol, veh/h		574				1109			92			64
Approach Delay, s/veh		13.3				15.1			62.4			59.0
Approach LOS		B				B			E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	31.7	87.6		15.7		119.3		15.7
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	45.4	40.0		33.4		91.0		33.4
Max Q Clear Time (g_c+I1), s	26.0	12.6		6.7		2.0		11.4
Green Ext Time (p_c), s	0.1	11.1		0.1		14.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	17
Future Volume (veh/h)	17
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	0
Adj No. of Lanes	0
Peak Hour Factor	0.25
Percent Heavy Veh, %	0
Cap, veh/h	0
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	0
V/C Ratio(X)	0.00
Avail Cap(c_a), veh/h	0
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	1	97	441	11	20	472	200	64	10	10	50	10	153
Future Volume (veh/h)	1	97	441	11	20	472	200	64	10	10	50	10	153
Number		5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1845	1845	1900	1900	1881	1900	1900	1900	1900	1810	1882	1900
Adj Flow Rate, veh/h		102	464	8	22	519	199	82	13	0	60	12	0
Adj No. of Lanes		1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor		0.95	0.95	0.95	0.91	0.91	0.91	0.78	0.78	0.78	0.83	0.83	0.83
Percent Heavy Veh, %		3	3	0	0	1	1	0	0	0	5	0	0
Cap, veh/h		125	2665	1226	27	1769	675	103	61	0	76	30	0
Arrive On Green		0.02	0.25	0.25	0.02	0.70	0.70	0.06	0.03	0.00	0.04	0.02	0.00
Sat Flow, veh/h		1757	3505	1613	1810	2531	966	1810	1900	0	1723	1882	0
Grp Volume(v), veh/h		102	464	8	22	366	352	82	13	0	60	12	0
Grp Sat Flow(s),veh/h/ln		1757	1752	1613	1810	1787	1710	1810	1900	0	1723	1882	0
Q Serve(g_s), s		7.8	14.0	0.5	1.6	10.5	10.5	6.0	0.9	0.0	4.7	0.9	0.0
Cycle Q Clear(g_c), s		7.8	14.0	0.5	1.6	10.5	10.5	6.0	0.9	0.0	4.7	0.9	0.0
Prop In Lane		1.00		1.00	1.00		0.57	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h		125	2665	1226	27	1249	1195	103	61	0	76	30	0
V/C Ratio(X)		0.82	0.17	0.01	0.80	0.29	0.29	0.80	0.21	0.00	0.79	0.40	0.00
Avail Cap(c_a), veh/h		271	2665	1226	101	1249	1195	181	429	0	204	453	0
HCM Platoon Ratio		0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh		65.0	17.4	12.3	66.3	7.7	7.7	62.9	63.7	0.0	63.9	65.8	0.0
Incr Delay (d2), s/veh		4.3	0.1	0.0	17.9	0.6	0.6	5.2	0.6	0.0	6.6	3.2	0.0
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		4.0	6.9	0.2	1.0	5.3	5.1	3.2	0.5	0.0	2.4	0.5	0.0
LnGrp Delay(d),s/veh		69.3	17.5	12.3	84.1	8.3	8.3	68.1	64.3	0.0	70.5	69.0	0.0
LnGrp LOS		E	B	B	F	A	A	E	E		E	E	
Approach Vol, veh/h			574			740			95			72	
Approach Delay, s/veh			26.6			10.6			67.5			70.2	
Approach LOS			C			B			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.5	108.6	11.0	8.9	14.8	100.4	13.2	6.6
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	7.5	61.0	16.0	30.5	* 21	47.0	13.5	32.5
Max Q Clear Time (g_c+I1), s	3.6	16.0	6.7	2.9	9.8	12.5	8.0	2.9
Green Ext Time (p_c), s	0.0	11.4	0.0	0.0	0.0	10.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.3
HCM 2010 LOS	C

Notes

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	360	50	100	420	60	130	10	190	30	10	10
Future Volume (veh/h)	10	360	50	100	420	60	130	10	190	30	10	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1852	1900	1900	1898	1900	1881	1900	1900	1827	1872	1900
Adj Flow Rate, veh/h	12	450	60	115	483	67	159	12	0	68	23	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.82	0.82	0.82	0.44	0.44	0.44
Percent Heavy Veh, %	5	2	2	0	0	0	1	0	0	4	0	0
Cap, veh/h	26	621	83	151	744	103	228	242	0	129	139	0
Arrive On Green	0.02	0.39	0.39	0.08	0.46	0.46	0.13	0.13	0.00	0.07	0.07	0.00
Sat Flow, veh/h	1723	1600	213	1810	1631	226	1792	1900	0	1740	1872	0
Grp Volume(v), veh/h	12	0	510	115	0	550	159	12	0	68	23	0
Grp Sat Flow(s),veh/h/ln	1723	0	1813	1810	0	1857	1792	1900	0	1740	1872	0
Q Serve(g_s), s	0.4	0.0	13.1	3.4	0.0	12.5	4.7	0.3	0.0	2.1	0.6	0.0
Cycle Q Clear(g_c), s	0.4	0.0	13.1	3.4	0.0	12.5	4.7	0.3	0.0	2.1	0.6	0.0
Prop In Lane	1.00		0.12	1.00		0.12	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	26	0	704	151	0	847	228	242	0	129	139	0
V/C Ratio(X)	0.46	0.00	0.72	0.76	0.00	0.65	0.70	0.05	0.00	0.53	0.17	0.00
Avail Cap(c_a), veh/h	786	0	1490	826	0	1526	1308	1387	0	1112	1196	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.7	0.0	14.3	24.6	0.0	11.5	22.9	21.0	0.0	24.4	23.8	0.0
Incr Delay (d2), s/veh	4.5	0.0	1.4	3.0	0.0	1.1	4.7	0.1	0.0	4.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	6.8	1.8	0.0	6.5	2.6	0.2	0.0	1.1	0.4	0.0
LnGrp Delay(d),s/veh	31.3	0.0	15.7	27.5	0.0	12.6	27.6	21.1	0.0	28.5	24.4	0.0
LnGrp LOS	C		B	C		B	C	C		C	C	
Approach Vol, veh/h		522			665			171			91	
Approach Delay, s/veh		16.1			15.2			27.2			27.5	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.1	27.3		8.3	4.3	31.0		11.2
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	5.4	15.1		4.1	2.4	14.5		6.7
Green Ext Time (p_c), s	0.1	6.1		0.4	0.0	6.1		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.7
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	12	267	103	148	0	11	65	18	0	159	63	15	0	8	50	81
Future Vol, veh/h	12	267	103	148	0	11	65	18	0	159	63	15	0	8	50	81
Peak Hour Factor	0.89	0.89	0.89	0.89	0.92	0.82	0.82	0.82	0.92	0.80	0.80	0.80	0.92	0.86	0.86	0.86
Heavy Vehicles, %	0	3	0	4	2	0	2	0	2	1	2	0	2	0	0	4
Mvmt Flow	13	300	116	166	0	13	79	22	0	199	79	19	0	9	58	94
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	3
HCM Control Delay	16.5	12.4	14.8	13.1
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	81%	0%	100%	0%	0%	78%	0%	38%
Vol Right, %	0%	19%	0%	0%	100%	0%	22%	0%	62%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	159	78	279	103	148	11	83	8	131
LT Vol	159	0	279	0	0	11	0	8	0
Through Vol	0	63	0	103	0	0	65	0	50
RT Vol	0	15	0	0	148	0	18	0	81
Lane Flow Rate	199	98	313	116	166	13	101	9	152
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.43	0.194	0.628	0.217	0.277	0.031	0.216	0.021	0.307
Departure Headway (Hd)	7.79	7.164	7.213	6.757	5.994	8.313	7.68	8.199	7.25
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	463	501	505	535	604	431	468	437	495
Service Time	5.534	4.908	4.913	4.457	3.694	6.063	5.43	5.948	4.999
HCM Lane V/C Ratio	0.43	0.196	0.62	0.217	0.275	0.03	0.216	0.021	0.307
HCM Control Delay	16.3	11.6	21.3	11.3	11	11.3	12.5	11.1	13.2
HCM Lane LOS	C	B	C	B	B	B	B	B	B
HCM 95th-tile Q	2.1	0.7	4.3	0.8	1.1	0.1	0.8	0.1	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	480	10	130	70	400	0	0	240	520
Future Volume (veh/h)	0	0	0	480	10	130	70	400	0	0	240	520
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1863	1863	0	0	1881	1881
Adj Flow Rate, veh/h				560	0	24	91	519	0	0	258	89
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.87	0.87	0.87	0.77	0.77	0.77	0.93	0.93	0.93
Percent Heavy Veh, %				2	2	2	2	2	0	0	1	1
Cap, veh/h				751	0	334	231	1607	0	0	759	338
Arrive On Green				0.21	0.00	0.21	0.13	0.45	0.00	0.00	0.21	0.21
Sat Flow, veh/h				3548	0	1579	1774	3632	0	0	3668	1591
Grp Volume(v), veh/h				560	0	24	91	519	0	0	258	89
Grp Sat Flow(s),veh/h/ln				1774	0	1579	1774	1770	0	0	1787	1591
Q Serve(g_s), s				5.6	0.0	0.5	1.8	3.5	0.0	0.0	2.3	1.8
Cycle Q Clear(g_c), s				5.6	0.0	0.5	1.8	3.5	0.0	0.0	2.3	1.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				751	0	334	231	1607	0	0	759	338
V/C Ratio(X)				0.75	0.00	0.07	0.39	0.32	0.00	0.00	0.34	0.26
Avail Cap(c_a), veh/h				2824	0	1256	1177	4694	0	0	4741	2111
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				13.9	0.0	11.9	15.0	6.6	0.0	0.0	12.6	12.4
Incr Delay (d2), s/veh				0.6	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.8	0.0	0.2	0.9	1.7	0.0	0.0	1.1	0.8
LnGrp Delay(d),s/veh				14.5	0.0	11.9	15.4	6.6	0.0	0.0	12.7	12.5
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					584			610			347	
Approach Delay, s/veh					14.4			7.9			12.7	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		23.9			9.1	14.8		13.8
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		5.5			3.8	4.3		7.6
Green Ext Time (p_c), s		1.7			0.1	1.7		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	30	370	390	550	170
Future Volume (veh/h)	80	30	370	390	550	170
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1881	1881	1863	1863
Adj Flow Rate, veh/h	85	1	493	520	632	36
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.94	0.94	0.75	0.75	0.87	0.87
Percent Heavy Veh, %	5	5	1	1	2	2
Cap, veh/h	419	187	698	2048	956	426
Arrive On Green	0.12	0.12	0.20	0.57	0.27	0.27
Sat Flow, veh/h	3447	1538	3476	3668	3632	1577
Grp Volume(v), veh/h	85	1	493	520	632	36
Grp Sat Flow(s),veh/h/ln	1723	1538	1738	1787	1770	1577
Q Serve(g_s), s	0.9	0.0	5.4	3.0	6.5	0.7
Cycle Q Clear(g_c), s	0.9	0.0	5.4	3.0	6.5	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	419	187	698	2048	956	426
V/C Ratio(X)	0.20	0.01	0.71	0.25	0.66	0.08
Avail Cap(c_a), veh/h	2090	932	2529	4334	4291	1913
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.3	15.9	15.3	4.4	13.4	11.2
Incr Delay (d2), s/veh	0.1	0.0	0.5	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.6	1.5	3.2	0.3
LnGrp Delay(d),s/veh	16.4	15.9	15.8	4.4	13.7	11.3
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	86			1013	668	
Approach Delay, s/veh	16.4			10.0	13.5	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		30.4		10.8	12.5	17.9		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		5.0		2.9	7.4	8.5		
Green Ext Time (p_c), s		2.6		0.1	0.9	2.6		

Intersection Summary	
HCM 2010 Ctrl Delay	11.6
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	226	229	101.2%	63.6	12.1	E
	Through	1,297	1,318	101.6%	31.6	2.5	C
	Right Turn	71	68	96.1%	27.5	3.3	C
	Subtotal	1,594	1,615	101.3%	36.0	3.4	D
SB	Left Turn	150	155	103.3%	103.1	22.0	F
	Through	900	905	100.6%	51.6	13.5	D
	Right Turn	80	85	105.6%	44.7	7.7	D
	Subtotal	1,130	1,145	101.3%	58.5	14.5	E
EB	Left Turn	240	237	98.5%	58.3	14.8	E
	Through	100	107	107.0%	65.8	15.2	E
	Right Turn	460	453	98.5%	33.1	14.8	C
	Subtotal	800	797	99.6%	44.5	14.7	D
WB	Left Turn	61	58	94.3%	35.7	10.3	D
	Through	90	89	98.7%	75.0	25.5	E
	Right Turn	260	256	98.5%	55.1	22.5	E
	Subtotal	411	402	97.9%	57.4	19.0	E
Total		3,935	3,958	100.6%	46.5	7.7	D

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	983	963	97.9%	43.0	16.0	D
	Through	1,293	1,298	100.4%	14.9	1.3	B
	Right Turn	201	196	97.7%	12.9	1.4	B
	Subtotal	2,477	2,457	99.2%	25.8	6.7	C
SB	Left Turn	41	35	85.1%	87.7	18.9	F
	Through	1,143	1,127	98.6%	65.1	17.2	E
	Right Turn	241	247	102.5%	30.4	11.9	C
	Subtotal	1,425	1,409	98.9%	59.7	16.4	E
EB	Left Turn	221	225	101.7%	40.1	2.9	D
	Through	60	61	102.0%	40.9	6.8	D
	Right Turn	50	48	95.8%	2.1	0.2	A
	Subtotal	331	334	100.8%	34.3	3.1	C
WB	Left Turn	180	175	97.2%	35.6	4.0	D
	Through	10	10	97.0%	33.6	14.8	C
	Right Turn	80	82	102.6%	5.2	1.7	A
	Subtotal	270	267	98.8%	25.7	3.4	C
Total		4,503	4,467	99.2%	37.4	7.5	D

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	2,006	1,985	98.9%	11.1	3.4	B
	Right Turn	522	517	99.1%	13.8	3.0	B
	Subtotal	2,528	2,502	99.0%	11.7	3.1	B
SB	Left Turn	314	305	97.0%	27.7	1.6	C
	Through	1,060	1,045	98.6%	8.8	1.2	A
	Right Turn						
	Subtotal	1,374	1,350	98.3%	13.0	1.5	B
EB	Left Turn						
	Through						
	Right Turn	810	816	100.7%	49.4	15.5	D
	Subtotal	810	816	100.7%	49.4	15.5	D
WB	Left Turn						
	Through						
	Right Turn	470	476	101.2%	12.0	1.2	B
	Subtotal	470	476	101.2%	12.0	1.2	B
Total		5,182	5,143	99.3%	18.3	3.4	B

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	10	9	85.0%	63.2	19.2	E
	Through	1,722	1,710	99.3%	90.5	18.4	F
	Right Turn	91	91	100.1%	7.3	3.3	A
	Subtotal	1,823	1,810	99.3%	86.5	17.6	F
SB	Left Turn	447	442	98.9%	42.0	5.8	D
	Through	1,413	1,412	99.9%	13.1	3.3	B
	Right Turn	10	10	96.0%	1.6	1.1	A
	Subtotal	1,870	1,864	99.7%	19.9	2.8	B
EB	Left Turn	250	246	98.2%	31.2	3.9	C
	Through	30	29	95.3%	24.2	12.1	C
	Right Turn	90	82	90.9%	13.7	3.9	B
	Subtotal	370	356	96.2%	26.9	3.1	C
WB	Left Turn	71	67	94.9%	44.6	8.9	D
	Through	10	10	101.0%	30.4	17.4	C
	Right Turn	550	543	98.7%	17.7	2.2	B
	Subtotal	631	621	98.4%	21.1	3.0	C
Total		4,694	4,650	99.1%	46.6	7.9	D

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	63	63	99.2%	52.7	8.9	D
	Through	1,050	1,051	100.1%	35.0	7.6	C
	Right Turn	280	284	101.4%	19.4	7.8	B
	Subtotal	1,393	1,397	100.3%	32.4	7.2	C
SB	Left Turn	243	247	101.4%	43.4	10.3	D
	Through	900	891	99.0%	25.8	8.0	C
	Right Turn	430	423	98.4%	13.5	3.0	B
	Subtotal	1,573	1,561	99.2%	25.4	6.6	C
EB	Left Turn	570	570	99.9%	59.6	12.5	E
	Through	270	260	96.2%	34.5	2.7	C
	Right Turn	110	113	102.4%	22.9	3.3	C
	Subtotal	950	942	99.2%	48.6	7.9	D
WB	Left Turn	311	309	99.4%	36.4	1.6	D
	Through	320	311	97.2%	43.7	3.5	D
	Right Turn	200	205	102.3%	7.3	1.4	A
	Subtotal	831	825	99.2%	31.6	2.0	C
Total		4,747	4,725	99.5%	33.3	3.4	C

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	0	919	77	19	106	659	26	1	259	4	236	32
Future Volume (veh/h)	0	919	77	19	106	659	26	1	259	4	236	32
Number	5	2	12		1	6	16		3	8	18	7
Initial Q (Qb), veh	0	0	0		0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		0.98		1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1883	1900		1884	1900	1900		1900	1882	1900	1900
Adj Flow Rate, veh/h	0	957	76		112	694	26		312	5	43	128
Adj No. of Lanes	0	2	0		1	2	0		1	1	0	1
Peak Hour Factor	0.96	0.96	0.96		0.95	0.95	0.95		0.83	0.83	0.83	0.25
Percent Heavy Veh, %	0	1	1		1	0	0		0	0	0	0
Cap, veh/h	0	1896	151		135	2416	90		384	41	348	352
Arrive On Green	0.00	0.56	0.56		0.08	0.68	0.68		0.24	0.24	0.24	0.24
Sat Flow, veh/h	0	3451	267		1794	3545	133		1416	169	1452	1376
Grp Volume(v), veh/h	0	510	523		112	353	367		312	0	48	128
Grp Sat Flow(s),veh/h/ln	0	1788	1835		1794	1805	1873		1416	0	1621	1376
Q Serve(g_s), s	0.0	23.4	23.4		8.3	10.5	10.5		29.2	0.0	3.1	10.8
Cycle Q Clear(g_c), s	0.0	23.4	23.4		8.3	10.5	10.5		30.1	0.0	3.1	14.0
Prop In Lane	0.00		0.15		1.00		0.07		1.00		0.90	1.00
Lane Grp Cap(c), veh/h	0	1010	1036		135	1230	1277		384	0	389	352
V/C Ratio(X)	0.00	0.50	0.50		0.83	0.29	0.29		0.81	0.00	0.12	0.36
Avail Cap(c_a), veh/h	0	1010	1036		271	1230	1277		625	0	665	586
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.76	0.76	0.76		1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	17.9	17.9		61.5	8.5	8.5		50.9	0.0	40.2	45.7
Incr Delay (d2), s/veh	0.0	1.8	1.8		3.7	0.4	0.4		1.6	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.0	12.3		4.3	5.4	5.6		11.6	0.0	1.4	4.1
LnGrp Delay(d),s/veh	0.0	19.7	19.7		65.3	9.0	8.9		52.5	0.0	40.2	45.9
LnGrp LOS		B	B		E	A	A		D		D	D
Approach Vol, veh/h		1033				832				360		
Approach Delay, s/veh		19.7				16.5				50.8		
Approach LOS		B				B				D		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	15.8	82.2		37.0		98.0		37.0
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	20.4	43.0		55.4		69.0		55.4
Max Q Clear Time (g_c+I1), s	10.3	25.4		16.0		12.5		32.1
Green Ext Time (p_c), s	0.0	11.4		0.3		20.8		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	4	32
Future Volume (veh/h)	4	32
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900
Adj Flow Rate, veh/h	16	0
Adj No. of Lanes	1	0
Peak Hour Factor	0.25	0.25
Percent Heavy Veh, %	0	0
Cap, veh/h	456	0
Arrive On Green	0.24	0.00
Sat Flow, veh/h	1900	0
Grp Volume(v), veh/h	16	0
Grp Sat Flow(s),veh/h/ln	1900	0
Q Serve(g_s), s	0.9	0.0
Cycle Q Clear(g_c), s	0.9	0.0
Prop In Lane		0.00
Lane Grp Cap(c), veh/h	456	0
V/C Ratio(X)	0.04	0.00
Avail Cap(c_a), veh/h	780	0
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	0.00
Uniform Delay (d), s/veh	39.3	0.0
Incr Delay (d2), s/veh	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0
LnGrp Delay(d),s/veh	39.3	0.0
LnGrp LOS	D	
Approach Vol, veh/h	144	
Approach Delay, s/veh	45.2	
Approach LOS	D	
Timer		

User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (veh/h)	2	200	590	10	10	540	100	30	10	10	1	190
Future Volume (veh/h)	2	200	590	10	10	540	100	30	10	10	1	190
Number		5	2	12	1	6	16	7	4	14		3
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0		0
Ped-Bike Adj(A_pbT)		1.00		0.98	1.00		0.98	1.00		1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Adj Sat Flow, veh/h/ln		1900	1881	1900	1900	1884	1900	1863	1900	1900		1900
Adj Flow Rate, veh/h		217	641	7	12	659	112	36	12	0		211
Adj No. of Lanes		1	2	1	1	2	0	1	1	0		1
Peak Hour Factor		0.92	0.92	0.92	0.82	0.82	0.82	0.84	0.84	0.84		0.90
Percent Heavy Veh, %		0	1	0	0	1	1	2	0	0		0
Cap, veh/h		241	2523	1113	15	1756	298	46	15	0		235
Arrive On Green		0.13	0.71	0.71	0.01	0.58	0.58	0.03	0.01	0.00		0.13
Sat Flow, veh/h		1810	3574	1577	1810	3051	518	1774	1900	0		1810
Grp Volume(v), veh/h		217	641	7	12	386	385	36	12	0		211
Grp Sat Flow(s),veh/h/ln		1810	1787	1577	1810	1790	1778	1774	1900	0		1810
Q Serve(g_s), s		15.9	8.7	0.2	0.9	15.8	15.8	2.7	0.9	0.0		15.5
Cycle Q Clear(g_c), s		15.9	8.7	0.2	0.9	15.8	15.8	2.7	0.9	0.0		15.5
Prop In Lane		1.00		1.00	1.00		0.29	1.00		0.00		1.00
Lane Grp Cap(c), veh/h		241	2523	1113	15	1030	1024	46	15	0		235
V/C Ratio(X)		0.90	0.25	0.01	0.82	0.37	0.38	0.78	0.78	0.00		0.90
Avail Cap(c_a), veh/h		252	2523	1113	74	1030	1024	177	317	0		295
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Upstream Filter(I)		0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.00	0.00		1.00
Uniform Delay (d), s/veh		57.7	7.1	5.9	66.9	15.5	15.5	65.4	66.8	0.0		57.8
Incr Delay (d2), s/veh		24.1	0.2	0.0	32.7	1.0	1.1	10.2	26.8	0.0		21.7
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
%ile BackOfQ(50%),veh/ln		9.6	4.3	0.1	0.6	8.0	8.0	1.5	0.6	0.0		9.2
LnGrp Delay(d),s/veh		81.8	7.3	5.9	99.5	16.5	16.6	75.5	93.7	0.0		79.5
LnGrp LOS		F	A	A	F	B	B	E	F			E
Approach Vol, veh/h			865			783			48			
Approach Delay, s/veh			26.0			17.8			80.1			
Approach LOS			C			B			F			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	101.3	22.5	5.6	23.2	83.7	9.0	19.1
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	5.5	65.0	22.0	22.5	* 19	51.0	13.5	30.5
Max Q Clear Time (g_c+I1), s	2.9	10.7	17.5	2.9	17.9	17.8	4.7	3.2
Green Ext Time (p_c), s	0.0	15.3	0.0	0.0	0.0	13.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.1
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	10	260
Future Volume (veh/h)	10	260
Number	8	18
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.99
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1882	1900
Adj Flow Rate, veh/h	11	6
Adj No. of Lanes	1	0
Peak Hour Factor	0.90	0.90
Percent Heavy Veh, %	0	0
Cap, veh/h	124	68
Arrive On Green	0.11	0.11
Sat Flow, veh/h	1143	623
Grp Volume(v), veh/h	0	17
Grp Sat Flow(s),veh/h/ln	0	1766
Q Serve(g_s), s	0.0	1.2
Cycle Q Clear(g_c), s	0.0	1.2
Prop In Lane		0.35
Lane Grp Cap(c), veh/h	0	191
V/C Ratio(X)	0.00	0.09
Avail Cap(c_a), veh/h	0	399
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	54.2
Incr Delay (d2), s/veh	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6
LnGrp Delay(d),s/veh	0.0	54.3
LnGrp LOS		D
Approach Vol, veh/h	228	
Approach Delay, s/veh	77.6	
Approach LOS	E	
Timer		

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	370	120	180	410	110	90	40	170	140	40	50
Future Volume (veh/h)	50	370	120	180	410	110	90	40	170	140	40	50
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1895	1900	1900	1900	1900	1900	1900	1900	1881	1900	1900
Adj Flow Rate, veh/h	59	435	134	205	466	120	93	41	62	146	42	21
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.97	0.97	0.97	0.96	0.96	0.96
Percent Heavy Veh, %	5	0	0	0	0	0	0	0	0	1	0	0
Cap, veh/h	79	536	165	248	691	178	172	65	98	278	181	90
Arrive On Green	0.05	0.39	0.39	0.14	0.48	0.48	0.10	0.10	0.10	0.16	0.16	0.16
Sat Flow, veh/h	1723	1390	428	1810	1450	373	1810	679	1027	1792	1165	582
Grp Volume(v), veh/h	59	0	569	205	0	586	93	0	103	146	0	63
Grp Sat Flow(s),veh/h/ln	1723	0	1818	1810	0	1824	1810	0	1706	1792	0	1747
Q Serve(g_s), s	2.7	0.0	22.1	8.7	0.0	19.6	3.9	0.0	4.6	5.9	0.0	2.5
Cycle Q Clear(g_c), s	2.7	0.0	22.1	8.7	0.0	19.6	3.9	0.0	4.6	5.9	0.0	2.5
Prop In Lane	1.00		0.24	1.00		0.20	1.00		0.60	1.00		0.33
Lane Grp Cap(c), veh/h	79	0	701	248	0	869	172	0	163	278	0	271
V/C Ratio(X)	0.74	0.00	0.81	0.83	0.00	0.67	0.54	0.00	0.63	0.52	0.00	0.23
Avail Cap(c_a), veh/h	546	0	1037	573	0	1040	917	0	865	795	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.2	0.0	21.7	33.1	0.0	15.9	34.0	0.0	34.4	30.7	0.0	29.2
Incr Delay (d2), s/veh	5.1	0.0	3.1	2.7	0.0	1.6	3.2	0.0	5.0	1.9	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	11.7	4.5	0.0	10.1	2.1	0.0	2.4	3.1	0.0	1.2
LnGrp Delay(d),s/veh	42.3	0.0	24.8	35.8	0.0	17.5	37.3	0.0	39.4	32.6	0.0	29.7
LnGrp LOS	D		C	D		B	D		D	C		C
Approach Vol, veh/h		628			791			196			209	
Approach Delay, s/veh		26.4			22.2			38.4			31.7	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.3	36.4		16.4	7.1	43.6		11.7
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	10.7	24.1		7.9	4.7	21.6		6.6
Green Ext Time (p_c), s	0.2	6.3		1.1	0.1	6.6		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.5
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	73.1
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	7	327	215	162	0	23	179	19	0	218	113	47
Future Vol, veh/h	7	327	215	162	0	23	179	19	0	218	113	47
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	3	2	0	0	0	2	1	0	0
Mvmt Flow	8	363	239	180	0	26	201	21	0	245	127	53
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	56.2	33.4	33.7
HCM LOS	F	D	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	71%	0%	100%	0%	0%	90%	0%	29%
Vol Right, %	0%	29%	0%	0%	100%	0%	10%	0%	71%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	218	160	334	215	162	23	198	18	421
LT Vol	218	0	334	0	0	23	0	18	0
Through Vol	0	113	0	215	0	0	179	0	122
RT Vol	0	47	0	0	162	0	19	0	299
Lane Flow Rate	245	180	371	239	180	26	222	19	453
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.734	0.503	1.03	0.63	0.44	0.082	0.67	0.059	1.251
Departure Headway (Hd)	11.641	10.882	10.84	10.315	9.58	12.387	11.782	11.176	10.156
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	314	334	338	354	378	291	309	322	362
Service Time	9.341	8.582	8.54	8.015	7.28	10.087	9.482	8.876	7.856
HCM Lane V/C Ratio	0.78	0.539	1.098	0.675	0.476	0.089	0.718	0.059	1.251
HCM Control Delay	40.7	24.1	91.5	29	19.6	16.2	35.4	14.6	163.7
HCM Lane LOS	E	C	F	D	C	C	E	B	F
HCM 95th-tile Q	5.4	2.7	12	4.1	2.2	0.3	4.5	0.2	19.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	18	122	299
Future Vol, veh/h	0	18	122	299
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	0	1	0
Mvmt Flow	0	19	131	322
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	157.6
HCM LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	580	0	290	80	890	0	0	310	130
Future Volume (veh/h)	0	0	0	580	0	290	80	890	0	0	310	130
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				644	0	202	86	957	0	0	356	16
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.93	0.93	0.93	0.87	0.87	0.87
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				835	0	371	225	1616	0	0	781	348
Arrive On Green				0.23	0.00	0.23	0.12	0.45	0.00	0.00	0.22	0.22
Sat Flow, veh/h				3619	0	1611	1810	3705	0	0	3705	1608
Grp Volume(v), veh/h				644	0	202	86	957	0	0	356	16
Grp Sat Flow(s),veh/h/ln				1810	0	1611	1810	1805	0	0	1805	1608
Q Serve(g_s), s				6.5	0.0	4.3	1.7	7.8	0.0	0.0	3.4	0.3
Cycle Q Clear(g_c), s				6.5	0.0	4.3	1.7	7.8	0.0	0.0	3.4	0.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				835	0	371	225	1616	0	0	781	348
V/C Ratio(X)				0.77	0.00	0.54	0.38	0.59	0.00	0.00	0.46	0.05
Avail Cap(c_a), veh/h				2772	0	1234	1155	4608	0	0	4608	2052
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				14.1	0.0	13.3	15.8	8.1	0.0	0.0	13.3	12.1
Incr Delay (d2), s/veh				0.6	0.0	0.5	0.4	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.3	0.0	2.0	0.9	3.9	0.0	0.0	1.6	0.1
LnGrp Delay(d),s/veh				14.7	0.0	13.7	16.2	8.3	0.0	0.0	13.5	12.2
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					846			1043			372	
Approach Delay, s/veh					14.5			8.9			13.4	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		24.3			9.1	15.3		14.8
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		9.8			3.7	5.4		8.5
Green Ext Time (p_c), s		3.1			0.1	3.1		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	325	60	230	645	760	130
Future Volume (veh/h)	325	60	230	645	760	130
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	365	12	250	701	800	39
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.89	0.89	0.92	0.92	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	608	271	571	2042	1134	506
Arrive On Green	0.17	0.17	0.16	0.57	0.31	0.31
Sat Flow, veh/h	3619	1615	3510	3705	3705	1610
Grp Volume(v), veh/h	365	12	250	701	800	39
Grp Sat Flow(s),veh/h/ln	1810	1615	1755	1805	1805	1610
Q Serve(g_s), s	4.4	0.3	3.0	5.0	9.2	0.8
Cycle Q Clear(g_c), s	4.4	0.3	3.0	5.0	9.2	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	608	271	571	2042	1134	506
V/C Ratio(X)	0.60	0.04	0.44	0.34	0.71	0.08
Avail Cap(c_a), veh/h	1913	853	2226	3815	3815	1701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.2	16.5	17.9	5.5	14.3	11.4
Incr Delay (d2), s/veh	0.4	0.0	0.2	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.3	1.5	2.4	4.6	0.4
LnGrp Delay(d),s/veh	18.6	16.5	18.0	5.6	14.6	11.4
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	377			951	839	
Approach Delay, s/veh	18.5			8.9	14.4	
Approach LOS	B			A	B	

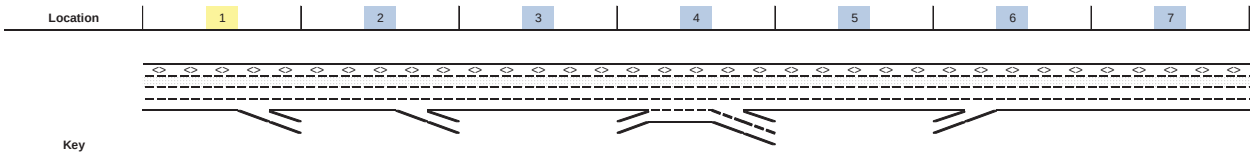
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		33.6		13.7	11.9	21.7		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		7.0		6.4	5.0	11.2		
Green Ext Time (p_c), s		3.6		0.6	0.4	3.6		

Intersection Summary	
HCM 2010 Ctrl Delay	12.7
HCM 2010 LOS	B

Notes

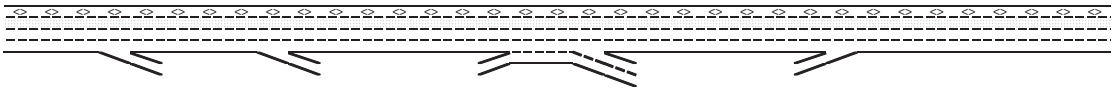
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Project: EDH Town Center Apartments EIR **Alternative:** Near Term No Proje
Freeway Corridor: Eastbound US 50 **Time Period:** AM Peak Hour



Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	2,550	1,480	1,360	1,360	1,600	1,600	2,140
On Ramp Volume				350		540	
Off Ramp Volume	1,070	120		110			
Express Lane Volume	128	74	68	68	80	80	107
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	2,423	1,406	1,292	1,642	1,520	2,060	2,033
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.980	0.980	0.980	0.980	0.980	0.980	0.862
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,840	1,648	1,515	1,925	1,782	2,415	2,711
GP Flow (pcphpl)	947	549	505	481	594	805	904
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.40	0.23	0.21	0.20	0.25	0.34	0.38
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	14.6	8.5	7.8	7.4	9.1	12.4	13.9
LOS	B	A	A	A	A	B	B
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				1,541		1,819	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.22		0.26	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	1,665	1,517		1,805			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.24	0.22		0.26			

Location	1	2	3	4	5	6	7



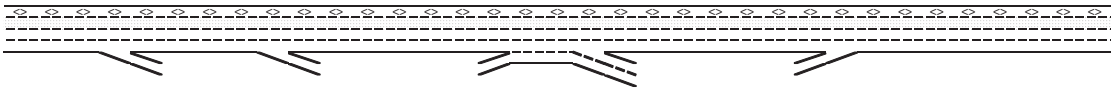
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	128	74	68	68	80	80	107
PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	165	96	88	88	104	104	150
EL Flow (pcphpl)	165	96	88	88	104	104	150
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.09	0.05	0.05	0.05	0.06	0.06	0.09
Calculate On Ramp Flow Rate							
On Volume (vph)				350		540	
PHF				0.92		0.92	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				2.0%		3.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.990		0.985	
f_P				1.00		1.00	
On Flow (pcph)				384		596	
On Flow (pcphpl)				384		596	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.18		0.31	

Location	1	2	3	4	5	6	7



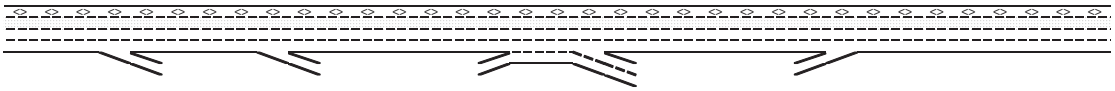
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Off Ramp Flow Rate							
Off Volume (vph)	1,070	120		110			
PHF	0.92	0.92		0.94			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	2.0%	2.0%		5.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.990	0.990		0.976			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	1,175	132		120			
Off Flow (pcphpl)	1,175	132		60			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.56	0.07		0.03			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		1,175					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	132	384				299	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						1,819	
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						1,773	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.589						
P_{FM}						0.593	
v_{12} (pcph)						1,079	
v_3 (pcph)						741	
v_{34} (pcph)							
v_{12a} (pcph)						1,079	
v_{R12a} (pcph)						1,674	
Merge Speed Index						0.31	
Merge Area Speed						57.8	
Outer Lanes Volume						741	
Outer Lanes Speed						64.1	
Segment Speed						59.6	
Merge v/c ratio						0.36	
Merge Density						14.8	
Merge LOS						B	

Location	1	2	3	4	5	6	7



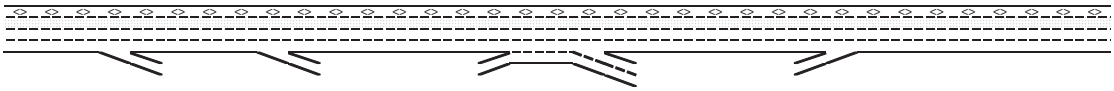
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	2,840	1,648					
Up Ramp L_{EQ}		11,877					
Down Ramp L_{EQ}	211	366					
P_{FD} (Eqn 13-9)	0.635	0.713					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.576						
P_{FD}	0.635	0.713					
v_{12} (pcph)	2,232	1,213					
v_3 (pcph)	608	436					
v_{34} (pcph)							
v_{12a} (pcph)	2,232	1,213					
Diverge Speed Index	0.40	0.57					
Diverge Area Speed	55.7	51.9					
Outer Lanes Volume	608	436					
Outer Lanes Speed	71.3	71.3					
Segment Speed	58.5	55.9					
Diverge v/c ratio	0.51	0.28					
Diverge Density	22.1	13.3					
Diverge LOS	C	B					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				70			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				3.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.983			
f_P				1.00			
On to Off Flow (pcph)				82			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				280			
PHF				0.92			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				2.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.990			
f_P				1.00			
On to ML Flow (pcph)				307			
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				40			
PHF				0.94			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				5.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.976			
f_P				1.00			
ML to Off Flow (pcph)				44			

Location	1	2	3	4	5	6	7



Key

<> Express Lane (HOV)

No Trucks

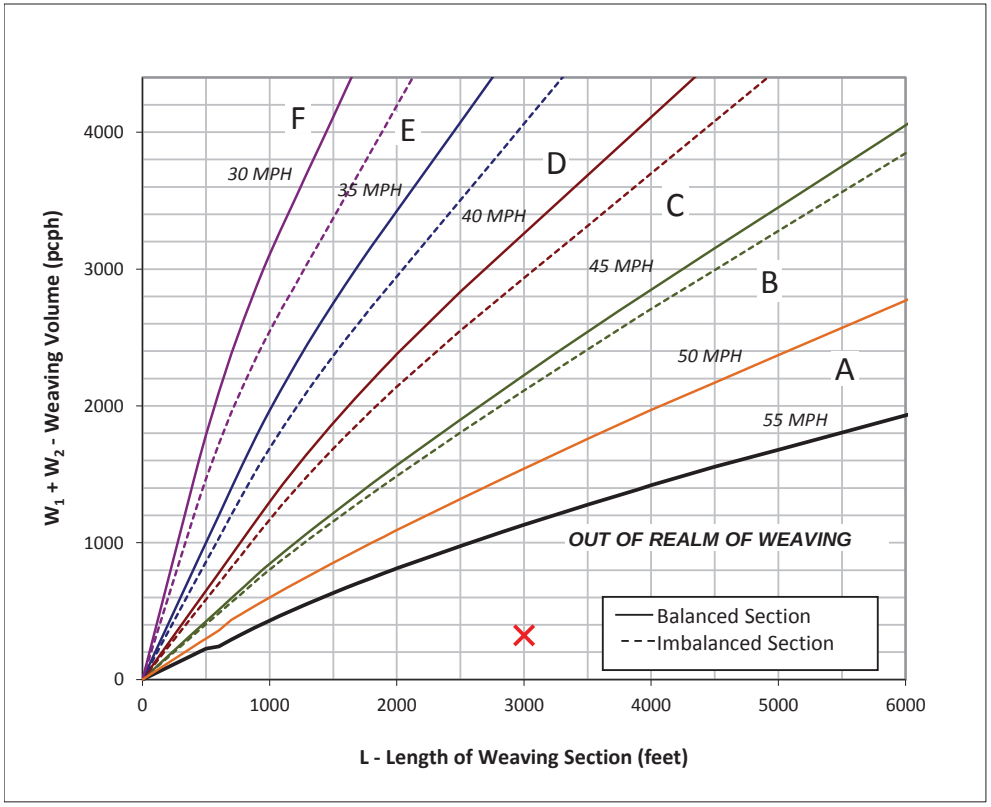
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				1,252			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				4.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.980			
f_P				1.00			
GP to GP Flow (pcph)				1,468			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				351			
Non-Weave Flow				1,550			
Segment Flow				1,901			
Max Weave Length				4,380			
Length Check				OK			
Ideal Weave Capacity				2,168			
f_{HV}				0.982			
f_P				0.998			
Capacity Condition 1				6,376			
Capacity Condition 2				12,741			
Weave v/c ratio				0.29			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				307			
Weave LC Rate				941			
Non-Weave LC Rate 1				825			
Non-Weave LC Rate 2				2,035			
Non-Weave LC Rate 3				-440			
Segment LC Rate				1,766			
Weave Intensity Factor				0.205			
Weave Speed				56.5			
Non-Weave Speed				59.7			
Segment Speed				59.1			
Weave Density				10.7			
Weave LOS				B			
Summarize Segment Operations							
Segment v/c ratio	0.51	0.28	0.21	0.29	0.25	0.36	0.38
Segment Density	22.1	13.3	7.8	10.7	9.1	14.8	13.9
Segment LOS	C	B	A	B	A	B	B
Over Capacity							

Leisch Method for Weaving Analysis

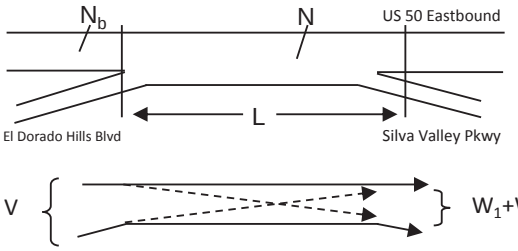
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near-Term No Project AM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	1,710	Volume (vph)*	280	Volume (vph)*	40
Truck Percentage	4%	Truck Percentage	2%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	1,744	Volume (pcph)	283	Volume (pcph)	41



Figure



Capacity Analysis

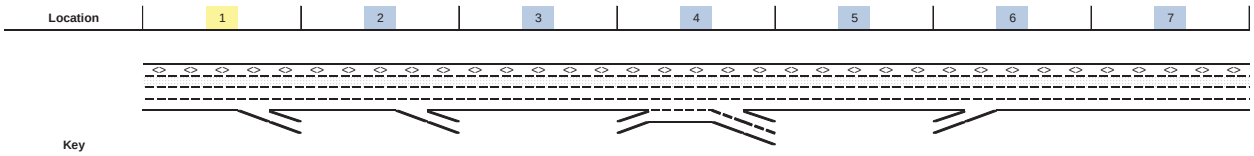
1. Is the weaving section balanced (Y / N)? **Y**
   If optional exit lane, then "Y". Otherwise "N".
2. In the chart to the left, which two speed curves is the red "x" between?
   55 MPH and **-**
   If left of the 30 MPH curve, LOS is F. Select "-".
   If below the 55 MPH curve, out of the realm of weaving.
3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Near Term No Proje
Freeway Corridor: Eastbound US 50 **Time Period:** PM Peak Hour



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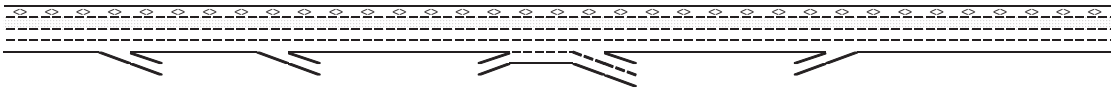
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	4,360	3,550	3,070	3,070	3,510	3,510	3,870
On Ramp Volume				830		360	
Off Ramp Volume	810	480		390			
Express Lane Volume	480	391	338	338	386	386	426
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	3,880	3,160	2,732	3,562	3,124	3,484	3,444
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	6.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,020	3,274	2,831	3,691	3,237	3,610	3,728
GP Flow (pcphpl)	1,340	1,091	944	923	1,079	1,203	1,243
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.57	0.46	0.40	0.39	0.46	0.51	0.53
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	20.6	16.8	14.5	14.2	16.6	18.5	19.1
LOS	C	B	B	B	B	C	C
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				2,831		3,134	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.40		0.44	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	3,181	2,776		3,253			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.45	0.39		0.46			

Location	1	2	3	4	5	6	7



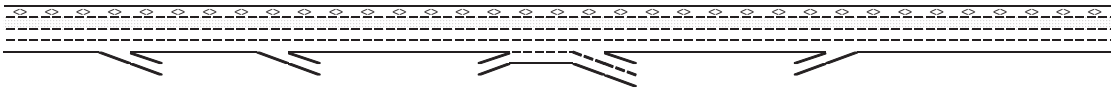
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	480	391	338	338	386	386	426
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	538	438	379	379	433	433	516
EL Flow (pcphpl)	538	438	379	379	433	433	516
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.31	0.25	0.22	0.22	0.25	0.25	0.29
Calculate On Ramp Flow Rate							
On Volume (vph)				830		360	
PHF				0.97		0.76	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				1.0%		1.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.995		0.995	
f_P				1.00		1.00	
On Flow (pcph)				860		476	
On Flow (pcphpl)				860		476	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.41		0.25	

Location	1	2	3	4	5	6	7



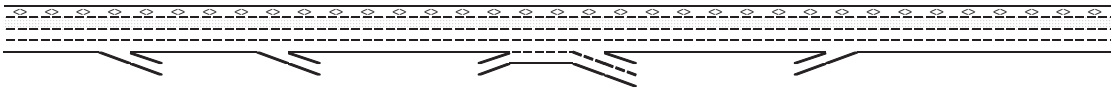
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Off Ramp Flow Rate							
Off Volume (vph)	810	480		390			
PHF	0.97	0.97		0.89			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	1.0%	1.0%		0.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.995	0.995		1.000			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	839	497		438			
Off Flow (pcphpl)	839	497		219			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.40	0.26		0.10			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		839					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	497	860				158	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						3,134	
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						939	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.702						
P_{FM}						0.593	
v_{12} (pcph)						1,858	
v_3 (pcph)						1,276	
v_{34} (pcph)							
v_{12a} (pcph)						1,858	
v_{R12a} (pcph)						2,334	
Merge Speed Index						0.33	
Merge Area Speed						57.3	
Outer Lanes Volume						1,276	
Outer Lanes Speed						62.2	
Segment Speed						59.0	
Merge v/c ratio						0.51	
Merge Density						20.0	
Merge LOS						C	

Location	1	2	3	4	5	6	7



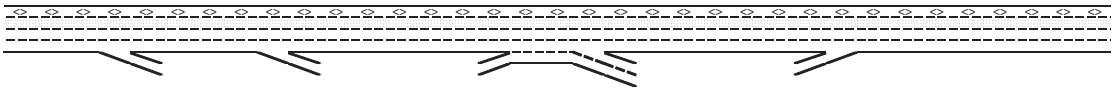
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	4,020	3,274					
Up Ramp L_{EQ}		7,735					
Down Ramp L_{EQ}	699	998					
P_{FD} (Eqn 13-9)	0.621	0.655					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.605						
P_{FD}	0.621	0.655					
v_{12} (pcph)	2,814	2,317					
v_3 (pcph)	1,206	957					
v_{34} (pcph)							
v_{12a} (pcph)	2,814	2,317					
Diverge Speed Index	0.37	0.60					
Diverge Area Speed	56.4	51.1					
Outer Lanes Volume	1,206	957					
Outer Lanes Speed	70.5	71.3					
Segment Speed	60.0	55.7					
Diverge v/c ratio	0.64	0.53					
Diverge Density	27.1	22.8					
Diverge LOS	C	C					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				155			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.998			
f_P				1.00			
On to Off Flow (pcph)				160			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				675			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
On to ML Flow (pcph)				699			
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				235			
PHF				0.89			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				1.000			
f_P				1.00			
ML to Off Flow (pcph)				264			

Location	1	2	3	4	5	6	7



Key

<> Express Lane (HOV)

No Trucks

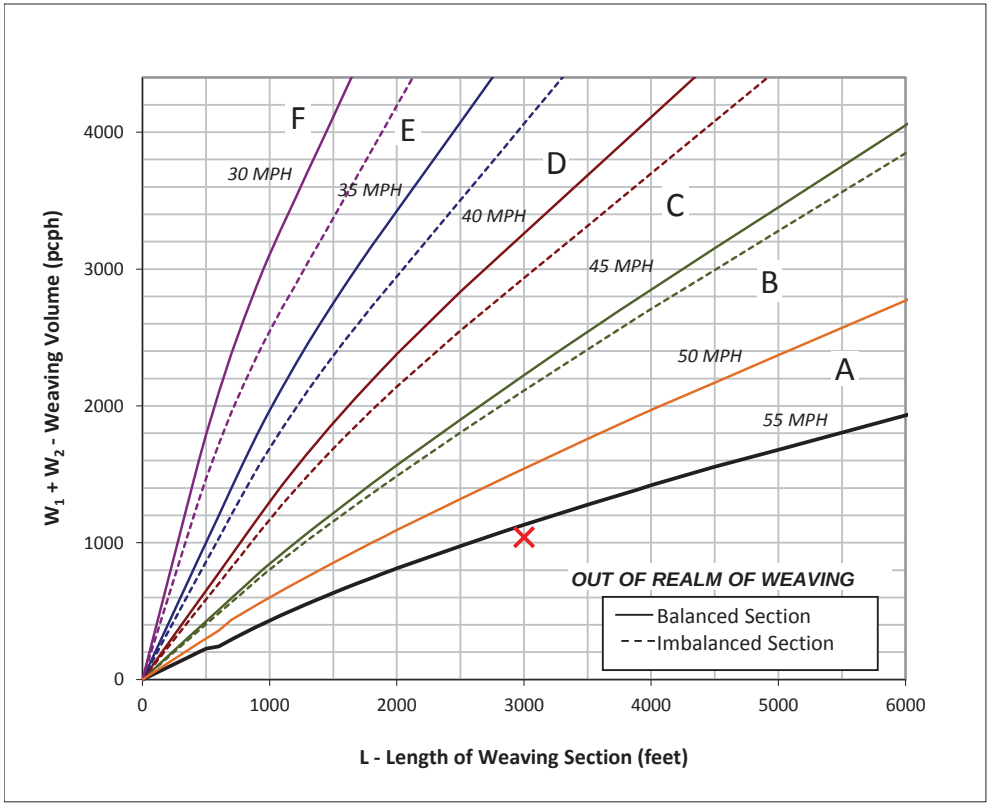
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				2,498			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
GP to GP Flow (pcph)				2,588			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				963			
Non-Weave Flow				2,748			
Segment Flow				3,711			
Max Weave Length				5,153			
Length Check				OK			
Ideal Weave Capacity				2,109			
f_{HV}				0.995			
f_P				0.999			
Capacity Condition 1				6,292			
Capacity Condition 2				9,199			
Weave v/c ratio				0.59			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				699			
Weave LC Rate				1,333			
Non-Weave LC Rate 1				1,072			
Non-Weave LC Rate 2				2,302			
Non-Weave LC Rate 3				692			
Segment LC Rate				2,405			
Weave Intensity Factor				0.261			
Weave Speed				54.6			
Non-Weave Speed				54.0			
Segment Speed				54.2			
Weave Density				22.8			
Weave LOS				C			
Summarize Segment Operations							
Segment v/c ratio	0.64	0.53	0.40	0.59	0.46	0.51	0.53
Segment Density	27.1	22.8	14.5	22.8	16.6	20.0	19.1
Segment LOS	C	C	B	C	B	C	C
Over Capacity							

Leisch Method for Weaving Analysis

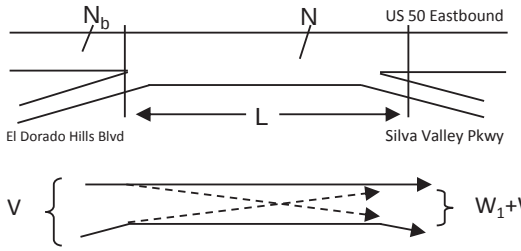
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near Term No Project PM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,900	Volume (vph)*	739	Volume (vph)*	299
Truck Percentage	1%	Truck Percentage	1%	Truck Percentage	0%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,920	Volume (pcph)	742	Volume (pcph)	299



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

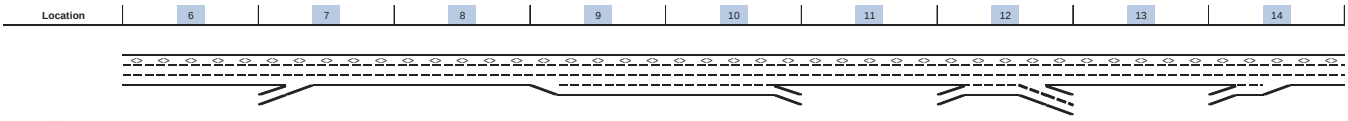
The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

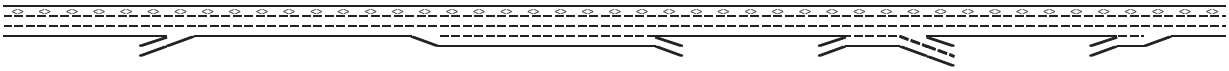
Project: EDH Town Center Apartments EIR **Alternative:** Near Term No Project Conditions
Freeway Corridor: Westbound US 50 **Time Period:** AM Peak Hour

Data Entry Value
Calculated Value



Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segment									
Type	Basic	Merge	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	2,350	1,500	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length		375							880
Decel Length					1,500				
Mainline Volume	3,140	3,140	3,920	3,920	3,920	3,320	3,320	3,280	3,280
On Ramp Volume		780					570		1,200
Off Ramp Volume					600		610		
Express Lane Volume	345	345	431	431	431	365	365	361	361
EL On Ramp Volume									
EL Off Ramp Volume									
Calculate Flow Rate in G									
GP Volume (vph)	2,795	3,575	3,489	3,489	3,489	2,955	3,525	2,919	4,119
PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
GP Lanes	2	2	2	3	3	2	3	2	2
Terrain	Level	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
f_p	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,988	3,822	3,730	3,730	3,730	3,159	3,769	3,121	4,404
GP Flow (pcphpl)	1,494	1,911	1,865	1,243	1,243	1,580	1,256	1,561	2,202
Calculate Speed in Gene									
Lane Width (ft)	12	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	69.6	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65	65
Calculate Operations in									
v/c ratio	0.64	0.81	0.79	0.53	0.53	0.67	0.53	0.66	0.94
Speed (mph)	64.9	61.3	61.9	65.0	65.0	64.5	65.0	64.6	55.9
Density (pcphpl)	23.0	31.2	30.1	19.1	19.1	24.5	19.3	24.1	39.4
LOS	C	D	D	C	C	C	C	C	E
Calculate Operations fo									
GP_{IN} Vol (pcph)		2,937		3,730			3,156		3,087
GP_{IN} Cap (pcph)		4,700		4,700			4,700		4,700
GP_{IN} v/c ratio		0.62		0.79			0.67		0.66
Calculate Operations fo									
GP_{OUT} Vol (pcph)					3,033		3,099		
GP_{OUT} Cap (pcph)					4,700		4,700		
GP_{OUT} v/c ratio					0.65		0.66		

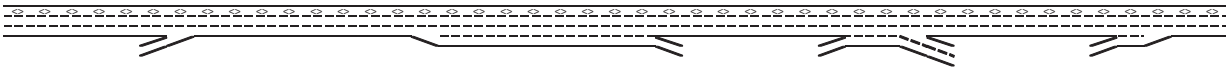
Location	6	7	8	9	10	11	12	13	14



Key
<> Express Lane (HOV)
No Trucks

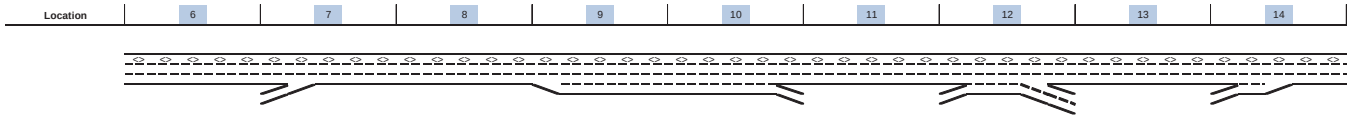
Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Flow Rate in E									
EL Volume (vph)	345	345	431	431	431	365	365	361	361
PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Express Lanes	1	1	1	1	1	1	1	1	1
Terrain	Level	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_p	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	392	392	489	489	489	414	414	409	409
EL Flow (pcphpl)	392	392	489	489	489	414	414	409	409
Calculate Speed in Expr									
Lane Width (ft)									
Shoulder Width									
TRD									
f_{LW}									
f_{LC}									
Calc'd FFS									
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65	65
Calculate Operations in									
EL_{IN} v/c ratio	0.22	0.22	0.28	0.28	0.28	0.24	0.24	0.23	0.23
Calculate On Ramp Flow									
On Volume (vph)		780					570		1,200
PHF		0.89					0.93		0.92
Total Lanes		1					1		1
Terrain		Level					Level		Level
Grade %		0.0%					0.0%		0.0%
Grade Length (mi)		0.00					0.00		0.00
Truck & Bus %		2.0%					0.0%		2.0%
RV %		0.0%					0.0%		0.0%
E_T		1.5					1.5		1.5
E_R		1.2					1.2		1.2
f_{HV}		0.990					1.000		0.990
f_p		1.00					1.00		1.00
On Flow (pcph)		885					613		1,317
On Flow (pcphpl)		885					613		1,317
Calculate On Ramp Roa									
On Ramp Type		Right					Right		Right
On Ramp Speed (mph)		45					45		45
On Ramp Cap (pcph)		2,100					2,100		2,100
On Ramp v/c ratio		0.42					0.29		0.63

Location	6	7	8	9	10	11	12	13	14



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Off Ramp Flow									
Off Volume (vph)					600		610		
PHF					0.87		0.92		
Total Lanes					1		2		
Terrain					Level		Level		
Grade %					0.0%		0.0%		
Grade Length (mi)					0.00		0.00		
Truck & Bus %					2.0%		2.0%		
RV %					0.0%		0.0%		
E_T					1.5		1.5		
E_R					1.2		1.2		
f_{HV}					0.990		0.990		
f_p					1.00		1.00		
Off Flow (pcph)					697		670		
Off Flow (pcphpl)					697		335		
Calculate Off Ramp Roa									
Off Ramp Type					Right		Right		
Off Ramp Speed					45		25		
Off Ramp Cap (pcph)					2,100		3,800		
Off Ramp v/c ratio					0.33		0.18		
Determine Adjacent Ran									
Up Type					On		Off		
Up Distance					5,200		2,550		
Up Flow (pcph)					885		697		
Down Type					On		No		
Down Distance					1,500				
Down Flow (pcph)					1,317				
Calculate Merge Influen									
Effective v_p (pcph)		2,937							3,087
Up Ramp L_{EQ}									
Down Ramp L_{EQ}									
P_{FM} (Eqn 13-3)		0.588							0.602
P_{FM} (Eqn 13-4)							#VALUE!		
P_{FM} (Eqn 13-5)									
P_{FM}		1.000							1.000
v_{12} (pcph)		2,937							3,087
v_3 (pcph)									
v_{34} (pcph)									
v_{12a} (pcph)		2,937							3,087
v_{R12a} (pcph)		3,822							4,404
Merge Speed Index		0.47							0.56
Merge Area Speed		54.3							52.1
Outer Lanes Volume									
Outer Lanes Speed									
Segment Speed		54.3							52.1
Merge v/c ratio		0.83							0.96
Merge Density		32.5							33.7
Merge LOS		D							D

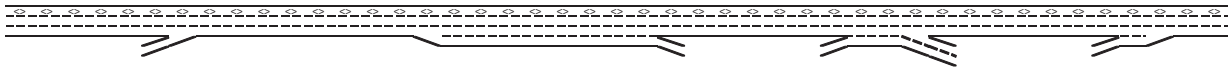


Location	6	7	8	9	10	11	12	13	14

Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Diverge Influe									
Effective v_p (pcph)					3,730				
Up Ramp L_{EQ}					8,523				
Down Ramp L_{EQ}					1,703				
P_{FD} (Eqn 13-9)					0.635				
P_{FD} (Eqn 13-10)					0.674				
P_{FD} (Eqn 13-11)									
P_{FD}					0.674				
v_{12} (pcph)					2,742				
v_3 (pcph)					988				
v_{34} (pcph)									
v_{12a} (pcph)					2,742				
Diverge Speed Index					0.36				
Diverge Area Speed					56.7				
Outer Lanes Volume					988				
Outer Lanes Speed					71.3				
Segment Speed					60.0				
Diverge v/c ratio					0.62				
Diverge Density					14.3				
Diverge LOS					B				
Calculate On Ramp to O									
On to Off Volume (vph)							107		
PHF							0.94		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							1.0%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							0.995		
f_p							1.00		
On to Off Flow (pcph)							114		
Calculate On Ramp to M									
On to ML Volume (vph)							463		
PHF							0.93		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							0.0%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							1.000		
f_p							1.00		
On to ML Flow (pcph)							498		
Calculate Mainline to Of									
ML to Off Volume (vph)							503		
PHF							0.92		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							2.0%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							0.990		
f_p							1.00		
ML to Off Flow (pcph)							553		
Calculate General Purp									
GP to GP Volume (vph)							2,451		
PHF							0.94		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							1.0%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							0.995		
f_p							1.00		
GP to GP Flow (pcph)							2,621		

Location	6	7	8	9	10	11	12	13	14



Key

<> Express Lane (HOV)

No Trucks

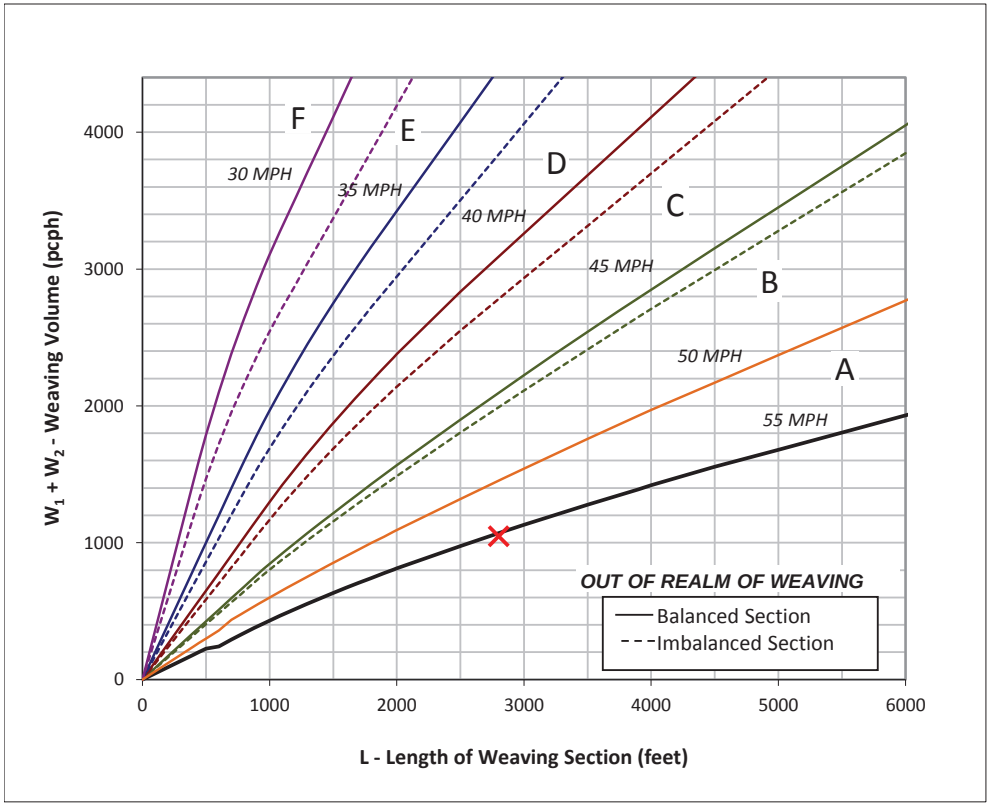
Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Weave Segme									
Weave Type							One-sided		
Weave Length							1,800		
Segment Lanes							2		
Weave Lanes							2		
Weave Flow (pcph)							1,051		
Non-Weave Flow							2,735		
Segment Flow							3,786		
Max Weave Length							5,345		
Length Check							OK		
Ideal Weave Capacity							2,079		
f_{HV}							0.995		
f_P							1.000		
Capacity Condition 1							4,137		
Capacity Condition 2							8,602		
Weave v/c ratio							0.91		
Interchange Density							1		
Lane Changes On to ML							1		
Lane Changes ML to Off							0		
Lane Changes On to Off							0		
Min Lane Change Rate							498		
Weave LC Rate							1,153		
Non-Weave LC Rate 1							1,154		
Non-Weave LC Rate 2							2,299		
Non-Weave LC Rate 3							-269		
Segment LC Rate							2,307		
Weave Intensity Factor							0.275		
Weave Speed							54.2		
Non-Weave Speed							52.3		
Segment Speed							52.8		
Weave Density							35.8		
Weave LOS							E		
Summarize Segment Op									
Segment v/c ratio	0.64	0.83	0.79	0.53	0.62	0.67	0.91	0.66	0.96
Segment Density	23.0	32.5	30.1	19.1	14.3	24.5	35.8	24.1	33.7
Segment LOS	C	D	D	C	B	C	E	C	D
Over Capacity									

Leisch Method for Weaving Analysis

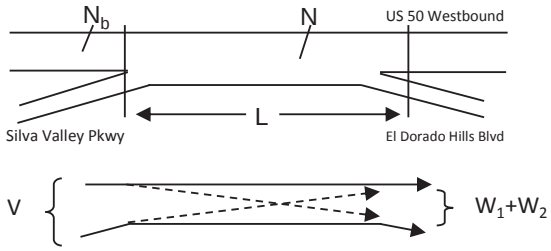
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near Tern No Project AM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,890	Volume (vph)*	502	Volume (vph)*	542
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,929	Volume (pcph)	502	Volume (pcph)	547



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   If optional exit lane, then "Y". Otherwise "N".
2. In the chart to the left, which two speed curves is the red "x" between?
   55 MPH and **-**
   If left of the 30 MPH curve, LOS is F. Select "-".
   If below the 55 MPH curve, out of the realm of weaving.
3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

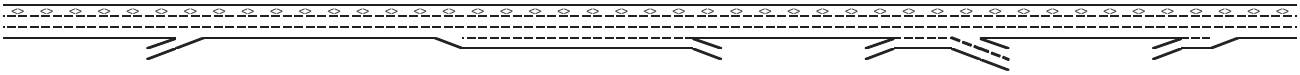
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Near Term No Project Conditions

Freeway Corridor: Westbound US 50 **Time Period:** PM Peak Hour

Data Entry Value

Calculated Value



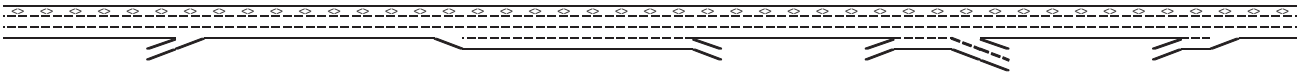
Key

<> Express Lane (HOV)

No Trucks

Location	6	7	8	9	10	11	12	13	14
Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segmer									
Type	Basic	Merge	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	2,350	1,500	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length		375							880
Decel Length					1,500				
Mainline Volume	2,810	2,810	3,150	3,150	3,150	2,290	2,290	2,170	2,170
On Ramp Volume		340					210		1,030
Off Ramp Volume					860		330		
Express Lane Volume	225	225	252	252	252	183	183	174	174
EL On Ramp Volume									
EL Off Ramp Volume									
Calculate Flow Rate in G									
GP Volume (vph)	2,585	2,925	2,898	2,898	2,898	2,107	2,317	1,996	3,026
PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
GP Lanes	2	2	2	3	3	2	3	2	2
Terrain	Level	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,720	3,078	3,049	3,049	3,049	2,217	2,437	2,100	3,184
GP Flow (pcphpl)	1,360	1,539	1,524	1,016	1,016	1,108	812	1,050	1,592
Calculate Speed in Gen									
Lane Width (ft)	12	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	69.6	69.6	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65	65
Calculate Operations in									
v/c ratio	0.58	0.65	0.65	0.43	0.43	0.47	0.35	0.45	0.68
Speed (mph)	65.0	64.7	64.8	65.0	65.0	65.0	65.0	65.0	64.5
Density (pcphpl)	20.9	23.8	23.5	15.6	15.6	17.1	12.5	16.2	24.7
LOS	C	C	C	B	B	B	B	B	C
Calculate Operations fo									
GP_{IN} Vol (pcph)		2,720		3,049			2,204		2,117
GP_{IN} Cap (pcph)		4,700		4,700			4,700		4,700
GP_{IN} v/c ratio		0.58		0.65			0.47		0.45
Calculate Operations fo									
GP_{OUT} Vol (pcph)					2,093		2,096		
GP_{OUT} Cap (pcph)					4,700		4,700		
GP_{OUT} v/c ratio					0.45		0.45		

Location	6	7	8	9	10	11	12	13	14



Key

<> Express Lane (HOV)

No Trucks

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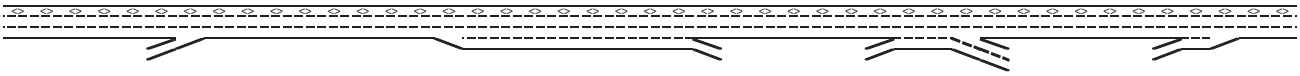
Calculate Flow Rate in E									
EL Volume (vph)	225	225	252	252	252	183	183	174	174
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1	1	1
Terrain	Level	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	252	252	283	283	283	206	206	195	195
EL Flow (pcphpl)	252	252	283	283	283	206	206	195	195
Calculate Speed in Exp									
Lane Width (ft)									
Shoulder Width									
TRD									
f_{LW}									
f_{LC}									
Calc'd FFS									
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65	65
Calculate Operations in									
EL_{IN} v/c ratio	0.14	0.14	0.16	0.16	0.16	0.12	0.12	0.11	0.11
Calculate On Ramp Flow									
On Volume (vph)		340					210		1,030
PHF		0.96					0.9		0.97
Total Lanes		1					1		1
Terrain		Level					Level		Level
Grade %		0.0%					0.0%		0.0%
Grade Length (mi)		0.00					0.00		0.00
Truck & Bus %		2.0%					0.0%		1.0%
RV %		0.0%					0.0%		0.0%
E_T		1.5					1.5		1.5
E_R		1.2					1.2		1.2
f_{HV}		0.990					1.000		0.995
f_P		1.00					1.00		1.00
On Flow (pcph)		358					233		1,067
On Flow (pcphpl)		358					233		1,067
Calculate On Ramp Roa									
On Ramp Type		Right					Right		Right
On Ramp Speed (mph)		45					45		45
On Ramp Cap (pcph)		2,100					2,100		2,100
On Ramp v/c ratio		0.17					0.11		0.51

Location	6	7	8	9	10	11	12	13	14

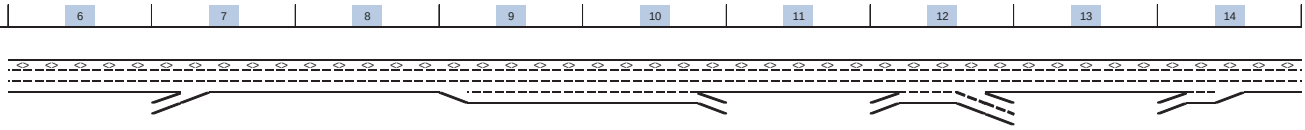


Key

<> Express Lane (HOV)

No Trucks

Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Off Ramp Flow									
Off Volume (vph)					860		330		
PHF					0.9		0.97		
Total Lanes					1		2		
Terrain					Level		Level		
Grade %					0.0%		0.0%		
Grade Length (mi)					0.00		0.00		
Truck & Bus %					0.0%		1.0%		
RV %					0.0%		0.0%		
E_T					1.5		1.5		
E_R					1.2		1.2		
f_{HV}					1.000		0.995		
f_P					1.00		1.00		
Off Flow (pcph)					956		342		
Off Flow (pcphpl)					956		171		
Calculate Off Ramp Roa									
Off Ramp Type					Right		Right		
Off Ramp Speed					45		25		
Off Ramp Cap (pcph)					2,100		3,800		
Off Ramp v/c ratio					0.46		0.09		
Determine Adjacent Ran									
Up Type					On		Off		
Up Distance					5,200		2,550		
Up Flow (pcph)					358		956		
Down Type					On		No		
Down Distance					1,500				
Down Flow (pcph)					1,067				
Calculate Merge Influen									
Effective v_P (pcph)		2,720							2,117
Up Ramp L_{EQ}									
Down Ramp L_{EQ}									
P_{FM} (Eqn 13-3)		0.588							0.602
P_{FM} (Eqn 13-4)							#VALUE!		
P_{FM} (Eqn 13-5)									
P_{FM}		1.000							1.000
v_{12} (pcph)		2,720							2,117
v_3 (pcph)									
v_{34} (pcph)									
v_{12a} (pcph)		2,720							2,117
v_{R12a} (pcph)		3,078							3,184
Merge Speed Index		0.37							0.34
Merge Area Speed		56.4							57.3
Outer Lanes Volume									
Outer Lanes Speed									
Segment Speed		56.4							57.3
Merge v/c ratio		0.67							0.69
Merge Density		27.0							24.3
Merge LOS		C							C



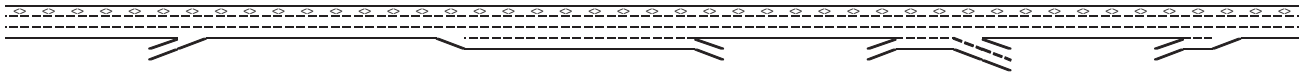
Key

<> Express Lane (HOV)

No Trucks

Location	6	7	8	9	10	11	12	13	14
Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Diverge Influe									
Effective v_P (pcph)					3,049				
Up Ramp L_{EQ}					5,222				
Down Ramp L_{EQ}					1,525				
P_{FD} (Eqn 13-9)					0.640				
P_{FD} (Eqn 13-10)					0.640				
P_{FD} (Eqn 13-11)									
P_{FD}					0.640				
v_{12} (pcph)					2,295				
v_3 (pcph)					754				
v_{34} (pcph)									
v_{12s} (pcph)					2,295				
Diverge Speed Index					0.38				
Diverge Area Speed					56.2				
Outer Lanes Volume					754				
Outer Lanes Speed					71.3				
Segment Speed					59.3				
Diverge v/c ratio					0.52				
Diverge Density					10.5				
Diverge LOS					B				
Calculate On Ramp to O									
On to Off Volume (vph)							88		
PHF							0.96		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							0.5%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							0.998		
f_P							1.00		
On to Off Flow (pcph)							91		
Calculate On Ramp to M									
On to ML Volume (vph)							122		
PHF							0.9		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							0.0%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							1.000		
f_P							1.00		
On to ML Flow (pcph)							136		
Calculate Mainline to Of									
ML to Off Volume (vph)							242		
PHF							0.97		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							1.0%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							0.995		
f_P							1.00		
ML to Off Flow (pcph)							251		

Location	6	7	8	9	10	11	12	13	14



Key

<> Express Lane (HOV)

No Trucks

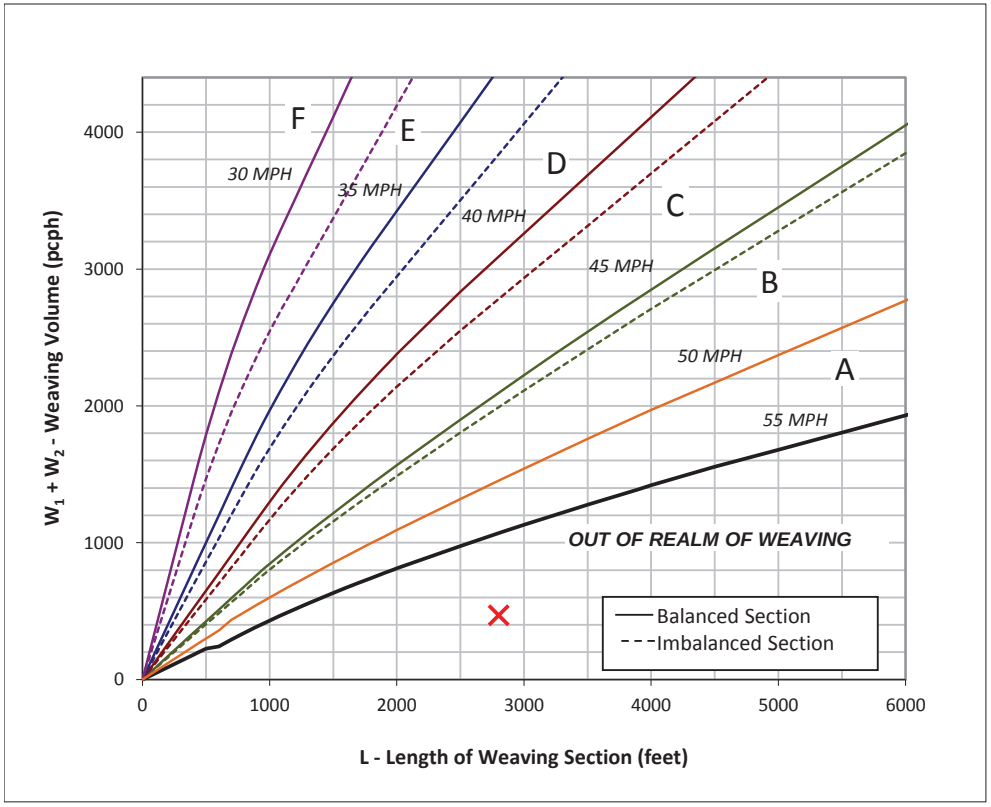
Name	Bass Lake Rd off to on-ramp	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate General Purpo									
GP to GP Volume (vph)							1,864		
PHF							0.96		
Terrain							Level		
Grade %							0.0%		
Grade Length (mi)							0.00		
Truck & Bus %							2.0%		
RV %							0.0%		
E_T							1.5		
E_R							1.2		
f_{HV}							0.990		
f_P							1.00		
GP to GP Flow (pcph)							1,961		
Calculate Weave Segme									
Weave Type							One-sided		
Weave Length							1,800		
Segment Lanes							2		
Weave Lanes							2		
Weave Flow (pcph)							387		
Non-Weave Flow							2,053		
Segment Flow							2,440		
Max Weave Length							4,118		
Length Check							OK		
Ideal Weave Capacity							2,173		
f_{HV}							0.991		
f_P							1.000		
Capacity Condition 1							4,308		
Capacity Condition 2							14,995		
Weave v/c ratio							0.56		
Interchange Density							2		
Lane Changes On to ML							1		
Lane Changes ML to Off							0		
Lane Changes On to Off							0		
Min Lane Change Rate							136		
Weave LC Rate							773		
Non-Weave LC Rate 1							1,013		
Non-Weave LC Rate 2							2,147		
Non-Weave LC Rate 3							35		
Segment LC Rate							1,786		
Weave Intensity Factor							0.225		
Weave Speed							55.8		
Non-Weave Speed							58.2		
Segment Speed							57.8		
Weave Density							21.1		
Weave LOS							C		
Summarize Segment Op									
Segment v/c ratio	0.58	0.67	0.65	0.43	0.52	0.47	0.56	0.45	0.69
Segment Density	20.9	27.0	23.5	15.6	10.5	17.1	21.1	16.2	24.3
Segment LOS	C	C	C	B	B	B	C	B	C
Over Capacity									

Leisch Method for Weaving Analysis

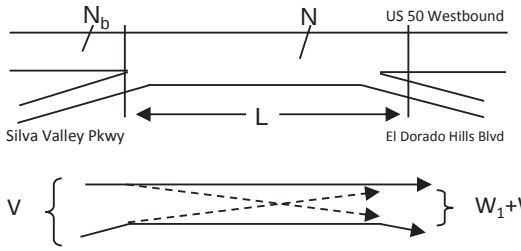
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near Term No Project PM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,500	Volume (vph)*	174	Volume (vph)*	294
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	1%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	2,525	Volume (pcph)	174	Volume (pcph)	296



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	351	329	93.8%	232.1	63.7	F
	Through	709	703	99.2%	14.1	2.7	B
	Right Turn	30	34	113.3%	9.9	2.8	A
	Subtotal	1,090	1,067	97.9%	80.3	19.4	F
SB	Left Turn	110	106	96.4%	169.7	47.1	F
	Through	1,347	1,289	95.7%	161.3	42.9	F
	Right Turn	300	291	96.9%	174.7	46.2	F
	Subtotal	1,757	1,685	95.9%	164.2	43.7	F
EB	Left Turn	70	71	100.9%	83.5	16.2	F
	Through	70	70	100.4%	123.9	39.7	F
	Right Turn	21	21	100.0%	18.5	10.3	B
	Subtotal	161	162	100.6%	93.9	26.3	F
WB	Left Turn	20	19	96.5%	40.7	18.5	D
	Through	50	50	100.8%	57.5	5.9	E
	Right Turn	50	56	112.6%	27.9	8.0	C
	Subtotal	120	126	105.0%	41.7	6.9	D
Total		3,128	3,040	97.2%	125.2	23.0	F

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	813	824	101.3%	39.8	4.3	D
	Through	774	782	101.0%	38.5	30.0	D
	Right Turn	61	64	105.1%	11.2	2.7	B
	Subtotal	1,648	1,670	101.3%	38.2	14.6	D
SB	Left Turn	54	48	89.4%	73.7	19.1	E
	Through	944	917	97.1%	45.2	8.6	D
	Right Turn	390	371	95.2%	22.9	4.8	C
	Subtotal	1,388	1,336	96.2%	40.0	6.8	D
EB	Left Turn	272	262	96.4%	135.7	89.7	F
	Through	50	51	102.4%	126.7	76.7	F
	Right Turn	301	301	99.9%	52.2	66.4	D
	Subtotal	623	614	98.6%	93.2	76.8	F
WB	Left Turn	92	99	107.4%	67.8	8.1	E
	Through	40	42	103.8%	64.1	12.0	E
	Right Turn	40	46	116.0%	12.2	8.9	B
	Subtotal	172	187	108.5%	53.7	6.5	D
Total		3,831	3,807	99.4%	47.9	16.3	D

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	1,528	1,557	101.9%	17.0	3.6	B
	Right Turn	93	94	101.5%	8.4	1.7	A
	Subtotal	1,621	1,651	101.9%	16.5	3.5	B
SB	Left Turn	260	253	97.2%	32.1	4.4	C
	Through	1,079	1,060	98.2%	17.9	2.0	B
	Right Turn						
	Subtotal	1,339	1,312	98.0%	20.6	1.5	C
EB	Left Turn						
	Through						
	Right Turn	1,074	1,103	102.7%	26.8	3.7	C
	Subtotal	1,074	1,103	102.7%	26.8	3.7	C
WB	Left Turn						
	Through						
	Right Turn	120	123	102.5%	7.4	0.7	A
	Subtotal	120	123	102.5%	7.4	0.7	A
Total		4,154	4,190	100.9%	20.2	2.0	C

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	62	65	104.2%	49.2	9.9	D
	Through	1,310	1,337	102.0%	24.7	2.2	C
	Right Turn	122	122	100.1%	5.3	1.0	A
	Subtotal	1,494	1,523	102.0%	24.3	1.9	C
SB	Left Turn	418	405	96.9%	39.3	3.0	D
	Through	1,535	1,552	101.1%	14.0	1.3	B
	Right Turn	200	206	102.9%	4.1	1.1	A
	Subtotal	2,153	2,163	100.4%	17.9	1.5	B
EB	Left Turn	20	19	97.0%	39.1	17.3	D
	Through	11	12	110.9%	32.9	11.5	C
	Right Turn	10	11	106.0%	22.3	19.5	C
	Subtotal	41	42	102.9%	34.6	7.5	C
WB	Left Turn	95	100	105.2%	39.2	7.2	D
	Through	34	34	101.2%	42.5	10.6	D
	Right Turn	282	286	101.4%	18.1	3.2	B
	Subtotal	411	420	102.3%	24.9	3.8	C
Total		4,099	4,148	101.2%	21.2	1.2	C

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	80	79	99.0%	65.6	6.5	E
	Through	871	890	102.2%	27.5	3.2	C
	Right Turn	222	236	106.4%	13.3	2.3	B
	Subtotal	1,173	1,206	102.8%	27.2	2.8	C
SB	Left Turn	107	105	97.9%	65.4	9.9	E
	Through	1,072	1,085	101.2%	34.3	3.7	C
	Right Turn	462	470	101.6%	17.6	1.4	B
	Subtotal	1,641	1,659	101.1%	31.6	2.6	C
EB	Left Turn	423	431	101.8%	53.2	5.2	D
	Through	232	240	103.6%	55.5	5.1	E
	Right Turn	40	43	107.3%	40.5	12.2	D
	Subtotal	695	714	102.7%	53.4	4.0	D
WB	Left Turn	358	375	104.6%	57.2	3.8	E
	Through	168	177	105.2%	57.5	6.5	E
	Right Turn	200	205	102.3%	8.9	2.6	A
	Subtotal	726	756	104.1%	44.0	2.5	D
Total		4,235	4,335	102.3%	36.2	1.7	D

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	0	400	146	9	307	683	41	54	4	68	12	4
Future Volume (veh/h)	0	400	146	9	307	683	41	54	4	68	12	4
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.99		1.00	0.99	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1873	1900		1900	1865	1900	1845	1847	1900	1900	1900
Adj Flow Rate, veh/h	0	435	141		334	742	43	86	6	0	48	16
Adj No. of Lanes	0	2	0		1	2	0	1	1	0	1	1
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.63	0.63	0.63	0.25	0.25
Percent Heavy Veh, %	0	2	2		0	2	2	3	0	0	0	0
Cap, veh/h	0	1597	513		352	2856	165	156	152	0	166	157
Arrive On Green	0.00	0.60	0.60		0.39	1.00	1.00	0.08	0.08	0.00	0.08	0.08
Sat Flow, veh/h	0	2743	851		1810	3404	197	1369	1847	0	1422	1900
Grp Volume(v), veh/h	0	291	285		334	386	399	86	6	0	48	16
Grp Sat Flow(s),veh/h/ln	0	1779	1721		1810	1772	1830	1369	1847	0	1422	1900
Q Serve(g_s), s	0.0	10.5	10.6		24.1	0.0	0.0	8.4	0.4	0.0	4.3	1.1
Cycle Q Clear(g_c), s	0.0	10.5	10.6		24.1	0.0	0.0	9.4	0.4	0.0	4.7	1.1
Prop In Lane	0.00		0.49		1.00		0.11	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	0	1073	1038		352	1486	1535	156	152	0	166	157
V/C Ratio(X)	0.00	0.27	0.27		0.95	0.26	0.26	0.55	0.04	0.00	0.29	0.10
Avail Cap(c_a), veh/h	0	1073	1038		609	1486	1535	381	457	0	401	470
HCM Platoon Ratio	1.00	1.00	1.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.79	0.79	0.79	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	12.7	12.8		40.6	0.0	0.0	61.7	57.0	0.0	59.2	57.3
Incr Delay (d2), s/veh	0.0	0.6	0.7		9.2	0.3	0.3	1.1	0.0	0.0	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.3	5.3		12.9	0.1	0.1	3.2	0.2	0.0	1.7	0.6
LnGrp Delay(d),s/veh	0.0	13.3	13.4		49.8	0.3	0.3	62.8	57.0	0.0	59.5	57.4
LnGrp LOS		B	B		D	A	A	E	E		E	E
Approach Vol, veh/h		576				1119			92			64
Approach Delay, s/veh		13.4				15.1			62.4			59.0
Approach LOS		B				B			E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	31.9	87.4		15.7		119.3		15.7
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	45.4	40.0		33.4		91.0		33.4
Max Q Clear Time (g_c+I1), s	26.1	12.6		6.7		2.0		11.4
Green Ext Time (p_c), s	0.1	11.2		0.1		14.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	17
Future Volume (veh/h)	17
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	0
Adj No. of Lanes	0
Peak Hour Factor	0.25
Percent Heavy Veh, %	0
Cap, veh/h	0
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	0
V/C Ratio(X)	0.00
Avail Cap(c_a), veh/h	0
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	1	99	448	11	20	495	201	64	11	10	52	11
Future Volume (veh/h)	1	99	448	11	20	495	201	64	11	10	52	11
Number		5	2	12	1	6	16	7	4	14	3	8
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1845	1845	1900	1900	1881	1900	1900	1900	1900	1810	1882
Adj Flow Rate, veh/h		104	472	8	22	544	201	82	14	0	63	13
Adj No. of Lanes		1	2	1	1	2	0	1	1	0	1	1
Peak Hour Factor		0.95	0.95	0.95	0.91	0.91	0.91	0.78	0.78	0.78	0.83	0.83
Percent Heavy Veh, %		3	3	0	0	1	1	0	0	0	5	0
Cap, veh/h		127	2663	1225	27	1784	657	103	58	0	80	31
Arrive On Green		0.02	0.25	0.25	0.02	0.70	0.70	0.06	0.03	0.00	0.05	0.02
Sat Flow, veh/h		1757	3505	1613	1810	2559	942	1810	1900	0	1723	1882
Grp Volume(v), veh/h		104	472	8	22	379	366	82	14	0	63	13
Grp Sat Flow(s),veh/h/ln		1757	1752	1613	1810	1787	1714	1810	1900	0	1723	1882
Q Serve(g_s), s		8.0	14.3	0.5	1.6	11.0	11.1	6.0	1.0	0.0	4.9	0.9
Cycle Q Clear(g_c), s		8.0	14.3	0.5	1.6	11.0	11.1	6.0	1.0	0.0	4.9	0.9
Prop In Lane		1.00		1.00	1.00		0.55	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h		127	2663	1225	27	1246	1195	103	58	0	80	31
V/C Ratio(X)		0.82	0.18	0.01	0.80	0.30	0.31	0.80	0.24	0.00	0.79	0.42
Avail Cap(c_a), veh/h		271	2663	1225	101	1246	1195	181	429	0	204	453
HCM Platoon Ratio		0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		65.0	17.5	12.3	66.3	7.9	7.9	62.9	63.9	0.0	63.7	65.8
Incr Delay (d2), s/veh		4.2	0.1	0.0	17.9	0.6	0.7	5.2	0.8	0.0	6.4	3.4
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		4.0	7.0	0.2	1.0	5.6	5.4	3.2	0.5	0.0	2.5	0.5
LnGrp Delay(d),s/veh		69.2	17.6	12.3	84.1	8.5	8.5	68.1	64.7	0.0	70.1	69.2
LnGrp LOS		E	B	B	F	A	A	E	E		E	E
Approach Vol, veh/h			584			767			96			76
Approach Delay, s/veh			26.7			10.7			67.6			69.9
Approach LOS			C			B			E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.5	108.6	11.2	8.6	15.0	100.1	13.2	6.7
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	7.5	61.0	16.0	30.5	* 21	47.0	13.5	32.5
Max Q Clear Time (g_c+I1), s	3.6	16.3	6.9	3.0	10.0	13.1	8.0	2.9
Green Ext Time (p_c), s	0.0	11.9	0.0	0.0	0.0	11.1	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.4
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	166
Future Volume (veh/h)	166
Number	18
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	0
Adj No. of Lanes	0
Peak Hour Factor	0.83
Percent Heavy Veh, %	0
Cap, veh/h	0
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	0
V/C Ratio(X)	0.00
Avail Cap(c_a), veh/h	0
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	362	50	100	421	65	130	12	190	46	17	33
Future Volume (veh/h)	17	362	50	100	421	65	130	12	190	46	17	33
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1852	1900	1900	1897	1900	1881	1900	1900	1827	1863	1900
Adj Flow Rate, veh/h	21	452	60	115	484	73	159	15	0	105	39	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.82	0.82	0.82	0.44	0.44	0.44
Percent Heavy Veh, %	5	2	2	0	0	0	1	0	0	4	0	0
Cap, veh/h	43	613	81	151	711	107	227	241	0	173	185	0
Arrive On Green	0.02	0.38	0.38	0.08	0.44	0.44	0.13	0.13	0.00	0.10	0.10	0.00
Sat Flow, veh/h	1723	1601	213	1810	1611	243	1792	1900	0	1740	1863	0
Grp Volume(v), veh/h	21	0	512	115	0	557	159	15	0	105	39	0
Grp Sat Flow(s),veh/h/ln	1723	0	1814	1810	0	1854	1792	1900	0	1740	1863	0
Q Serve(g_s), s	0.7	0.0	14.1	3.6	0.0	14.0	5.0	0.4	0.0	3.4	1.1	0.0
Cycle Q Clear(g_c), s	0.7	0.0	14.1	3.6	0.0	14.0	5.0	0.4	0.0	3.4	1.1	0.0
Prop In Lane	1.00		0.12	1.00		0.13	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	43	0	695	151	0	819	227	241	0	173	185	0
V/C Ratio(X)	0.49	0.00	0.74	0.76	0.00	0.68	0.70	0.06	0.00	0.61	0.21	0.00
Avail Cap(c_a), veh/h	740	0	1402	777	0	1433	1231	1306	0	1046	1120	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.0	0.0	15.4	26.1	0.0	13.0	24.4	22.4	0.0	25.1	24.1	0.0
Incr Delay (d2), s/veh	3.2	0.0	1.5	3.0	0.0	1.3	4.8	0.1	0.0	4.2	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	7.3	1.9	0.0	7.4	2.7	0.2	0.0	1.8	0.6	0.0
LnGrp Delay(d),s/veh	31.3	0.0	17.0	29.1	0.0	14.3	29.2	22.5	0.0	29.4	24.8	0.0
LnGrp LOS	C		B	C		B	C	C		C	C	
Approach Vol, veh/h		533			672			174			144	
Approach Delay, s/veh		17.5			16.8			28.6			28.1	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.4	28.3		10.0	4.9	31.7		11.6
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	5.6	16.1		5.4	2.7	16.0		7.0
Green Ext Time (p_c), s	0.1	6.1		0.7	0.0	6.2		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	19.5
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	12	272	110	148	0	23	90	18	0	159	64	18
Future Vol, veh/h	12	272	110	148	0	23	90	18	0	159	64	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.92	0.82	0.82	0.82	0.92	0.80	0.80	0.80
Heavy Vehicles, %	0	3	0	4	2	0	2	0	2	1	2	0
Mvmt Flow	13	306	124	166	0	28	110	22	0	199	80	23
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	18.3	13.6	15.7
HCM LOS	C	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	78%	0%	100%	0%	0%	83%	0%	36%
Vol Right, %	0%	22%	0%	0%	100%	0%	17%	0%	64%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	159	82	284	110	148	23	108	8	150
LT Vol	159	0	284	0	0	23	0	8	0
Through Vol	0	64	0	110	0	0	90	0	54
RT Vol	0	18	0	0	148	0	18	0	96
Lane Flow Rate	199	102	319	124	166	28	132	9	174
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.451	0.214	0.667	0.243	0.291	0.067	0.292	0.022	0.367
Departure Headway (Hd)	8.174	7.527	7.523	7.066	6.302	8.587	7.988	8.552	7.585
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	441	477	482	508	570	417	449	418	474
Service Time	5.928	5.281	5.27	4.812	4.047	6.351	5.752	6.312	5.344
HCM Lane V/C Ratio	0.451	0.214	0.662	0.244	0.291	0.067	0.294	0.022	0.367
HCM Control Delay	17.5	12.3	24.1	12.1	11.6	12	14	11.5	14.7
HCM Lane LOS	C	B	C	B	B	B	B	B	B
HCM 95th-tile Q	2.3	0.8	4.8	0.9	1.2	0.2	1.2	0.1	1.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	8	54	96
Future Vol, veh/h	0	8	54	96
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	0	0	4
Mvmt Flow	0	9	63	112
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	14.5
HCM LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	483	10	130	70	408	0	0	243	520
Future Volume (veh/h)	0	0	0	483	10	130	70	408	0	0	243	520
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1863	1863	1863	0	0	1881	1881
Adj Flow Rate, veh/h				563	0	24	91	530	0	0	261	89
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.87	0.87	0.87	0.77	0.77	0.77	0.93	0.93	0.93
Percent Heavy Veh, %				2	2	2	2	2	0	0	1	1
Cap, veh/h				751	0	334	231	1607	0	0	759	338
Arrive On Green				0.21	0.00	0.21	0.13	0.45	0.00	0.00	0.21	0.21
Sat Flow, veh/h				3548	0	1579	1774	3632	0	0	3668	1591
Grp Volume(v), veh/h				563	0	24	91	530	0	0	261	89
Grp Sat Flow(s),veh/h/ln				1774	0	1579	1774	1770	0	0	1787	1591
Q Serve(g_s), s				5.6	0.0	0.5	1.8	3.6	0.0	0.0	2.3	1.8
Cycle Q Clear(g_c), s				5.6	0.0	0.5	1.8	3.6	0.0	0.0	2.3	1.8
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				751	0	334	231	1607	0	0	759	338
V/C Ratio(X)				0.75	0.00	0.07	0.39	0.33	0.00	0.00	0.34	0.26
Avail Cap(c_a), veh/h				2824	0	1256	1176	4694	0	0	4741	2111
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				13.9	0.0	11.9	15.0	6.6	0.0	0.0	12.6	12.4
Incr Delay (d2), s/veh				0.6	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.8	0.0	0.2	0.9	1.8	0.0	0.0	1.1	0.8
LnGrp Delay(d),s/veh				14.5	0.0	11.9	15.4	6.7	0.0	0.0	12.7	12.5
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					587			621			350	
Approach Delay, s/veh					14.4			7.9			12.7	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		23.9			9.1	14.8		13.8
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		5.6			3.8	4.3		7.6
Green Ext Time (p_c), s		1.7			0.1	1.7		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	30	380	398	556	170
Future Volume (veh/h)	80	30	380	398	556	170
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1881	1881	1863	1863
Adj Flow Rate, veh/h	85	1	507	531	639	38
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.94	0.94	0.75	0.75	0.87	0.87
Percent Heavy Veh, %	5	5	1	1	2	2
Cap, veh/h	417	186	711	2063	962	429
Arrive On Green	0.12	0.12	0.20	0.58	0.27	0.27
Sat Flow, veh/h	3447	1538	3476	3668	3632	1578
Grp Volume(v), veh/h	85	1	507	531	639	38
Grp Sat Flow(s),veh/h/ln	1723	1538	1738	1787	1770	1578
Q Serve(g_s), s	0.9	0.0	5.7	3.1	6.7	0.7
Cycle Q Clear(g_c), s	0.9	0.0	5.7	3.1	6.7	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	417	186	711	2063	962	429
V/C Ratio(X)	0.20	0.01	0.71	0.26	0.66	0.09
Avail Cap(c_a), veh/h	2065	921	2499	4283	4241	1890
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	16.1	15.5	4.4	13.5	11.3
Incr Delay (d2), s/veh	0.1	0.0	0.5	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.7	1.5	3.2	0.3
LnGrp Delay(d),s/veh	16.6	16.1	16.0	4.4	13.8	11.4
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	86			1038	677	
Approach Delay, s/veh	16.6			10.0	13.7	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		30.9		10.8	12.7	18.1		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		5.1		2.9	7.7	8.7		
Green Ext Time (p_c), s		2.7		0.1	0.9	2.6		

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	227	220	97.0%	69.8	15.0	E
	Through	1,300	1,292	99.4%	32.1	3.5	C
	Right Turn	71	74	104.4%	29.7	7.2	C
	Subtotal	1,598	1,586	99.3%	37.8	3.4	D
SB	Left Turn	150	146	97.0%	76.5	15.2	E
	Through	907	909	100.2%	42.7	9.9	D
	Right Turn	80	80	99.9%	40.0	15.9	D
	Subtotal	1,137	1,135	99.8%	46.7	10.8	D
EB	Left Turn	240	242	100.7%	59.8	14.1	E
	Through	100	93	93.0%	67.1	20.4	E
	Right Turn	461	451	97.9%	31.2	15.7	C
	Subtotal	801	786	98.1%	44.3	16.5	D
WB	Left Turn	61	59	96.1%	38.3	7.7	D
	Through	90	87	97.1%	65.7	35.6	E
	Right Turn	260	260	100.1%	46.8	29.3	D
	Subtotal	411	406	98.8%	50.1	27.2	D
Total		3,947	3,913	99.1%	43.1	7.0	D

Intersection 2 **El Dorado Hills Blvd/US 50 WB Ramps-Saratoga Wy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	999	977	97.8%	44.7	10.2	D
	Through	1,297	1,285	99.0%	14.8	1.3	B
	Right Turn	202	196	97.2%	12.4	1.9	B
	Subtotal	2,498	2,458	98.4%	26.9	4.5	C
SB	Left Turn	41	41	100.5%	85.8	24.5	F
	Through	1,151	1,143	99.3%	72.8	25.7	E
	Right Turn	241	233	96.7%	29.6	18.7	C
	Subtotal	1,433	1,417	98.9%	66.1	24.1	E
EB	Left Turn	221	224	101.1%	38.6	7.2	D
	Through	60	62	102.8%	41.5	5.0	D
	Right Turn	52	51	97.1%	2.3	0.4	A
	Subtotal	333	336	100.8%	33.6	5.6	C
WB	Left Turn	181	176	97.0%	36.2	5.9	D
	Through	10	11	105.0%	31.2	17.6	C
	Right Turn	80	76	94.6%	5.4	1.1	A
	Subtotal	271	262	96.6%	27.0	4.4	C
Total		4,535	4,472	98.6%	39.9	7.6	D

Intersection 3 **Latrobe Rd/US 50 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	2,027	1,999	98.6%	12.0	3.2	B
	Right Turn	523	506	96.8%	15.0	3.4	B
	Subtotal	2,550	2,505	98.2%	12.6	3.1	B
SB	Left Turn	314	310	98.8%	28.8	1.2	C
	Through	1,071	1,057	98.7%	9.2	1.1	A
	Right Turn						
	Subtotal	1,385	1,368	98.7%	13.7	1.1	B
EB	Left Turn						
	Through						
	Right Turn	842	855	101.5%	24.0	1.9	C
	Subtotal	842	855	101.5%	24.0	1.9	C
WB	Left Turn						
	Through						
	Right Turn	470	460	97.8%	12.2	1.7	B
	Subtotal	470	460	97.8%	12.2	1.7	B
Total		5,247	5,187	98.9%	14.7	1.5	B

Intersection 4 **Latrobe Rd/Town Center Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	10	8	80.0%	33.9	23.7	C
	Through	1,731	1,726	99.7%	101.1	18.9	F
	Right Turn	95	93	97.8%	10.1	4.3	B
	Subtotal	1,836	1,826	99.5%	96.0	17.7	F
SB	Left Turn	475	472	99.4%	44.7	8.2	D
	Through	1,428	1,436	100.6%	12.2	2.2	B
	Right Turn	10	9	94.0%	1.5	1.0	A
	Subtotal	1,913	1,918	100.3%	20.4	3.3	C
EB	Left Turn	250	232	92.8%	30.2	3.3	C
	Through	33	32	95.5%	20.1	7.7	C
	Right Turn	90	89	99.3%	13.8	4.5	B
	Subtotal	373	353	94.6%	25.3	3.6	C
WB	Left Turn	73	73	100.5%	49.3	13.0	D
	Through	12	12	98.3%	46.4	33.2	D
	Right Turn	563	551	97.8%	19.8	4.0	B
	Subtotal	648	636	98.1%	23.7	5.4	C
Total		4,770	4,733	99.2%	50.8	8.0	D

Intersection 5 **Latrobe Rd/White Rock Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	63	59	94.0%	46.0	9.4	D
	Through	1,052	1,043	99.1%	34.4	4.9	C
	Right Turn	287	289	100.6%	18.1	3.4	B
	Subtotal	1,402	1,391	99.2%	31.6	4.1	C
SB	Left Turn	258	256	99.1%	45.4	10.4	D
	Through	901	902	100.2%	27.0	10.6	C
	Right Turn	431	438	101.6%	16.7	4.3	B
	Subtotal	1,590	1,596	100.4%	27.1	7.9	C
EB	Left Turn	572	570	99.7%	56.5	13.0	E
	Through	277	275	99.1%	33.1	3.6	C
	Right Turn	110	108	97.7%	18.7	4.3	B
	Subtotal	959	952	99.3%	45.9	8.3	D
WB	Left Turn	315	307	97.3%	34.8	3.2	C
	Through	324	324	99.9%	40.0	4.4	D
	Right Turn	209	217	103.9%	6.9	1.3	A
	Subtotal	848	848	99.9%	29.6	2.8	C
Total		4,799	4,786	99.7%	32.6	2.6	C

Intersection 9 **Post St/Town Center Blvd** **All-way Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	218	219	100.5%	13.5	2.9	B
	Through	115	115	100.2%	11.2	1.8	B
	Right Turn	55	56	100.9%	6.0	1.2	A
	Subtotal	388	390	100.5%	11.7	2.2	B
SB	Left Turn	18	19	107.2%	12.6	4.0	B
	Through	124	127	102.4%	21.0	8.1	C
	Right Turn	306	291	95.0%	15.3	6.0	C
	Subtotal	448	437	97.5%	16.8	6.4	C
EB	Left Turn	348	336	96.5%	42.0	19.0	E
	Through	236	231	98.0%	19.0	6.5	C
	Right Turn	162	169	104.2%	8.9	1.3	A
	Subtotal	746	736	98.6%	27.5	10.8	D
WB	Left Turn	28	29	102.9%	12.9	8.0	B
	Through	189	189	100.2%	18.4	8.7	C
	Right Turn	19	20	106.8%	13.4	4.9	B
	Subtotal	236	238	101.0%	17.4	8.2	C
Total		1,818	1,801	99.1%	20.4	6.2	C

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	0	926	77	19	107	663	26	1	259	4	238	32
Future Volume (veh/h)	0	926	77	19	107	663	26	1	259	4	238	32
Number	5	2	12		1	6	16		3	8	18	7
Initial Q (Qb), veh	0	0	0		0	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		0.98		1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1883	1900		1884	1900	1900		1900	1882	1900	1900
Adj Flow Rate, veh/h	0	965	76		113	698	26		312	5	44	128
Adj No. of Lanes	0	2	0		1	2	0		1	1	0	1
Peak Hour Factor	0.96	0.96	0.96		0.95	0.95	0.95		0.83	0.83	0.83	0.25
Percent Heavy Veh, %	0	1	1		1	0	0		0	0	0	0
Cap, veh/h	0	1895	149		136	2417	90		384	40	349	351
Arrive On Green	0.00	0.56	0.56		0.08	0.68	0.68		0.24	0.24	0.24	0.24
Sat Flow, veh/h	0	3453	265		1794	3546	132		1416	165	1455	1375
Grp Volume(v), veh/h	0	514	527		113	355	369		312	0	49	128
Grp Sat Flow(s),veh/h/ln	0	1788	1835		1794	1805	1873		1416	0	1620	1375
Q Serve(g_s), s	0.0	23.7	23.7		8.4	10.5	10.5		29.2	0.0	3.2	10.9
Cycle Q Clear(g_c), s	0.0	23.7	23.7		8.4	10.5	10.5		30.1	0.0	3.2	14.1
Prop In Lane	0.00		0.14		1.00		0.07		1.00		0.90	1.00
Lane Grp Cap(c), veh/h	0	1009	1035		136	1230	1277		384	0	389	351
V/C Ratio(X)	0.00	0.51	0.51		0.83	0.29	0.29		0.81	0.00	0.13	0.37
Avail Cap(c_a), veh/h	0	1009	1035		271	1230	1277		625	0	665	585
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00		0.76	0.76	0.76		1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	18.0	18.0		61.5	8.5	8.5		50.9	0.0	40.2	45.7
Incr Delay (d2), s/veh	0.0	1.8	1.8		3.7	0.5	0.4		1.6	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.2	12.5		4.3	5.4	5.6		11.6	0.0	1.4	4.1
LnGrp Delay(d),s/veh	0.0	19.8	19.8		65.2	9.0	9.0		52.5	0.0	40.3	46.0
LnGrp LOS		B	B		E	A	A		D		D	D
Approach Vol, veh/h		1041				837				361		
Approach Delay, s/veh		19.8				16.6				50.8		
Approach LOS		B				B				D		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	15.9	82.1		37.0		98.0		37.0
Change Period (Y+Rc), s	5.6	6.0		4.6		6.0		4.6
Max Green Setting (Gmax), s	20.4	43.0		55.4		69.0		55.4
Max Q Clear Time (g_c+I1), s	10.4	25.7		16.1		12.5		32.1
Green Ext Time (p_c), s	0.0	11.4		0.3		21.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	4	32
Future Volume (veh/h)	4	32
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900
Adj Flow Rate, veh/h	16	0
Adj No. of Lanes	1	0
Peak Hour Factor	0.25	0.25
Percent Heavy Veh, %	0	0
Cap, veh/h	456	0
Arrive On Green	0.24	0.00
Sat Flow, veh/h	1900	0
Grp Volume(v), veh/h	16	0
Grp Sat Flow(s),veh/h/ln	1900	0
Q Serve(g_s), s	0.9	0.0
Cycle Q Clear(g_c), s	0.9	0.0
Prop In Lane		0.00
Lane Grp Cap(c), veh/h	456	0
V/C Ratio(X)	0.04	0.00
Avail Cap(c_a), veh/h	780	0
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	0.00
Uniform Delay (d), s/veh	39.3	0.0
Incr Delay (d2), s/veh	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0
LnGrp Delay(d),s/veh	39.3	0.0
LnGrp LOS	D	
Approach Vol, veh/h	144	
Approach Delay, s/veh	45.2	
Approach LOS	D	
Timer		

User approved ignoring U-Turning movement.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (veh/h)	2	207	612	10	10	550	102	30	11	10	1	191
Future Volume (veh/h)	2	207	612	10	10	550	102	30	11	10	1	191
Number		5	2	12	1	6	16	7	4	14		3
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0		0
Ped-Bike Adj(A_pbT)		1.00		0.98	1.00		0.98	1.00		1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Adj Sat Flow, veh/h/ln		1900	1881	1900	1900	1884	1900	1863	1900	1900		1900
Adj Flow Rate, veh/h		225	665	7	12	671	114	36	13	0		212
Adj No. of Lanes		1	2	1	1	2	0	1	1	0		1
Peak Hour Factor		0.92	0.92	0.92	0.82	0.82	0.82	0.84	0.84	0.84		0.90
Percent Heavy Veh, %		0	1	0	0	1	1	2	0	0		0
Cap, veh/h		248	2519	1112	15	1740	295	46	16	0		236
Arrive On Green		0.14	0.70	0.70	0.01	0.57	0.57	0.03	0.01	0.00		0.13
Sat Flow, veh/h		1810	3574	1577	1810	3051	518	1774	1900	0		1810
Grp Volume(v), veh/h		225	665	7	12	393	392	36	13	0		212
Grp Sat Flow(s),veh/h/ln		1810	1787	1577	1810	1790	1778	1774	1900	0		1810
Q Serve(g_s), s		16.5	9.1	0.2	0.9	16.3	16.4	2.7	0.9	0.0		15.6
Cycle Q Clear(g_c), s		16.5	9.1	0.2	0.9	16.3	16.4	2.7	0.9	0.0		15.6
Prop In Lane		1.00		1.00	1.00		0.29	1.00		0.00		1.00
Lane Grp Cap(c), veh/h		248	2519	1112	15	1021	1014	46	16	0		236
V/C Ratio(X)		0.91	0.26	0.01	0.82	0.39	0.39	0.78	0.80	0.00		0.90
Avail Cap(c_a), veh/h		252	2519	1112	74	1021	1014	177	317	0		295
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Upstream Filter(I)		0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.00	0.00		1.00
Uniform Delay (d), s/veh		57.4	7.2	5.9	66.9	16.0	16.0	65.4	66.8	0.0		57.8
Incr Delay (d2), s/veh		25.4	0.2	0.0	32.7	1.1	1.1	10.2	26.9	0.0		21.9
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
%ile BackOfQ(50%),veh/ln		10.0	4.5	0.1	0.6	8.4	8.4	1.5	0.6	0.0		9.2
LnGrp Delay(d),s/veh		82.8	7.4	5.9	99.5	17.1	17.1	75.5	93.7	0.0		79.7
LnGrp LOS		F	A	A	F	B	B	E	F			E
Approach Vol, veh/h			897			797			49			
Approach Delay, s/veh			26.3			18.3			80.4			
Approach LOS			C			B			F			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	101.1	22.6	5.7	23.7	83.0	9.0	19.3
Change Period (Y+Rc), s	4.5	6.0	5.0	4.5	* 5.2	6.0	5.5	4.5
Max Green Setting (Gmax), s	5.5	65.0	22.0	22.5	* 19	51.0	13.5	30.5
Max Q Clear Time (g_c+I1), s	2.9	11.1	17.6	2.9	18.5	18.4	4.7	3.2
Green Ext Time (p_c), s	0.0	15.9	0.0	0.0	0.0	13.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.4
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	10	266
Future Volume (veh/h)	10	266
Number	8	18
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.99
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1882	1900
Adj Flow Rate, veh/h	11	6
Adj No. of Lanes	1	0
Peak Hour Factor	0.90	0.90
Percent Heavy Veh, %	0	0
Cap, veh/h	125	68
Arrive On Green	0.11	0.11
Sat Flow, veh/h	1143	623
Grp Volume(v), veh/h	0	17
Grp Sat Flow(s),veh/h/ln	0	1766
Q Serve(g_s), s	0.0	1.2
Cycle Q Clear(g_c), s	0.0	1.2
Prop In Lane		0.35
Lane Grp Cap(c), veh/h	0	193
V/C Ratio(X)	0.00	0.09
Avail Cap(c_a), veh/h	0	399
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	54.1
Incr Delay (d2), s/veh	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6
LnGrp Delay(d),s/veh	0.0	54.1
LnGrp LOS		D
Approach Vol, veh/h	229	
Approach Delay, s/veh	77.8	
Approach LOS	E	
Timer		

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	371	120	180	412	123	90	46	170	147	43	60
Future Volume (veh/h)	72	371	120	180	412	123	90	46	170	147	43	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1895	1900	1900	1900	1900	1900	1900	1900	1881	1900	1900
Adj Flow Rate, veh/h	85	436	134	205	468	134	93	47	77	153	45	28
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.97	0.97	0.97	0.96	0.96	0.96
Percent Heavy Veh, %	5	0	0	0	0	0	0	0	0	1	0	0
Cap, veh/h	109	533	164	246	644	184	195	69	114	281	167	104
Arrive On Green	0.06	0.38	0.38	0.14	0.46	0.46	0.11	0.11	0.11	0.16	0.16	0.16
Sat Flow, veh/h	1723	1391	428	1810	1413	405	1810	645	1057	1792	1065	662
Grp Volume(v), veh/h	85	0	570	205	0	602	93	0	124	153	0	73
Grp Sat Flow(s),veh/h/ln	1723	0	1819	1810	0	1817	1810	0	1702	1792	0	1727
Q Serve(g_s), s	4.0	0.0	23.3	9.1	0.0	22.3	4.0	0.0	5.8	6.5	0.0	3.1
Cycle Q Clear(g_c), s	4.0	0.0	23.3	9.1	0.0	22.3	4.0	0.0	5.8	6.5	0.0	3.1
Prop In Lane	1.00		0.24	1.00		0.22	1.00		0.62	1.00		0.38
Lane Grp Cap(c), veh/h	109	0	696	246	0	828	195	0	183	281	0	271
V/C Ratio(X)	0.78	0.00	0.82	0.83	0.00	0.73	0.48	0.00	0.68	0.54	0.00	0.27
Avail Cap(c_a), veh/h	521	0	990	547	0	990	876	0	824	759	0	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.1	0.0	22.9	34.8	0.0	18.3	34.7	0.0	35.5	32.1	0.0	30.7
Incr Delay (d2), s/veh	4.4	0.0	3.7	2.8	0.0	2.5	2.3	0.0	5.4	2.0	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	12.3	4.7	0.0	11.6	2.1	0.0	3.0	3.4	0.0	1.5
LnGrp Delay(d),s/veh	42.6	0.0	26.7	37.6	0.0	20.8	36.9	0.0	40.8	34.2	0.0	31.3
LnGrp LOS	D		C	D		C	D		D	C		C
Approach Vol, veh/h		655			807			217			226	
Approach Delay, s/veh		28.7			25.1			39.2			33.3	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.7	37.6		17.2	8.7	43.6		13.1
Change Period (Y+Rc), s	3.5	* 6		* 4.2	3.5	6.0		4.2
Max Green Setting (Gmax), s	25.0	* 45		* 35	25.0	45.0		40.0
Max Q Clear Time (g_c+I1), s	11.1	25.3		8.5	6.0	24.3		7.8
Green Ext Time (p_c), s	0.2	6.4		1.1	0.1	6.5		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	83.9
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	7	341	236	162	0	28	189	19	0	218	115	55
Future Vol, veh/h	7	341	236	162	0	28	189	19	0	218	115	55
Peak Hour Factor	0.90	0.90	0.90	0.90	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	3	2	0	0	0	2	1	0	0
Mvmt Flow	8	379	262	180	0	31	212	21	0	245	129	62
Number of Lanes	0	1	1	1	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	3	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	67.6	37.3	35.8
HCM LOS	F	E	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	68%	0%	100%	0%	0%	91%	0%	29%
Vol Right, %	0%	32%	0%	0%	100%	0%	9%	0%	71%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	218	170	348	236	162	28	208	18	430
LT Vol	218	0	348	0	0	28	0	18	0
Through Vol	0	115	0	236	0	0	189	0	124
RT Vol	0	55	0	0	162	0	19	0	306
Lane Flow Rate	245	191	387	262	180	31	234	19	462
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.747	0.543	1.093	0.705	0.449	0.101	0.714	0.06	1.31
Departure Headway (Hd)	12.014	11.231	11.145	10.618	9.881	12.707	12.104	11.507	10.484
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	304	323	329	344	367	284	301	313	351
Service Time	9.714	8.931	8.845	8.318	7.581	10.407	9.804	9.207	8.184
HCM Lane V/C Ratio	0.806	0.591	1.176	0.762	0.49	0.109	0.777	0.061	1.316
HCM Control Delay	43.1	26.5	111.7	35.1	20.4	16.8	40.1	14.9	188
HCM Lane LOS	E	D	F	E	C	C	E	B	F
HCM 95th-tile Q	5.6	3.1	13.5	5.1	2.2	0.3	5.1	0.2	21.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	18	124	306
Future Vol, veh/h	0	18	124	306
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	0	1	0
Mvmt Flow	0	19	133	329
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	181
HCM LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	588	0	290	80	894	0	0	317	130
Future Volume (veh/h)	0	0	0	588	0	290	80	894	0	0	317	130
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				653	0	203	86	961	0	0	364	16
Adj No. of Lanes				2	0	1	1	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.93	0.93	0.93	0.87	0.87	0.87
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				842	0	375	224	1618	0	0	788	351
Arrive On Green				0.23	0.00	0.23	0.12	0.45	0.00	0.00	0.22	0.22
Sat Flow, veh/h				3619	0	1611	1810	3705	0	0	3705	1608
Grp Volume(v), veh/h				653	0	203	86	961	0	0	364	16
Grp Sat Flow(s),veh/h/ln				1810	0	1611	1810	1805	0	0	1805	1608
Q Serve(g_s), s				6.7	0.0	4.4	1.7	7.9	0.0	0.0	3.5	0.3
Cycle Q Clear(g_c), s				6.7	0.0	4.4	1.7	7.9	0.0	0.0	3.5	0.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				842	0	375	224	1618	0	0	788	351
V/C Ratio(X)				0.78	0.00	0.54	0.38	0.59	0.00	0.00	0.46	0.05
Avail Cap(c_a), veh/h				2749	0	1224	1146	4571	0	0	4571	2035
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				14.2	0.0	13.3	15.9	8.2	0.0	0.0	13.4	12.2
Incr Delay (d2), s/veh				0.6	0.0	0.5	0.4	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.3	0.0	2.0	0.9	3.9	0.0	0.0	1.7	0.1
LnGrp Delay(d),s/veh				14.8	0.0	13.8	16.3	8.3	0.0	0.0	13.6	12.2
LnGrp LOS				B		B	B	A			B	B
Approach Vol, veh/h					856			1047			380	
Approach Delay, s/veh					14.5			9.0			13.5	
Approach LOS					B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		24.5			9.1	15.4		15.0
Change Period (Y+Rc), s		6.8			* 4.2	6.8		5.8
Max Green Setting (Gmax), s		50.0			* 25	50.0		30.0
Max Q Clear Time (g_c+I1), s		9.9			3.7	5.5		8.7
Green Ext Time (p_c), s		3.2			0.1	3.2		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	325	60	234	649	775	130
Future Volume (veh/h)	325	60	234	649	775	130
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	365	12	254	705	816	39
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.89	0.89	0.92	0.92	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	604	269	569	2053	1150	513
Arrive On Green	0.17	0.17	0.16	0.57	0.32	0.32
Sat Flow, veh/h	3619	1615	3510	3705	3705	1610
Grp Volume(v), veh/h	365	12	254	705	816	39
Grp Sat Flow(s),veh/h/ln	1810	1615	1755	1805	1805	1610
Q Serve(g_s), s	4.5	0.3	3.1	5.0	9.5	0.8
Cycle Q Clear(g_c), s	4.5	0.3	3.1	5.0	9.5	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	604	269	569	2053	1150	513
V/C Ratio(X)	0.60	0.04	0.45	0.34	0.71	0.08
Avail Cap(c_a), veh/h	1899	847	2210	3789	3789	1690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	16.7	18.0	5.5	14.3	11.3
Incr Delay (d2), s/veh	0.4	0.0	0.2	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.3	1.5	2.5	4.7	0.4
LnGrp Delay(d),s/veh	18.8	16.7	18.2	5.5	14.6	11.4
LnGrp LOS	B	B	B	A	B	B
Approach Vol, veh/h	377			959	855	
Approach Delay, s/veh	18.7			8.9	14.5	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		33.9		13.7	11.9	22.0		
Change Period (Y+Rc), s		6.8		5.8	* 4.2	6.8		
Max Green Setting (Gmax), s		50.0		25.0	* 30	50.0		
Max Q Clear Time (g_c+I1), s		7.0		6.5	5.1	11.5		
Green Ext Time (p_c), s		3.7		0.6	0.4	3.7		

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Notes

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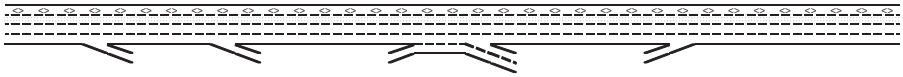
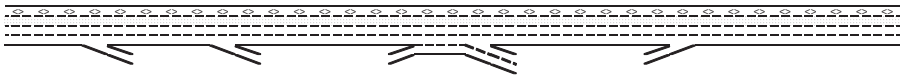
Project: EDH Town Center Apartments EIR **Alternative:** Near Term Plus Project Conditions
Freeway Corridor: Eastbound US 50 **Time Period:** AM Peak Hour



Key
<> Express Lane (HOV)
No Trucks

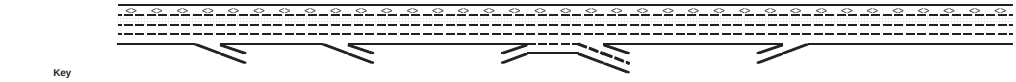
Location	1	2	3	4	5	6	7
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	2,550	1,470	1,350	1,350	1,592	1,592	2,142
On Ramp Volume				352		550	
Off Ramp Volume	1,080	120		110			
Express Lane Volume	128	74	68	68	80	80	107
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	2,423	1,397	1,283	1,635	1,512	2,062	2,035
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.980	0.980	0.980	0.980	0.980	0.980	0.862
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	2,840	1,637	1,504	1,916	1,773	2,418	2,713
GP Flow (pcphpl)	947	546	501	479	591	806	904
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.40	0.23	0.21	0.20	0.25	0.34	0.38
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	14.6	8.4	7.7	7.4	9.1	12.4	13.9
LOS	B	A	A	A	A	B	B
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				1,530		1,811	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.22		0.26	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	1,655	1,506		1,796			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.23	0.21		0.25			

Location	1	2	3	4	5	6	7



Key
<> Express Lane (HOV)
No Trucks

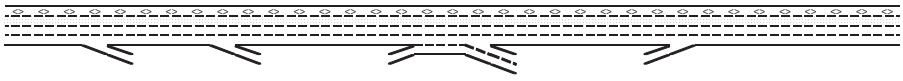
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	128	74	68	68	80	80	107
PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	165	95	87	87	103	103	150
EL Flow (pcphpl)	165	95	87	87	103	103	150
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.09	0.05	0.05	0.05	0.06	0.06	0.09
Calculate On Ramp Flow Rate							
On Volume (vph)				352		550	
PHF				0.92		0.92	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				2.0%		3.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.990		0.985	
f_P				1.00		1.00	
On Flow (pcph)				386		607	
On Flow (pcphpl)				386		607	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.18		0.32	



Key
<> Express Lane (HOV)
No Trucks

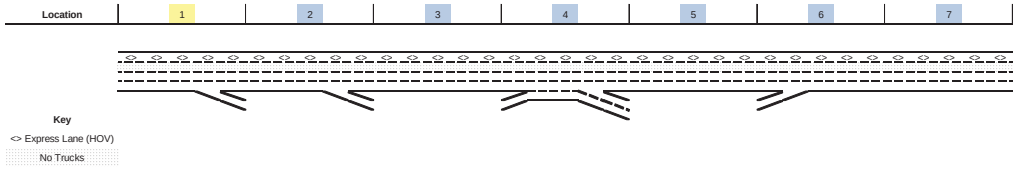
Location	1	2	3	4	5	6	7
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Off Ramp Flow Rate							
Off Volume (vph)	1,080	120		110			
PHF	0.92	0.92		0.94			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	2.0%	2.0%		5.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.990	0.990		0.976			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	1,186	132		120			
Off Flow (pcphpl)	1,186	132		60			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.56	0.07		0.03			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		1,186					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	132	386				299	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						1,811	
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						1,773	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.589						
P_{FM}						0.593	
v_{12} (pcph)						1,074	
v_3 (pcph)						737	
v_{34} (pcph)							
v_{12a} (pcph)						1,074	
v_{R12a} (pcph)						1,681	
Merge Speed Index						0.31	
Merge Area Speed						57.8	
Outer Lanes Volume						737	
Outer Lanes Speed						64.1	
Segment Speed						59.6	
Merge v/c ratio						0.37	
Merge Density						14.9	
Merge LOS						B	

Location	1	2	3	4	5	6	7



Key
<> Express Lane (HOV)
No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	2,840	1,637					
Up Ramp L_{EQ}		12,019					
Down Ramp L_{EQ}	212	368					
P_{FD} (Eqn 13-9)	0.634	0.713					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.576						
P_{FD}	0.634	0.713					
v_{12} (pcph)	2,235	1,205					
v_3 (pcph)	605	432					
v_{34} (pcph)							
v_{12a} (pcph)	2,235	1,205					
Diverge Speed Index	0.40	0.57					
Diverge Area Speed	55.7	51.9					
Outer Lanes Volume	605	432					
Outer Lanes Speed	71.3	71.3					
Segment Speed	58.4	55.9					
Diverge v/c ratio	0.51	0.27					
Diverge Density	22.1	13.3					
Diverge LOS	C	B					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				70			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				3.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.983			
f_P				1.00			
On to Off Flow (pcph)				82			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				282			
PHF				0.92			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				2.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.990			
f_P				1.00			
On to ML Flow (pcph)				309			
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				40			
PHF				0.94			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				5.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.976			
f_P				1.00			
ML to Off Flow (pcph)				43			



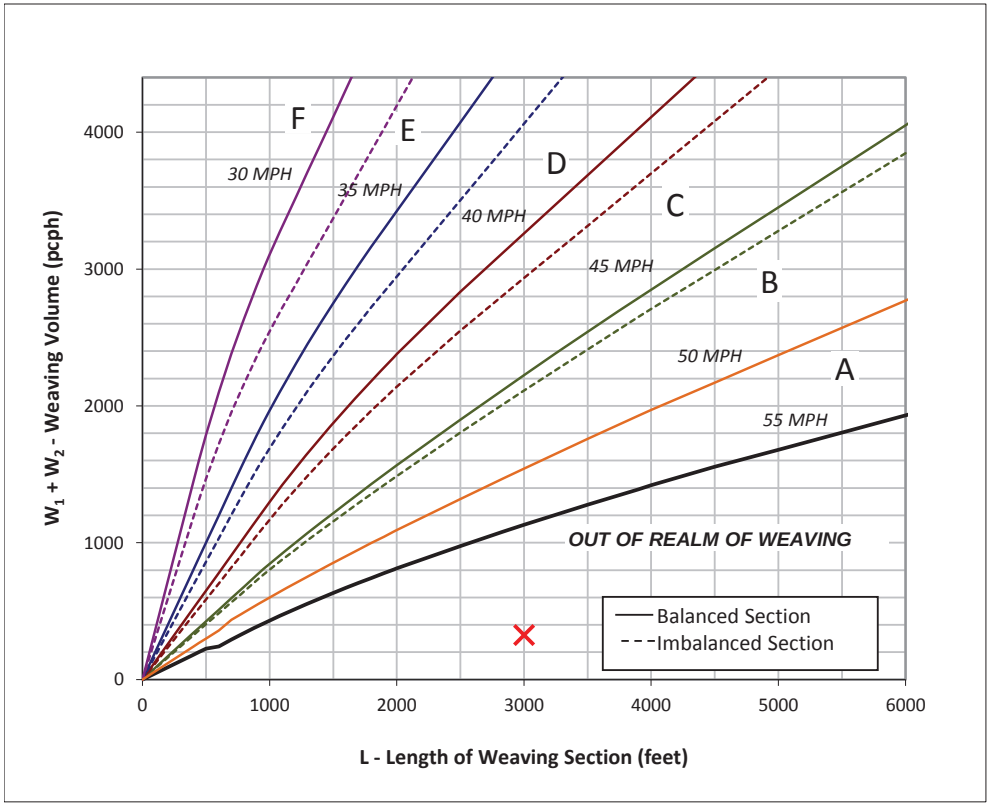
Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				1,243			
PHF				0.87			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				4.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.980			
f_P				1.00			
GP to GP Flow (pcph)				1,457			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				352			
Non-Weave Flow				1,540			
Segment Flow				1,892			
Max Weave Length				4,396			
Length Check				OK			
Ideal Weave Capacity				2,167			
f_{HV}				0.982			
f_P				0.998			
Capacity Condition 1				6,373			
Capacity Condition 2				12,634			
Weave v/c ratio				0.29			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				309			
Weave LC Rate				943			
Non-Weave LC Rate 1				823			
Non-Weave LC Rate 2				2,032			
Non-Weave LC Rate 3				-449			
Segment LC Rate				1,766			
Weave Intensity Factor				0.205			
Weave Speed				56.5			
Non-Weave Speed				59.7			
Segment Speed				59.1			
Weave Density				10.7			
Weave LOS				B			
Summarize Segment Operations							
Segment v/c ratio	0.51	0.27	0.21	0.29	0.25	0.37	0.38
Segment Density	22.1	13.3	7.7	10.7	9.1	14.9	13.9
Segment LOS	C	B	A	B	A	B	B
Over Capacity							

Leisch Method for Weaving Analysis

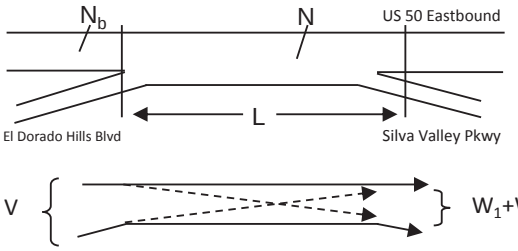
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near Term Plus Project AM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	1,702	Volume (vph)*	282	Volume (vph)*	40
Truck Percentage	4%	Truck Percentage	2%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	1,736	Volume (pcph)	284	Volume (pcph)	41



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

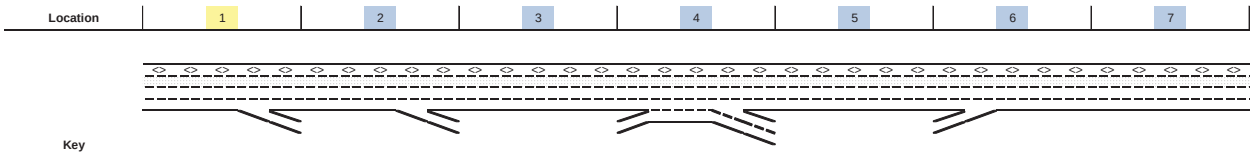
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Near Term Plus Project Conditions
Freeway Corridor: Eastbound US 50 **Time Period:** PM Peak Hour



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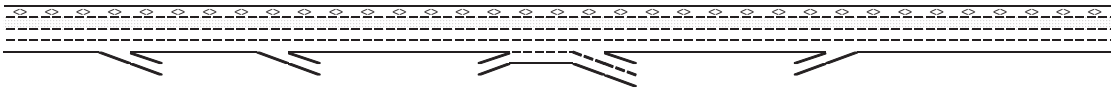
Define Freeway Segment							
Type	Diverge	Diverge	Basic	Weave	Basic	Merge	Basic
Length (ft)	1,500	850	1,975	3,000	1,575	1,500	2,925
Accel Length						550	
Decel Length	150	150					
Mainline Volume	4,360	3,518	3,038	3,038	3,479	3,479	3,843
On Ramp Volume				831		364	
Off Ramp Volume	842	480		390			
Express Lane Volume	480	387	334	334	383	383	423
EL On Ramp Volume							
EL Off Ramp Volume							
Calculate Flow Rate in General Purpose Lanes (GP)							
GP Volume (vph)	3,880	3,131	2,704	3,535	3,096	3,460	3,420
PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
GP Lanes	3	3	3	4	3	3	3
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	6.0
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.952
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	4,020	3,244	2,801	3,662	3,208	3,585	3,702
GP Flow (pcphpl)	1,340	1,081	934	916	1,069	1,195	1,234
Calculate Speed in General Purpose Lanes							
Lane Width (ft)	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6
TRD	3.0	3.0	3.0	3.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in General Purpose Lanes							
v/c ratio	0.57	0.46	0.40	0.39	0.46	0.51	0.53
Speed (mph)	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Density (pcphpl)	20.6	16.6	14.4	14.1	16.5	18.4	19.0
LOS	C	B	B	B	B	C	C
Calculate Operations for Entering GP Lanes							
GP_{IN} Vol (pcph)				2,801		3,104	
GP_{IN} Cap (pcph)				7,050		7,050	
GP_{IN} v/c ratio				0.40		0.44	
Calculate Operations for Exiting GP Lanes							
GP_{OUT} Vol (pcph)	3,148	2,747		3,224			
GP_{OUT} Cap (pcph)	7,050	7,050		7,050			
GP_{OUT} v/c ratio	0.45	0.39		0.46			

Location	1	2	3	4	5	6	7



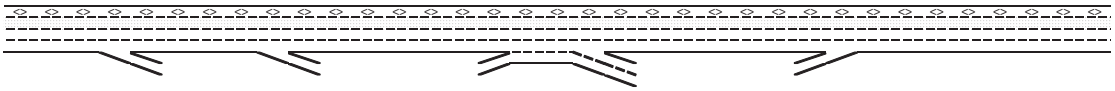
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Flow Rate in Express Lanes (EL)							
EL Volume (vph)	480	387	334	334	383	383	423
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1
Terrain	Level	Level	Level	Level	Level	Level	Grade
Grade %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%
Grade Length (mi)	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	5.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	6.0
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.917
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	538	434	375	375	429	429	512
EL Flow (pcphpl)	538	434	375	375	429	429	512
Calculate Speed in Express Lanes							
Lane Width (ft)							
Shoulder Width							
TRD							
f_{LW}							
f_{LC}							
Calc'd FFS							
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65
Calculate Operations in Express Lanes							
EL_{IN} v/c ratio	0.31	0.25	0.21	0.21	0.25	0.25	0.29
Calculate On Ramp Flow Rate							
On Volume (vph)				831		364	
PHF				0.97		0.76	
Total Lanes				1		1	
Terrain				Level		Level	
Grade %				0.0%		0.0%	
Grade Length (mi)				0.00		0.00	
Truck & Bus %				1.0%		1.0%	
RV %				0.0%		0.0%	
E_T				1.5		1.5	
E_R				1.2		1.2	
f_{HV}				0.995		0.995	
f_P				1.00		1.00	
On Flow (pcph)				861		481	
On Flow (pcphpl)				861		481	
Calculate On Ramp Roadway Operations							
On Ramp Type				Right		Right	
On Ramp Speed (mph)				45		25	
On Ramp Cap (pcph)				2,100		1,900	
On Ramp v/c ratio				0.41		0.25	

Location	1	2	3	4	5	6	7



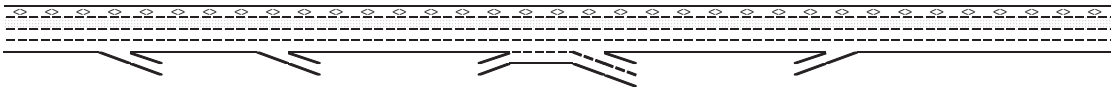
Key

<> Express Lane (HOV)

No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Off Ramp Flow Rate							
Off Volume (vph)	842	480		390			
PHF	0.97	0.97		0.89			
Total Lanes	1	1		2			
Terrain	Level	Level		Level			
Grade %	0.0%	0.0%		0.0%			
Grade Length (mi)	0.00	0.00		0.00			
Truck & Bus %	1.0%	1.0%		0.0%			
RV %	0.0%	0.0%		0.0%			
E_T	1.5	1.5		1.5			
E_R	1.2	1.2		1.2			
f_{HV}	0.995	0.995		1.000			
f_P	1.00	1.00		1.00			
Off Flow (pcph)	872	497		438			
Off Flow (pcphpl)	872	497		219			
Calculate Off Ramp Roadway Operations							
Off Ramp Type	Right	Right		Right			
Off Ramp Speed	45	25		45			
Off Ramp Cap (pcph)	2,100	1,900		4,200			
Off Ramp v/c ratio	0.42	0.26		0.10			
Determine Adjacent Ramp for Three-Lane Mainline Segments with One-Lane Ramps							
Up Type		Off				No	
Up Distance		2,350					
Up Flow (pcph)		872					
Down Type	Off	On				On	
Down Distance	850	1,975				3,600	
Down Flow (pcph)	497	861				158	
Calculate Merge Influence Area Operations							
Effective v_P (pcph)						3,104	
Up Ramp L_{EQ}							
Down Ramp L_{EQ}						939	
P_{FM} (Eqn 13-3)						0.593	
P_{FM} (Eqn 13-4)		#VALUE!					
P_{FM} (Eqn 13-5)	0.702						
P_{FM}						0.593	
v_{12} (pcph)						1,840	
v_3 (pcph)						1,264	
v_{34} (pcph)							
v_{12a} (pcph)						1,840	
v_{R12a} (pcph)						2,322	
Merge Speed Index						0.33	
Merge Area Speed						57.3	
Outer Lanes Volume						1,264	
Outer Lanes Speed						62.3	
Segment Speed						59.0	
Merge v/c ratio						0.50	
Merge Density						19.9	
Merge LOS						B	

Location	1	2	3	4	5	6	7



Key

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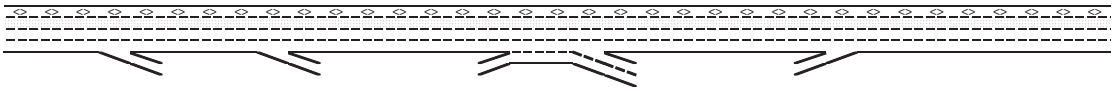
No Trucks

Name	Latrobe Rd off-ramp	El Dorado Hills Blvd off-ramp	El Dorado Hills Blvd off to on-ramp	El Dorado Hills Blvd to Silva Valley Pkwy	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy on-ramp (loop)	Silva Valley Pkwy to Bass Lake Rd
Calculate Diverge Influence Area Operations							
Effective v_P (pcph)	4,020	3,244					
Up Ramp L_{EQ}		8,091					
Down Ramp L_{EQ}	711	998					
P_{FD} (Eqn 13-9)	0.619	0.656					
P_{FD} (Eqn 13-10)							
P_{FD} (Eqn 13-11)	0.605						
P_{FD}	0.619	0.656					
v_{12} (pcph)	2,822	2,299					
v_3 (pcph)	1,198	945					
v_{34} (pcph)							
v_{12a} (pcph)	2,822	2,299					
Diverge Speed Index	0.38	0.60					
Diverge Area Speed	56.3	51.1					
Outer Lanes Volume	1,198	945					
Outer Lanes Speed	70.5	71.3					
Segment Speed	59.9	55.7					
Diverge v/c ratio	0.64	0.52					
Diverge Density	27.2	22.7					
Diverge LOS	C	C					
Calculate On Ramp to Off Ramp Flow Rate for Weave Segments							
On to Off Volume (vph)				155			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.5%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.998			
f_P				1.00			
On to Off Flow (pcph)				161			
Calculate On Ramp to Mainline Flow Rate for Weave Segments							
On to ML Volume (vph)				676			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
On to ML Flow (pcph)				700			
Calculate Mainline to Off Ramp Flow Rate for Weave Segments							
ML to Off Volume (vph)				235			
PHF				0.89			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				0.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				1.000			
f_P				1.00			
ML to Off Flow (pcph)				264			

Location	1	2	3	4	5	6	7



Key

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No Trucks

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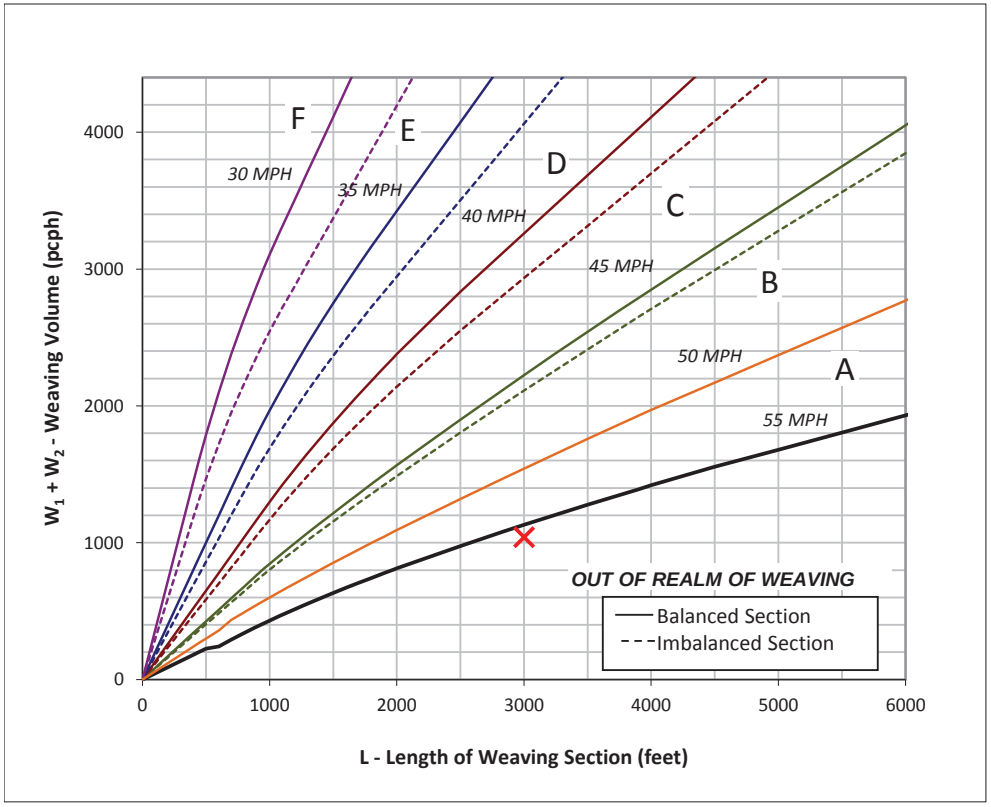
Calculate General Purpose Lanes to General Purpose Lanes Flow Rate for Weave Segments							
GP to GP Volume (vph)				2,469			
PHF				0.97			
Terrain				Level			
Grade %				0.0%			
Grade Length (mi)				0.00			
Truck & Bus %				1.0%			
RV %				0.0%			
E_T				1.5			
E_R				1.2			
f_{HV}				0.995			
f_P				1.00			
GP to GP Flow (pcph)				2,558			
Calculate Weave Segment Operations							
Weave Type				One-sided			
Weave Length				2,000			
Segment Lanes				3			
Weave Lanes				2			
Weave Flow (pcph)				964			
Non-Weave Flow				2,719			
Segment Flow				3,682			
Max Weave Length				5,176			
Length Check				OK			
Ideal Weave Capacity				2,107			
f_{HV}				0.995			
f_P				0.999			
Capacity Condition 1				6,287			
Capacity Condition 2				9,122			
Weave v/c ratio				0.58			
Interchange Density				2			
Lane Changes On to ML				1			
Lane Changes ML to Off				0			
Lane Changes On to Off				0			
Min Lane Change Rate				700			
Weave LC Rate				1,334			
Non-Weave LC Rate 1				1,066			
Non-Weave LC Rate 2				2,295			
Non-Weave LC Rate 3				665			
Segment LC Rate				2,400			
Weave Intensity Factor				0.261			
Weave Speed				54.7			
Non-Weave Speed				54.1			
Segment Speed				54.2			
Weave Density				22.6			
Weave LOS				C			
Summarize Segment Operations							
Segment v/c ratio	0.64	0.52	0.40	0.58	0.46	0.50	0.53
Segment Density	27.2	22.7	14.4	22.6	16.5	19.9	19.0
Segment LOS	C	C	B	C	B	B	C
Over Capacity							

Leisch Method for Weaving Analysis

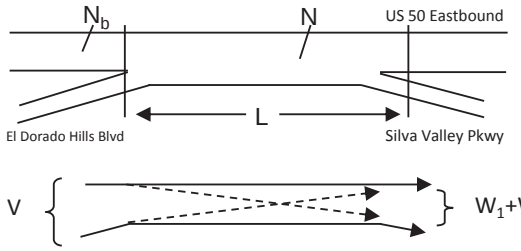
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	3,000

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near Term Plus Project PM Peak Hour
Freeway	US 50 Eastbound
On-ramp	El Dorado Hills Blvd
Off-ramp	Silva Valley Pkwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,869	Volume (vph)*	740	Volume (vph)*	299
Truck Percentage	1%	Truck Percentage	1%	Truck Percentage	0%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,888	Volume (pcph)	743	Volume (pcph)	299



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   If optional exit lane, then "Y". Otherwise "N".
2. In the chart to the left, which two speed curves is the red "x" between?
   55 MPH and **-**
   If left of the 30 MPH curve, LOS is F. Select "-".
   If below the 55 MPH curve, out of the realm of weaving.
3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

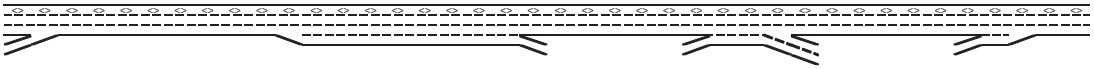
* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Near Term Plus Project Conditions
Freeway Corridor: Westbound US 50 **Time Period:** AM Peak Hour

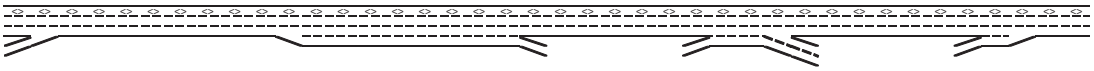
Data Entry Value
Calculated Value

Location	7	8	9	10	11	12	13	14



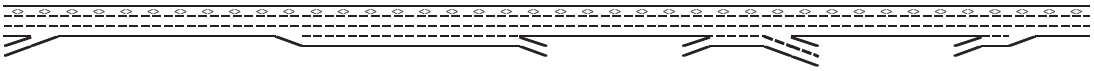
Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segment								
Type	Merge	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	1,500	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length	375							880
Decel Length				1,500				
Mainline Volume	3,140	3,920	3,920	3,920	3,317	3,317	3,277	3,277
On Ramp Volume	780					570		1,239
Off Ramp Volume				603		610		
Express Lane Volume	345	431	431	431	365	365	360	360
EL On Ramp Volume								
EL Off Ramp Volume								
Calculate Flow Rate in G								
GP Volume (vph)	3,575	3,489	3,489	3,489	2,952	3,522	2,917	4,156
PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
GP Lanes	2	2	3	3	2	3	2	2
Terrain	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
f_p	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	3,822	3,730	3,730	3,730	3,156	3,766	3,118	4,443
GP Flow (pcphpl)	1,911	1,865	1,243	1,243	1,578	1,255	1,559	2,221
Calculate Speed in Gene								
Lane Width (ft)	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	67.3	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in								
v/c ratio	0.81	0.79	0.53	0.53	0.67	0.53	0.66	0.95
Speed (mph)	61.3	61.9	65.0	65.0	64.6	65.0	64.6	55.4
Density (pcphpl)	31.2	30.1	19.1	19.1	24.4	19.3	24.1	40.1
LOS	D	D	C	C	C	C	C	E
Calculate Operations fo								
GP_{IN} Vol (pcph)	2,937		3,730			3,153		3,083
GP_{IN} Cap (pcph)	4,700		4,700			4,700		4,700
GP_{IN} v/c ratio	0.62		0.79			0.67		0.66
Calculate Operations fo								
GP_{OUT} Vol (pcph)				3,030		3,096		
GP_{OUT} Cap (pcph)				4,700		4,700		
GP_{OUT} v/c ratio				0.64		0.66		



Key
<> Express Lane (HOV)
No Trucks

Location	7	8	9	10	11	12	13	14
Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Flow Rate in E								
EL Volume (vph)	345	431	431	431	365	365	360	360
PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Express Lanes	1	1	1	1	1	1	1	1
Terrain	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	392	489	489	489	414	414	409	409
EL Flow (pcphpl)	392	489	489	489	414	414	409	409
Calculate Speed in Expr								
Lane Width (ft)								
Shoulder Width								
TRD								
f_{LW}								
f_{LC}								
Calc'd FFS								
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in								
EL_{IN} v/c ratio	0.22	0.28	0.28	0.28	0.24	0.24	0.23	0.23
Calculate On Ramp Flow								
On Volume (vph)	780					570		1,239
PHF	0.89					0.93		0.92
Total Lanes	1					1		1
Terrain	Level					Level		Level
Grade %	0.0%					0.0%		0.0%
Grade Length (mi)	0.00					0.00		0.00
Truck & Bus %	2.0%					0.0%		2.0%
RV %	0.0%					0.0%		0.0%
E_T	1.5					1.5		1.5
E_R	1.2					1.2		1.2
f_{HV}	0.990					1.000		0.990
f_P	1.00					1.00		1.00
On Flow (pcph)	885					613		1,360
On Flow (pcphpl)	885					613		1,360
Calculate On Ramp Roa								
On Ramp Type	Right					Right		Right
On Ramp Speed (mph)	45					45		45
On Ramp Cap (pcph)	2,100					2,100		2,100
On Ramp v/c ratio	0.42					0.29		0.65



Key
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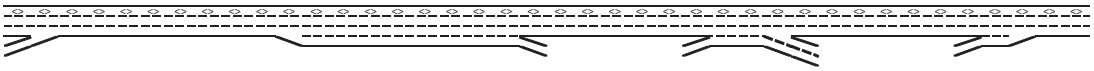
No Trucks

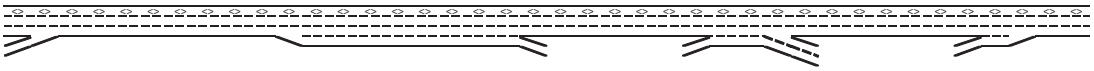
Location	7	8	9	10	11	12	13	14
Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Off Ramp Flow								
Off Volume (vph)				603		610		
PHF				0.87		0.92		
Total Lanes				1		2		
Terrain				Level		Level		
Grade %				0.0%		0.0%		
Grade Length (mi)				0.00		0.00		
Truck & Bus %				2.0%		2.0%		
RV %				0.0%		0.0%		
E_T				1.5		1.5		
E_R				1.2		1.2		
f_{HV}				0.990		0.990		
f_p				1.00		1.00		
Off Flow (pcph)				700		670		
Off Flow (pcphpl)				700		335		
Calculate Off Ramp Roa								
Off Ramp Type				Right		Right		
Off Ramp Speed				45		25		
Off Ramp Cap (pcph)				2,100		3,800		
Off Ramp v/c ratio				0.33		0.18		
Determine Adjacent Ran								
Up Type				On		Off		
Up Distance				5,200		2,550		
Up Flow (pcph)				885		700		
Down Type				On		No		
Down Distance				1,500				
Down Flow (pcph)				1,360				
Calculate Merge Influen								
Effective v_p (pcph)	2,937							3,083
Up Ramp L_{EQ}								
Down Ramp L_{EQ}								
P_{FM} (Eqn 13-3)	0.588							0.602
P_{FM} (Eqn 13-4)						#VALUE!		
P_{FM} (Eqn 13-5)								
P_{FM}	1.000							1.000
v_{12} (pcph)	2,937							3,083
v_3 (pcph)								
v_{34} (pcph)								
v_{12a} (pcph)	2,937							3,083
v_{R12a} (pcph)	3,822							4,443
Merge Speed Index	0.47							0.57
Merge Area Speed	54.3							51.8
Outer Lanes Volume								
Outer Lanes Speed								
Segment Speed	54.3							51.8
Merge v/c ratio	0.83							0.97
Merge Density	32.5							34.0
Merge LOS	D							D



Key
<> Express Lane (HOV)
No Trucks

Location	7	8	9	10	11	12	13	14
Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Diverge Influe								
Effective v_p (pcph)				3,730				
Up Ramp L_{EQ}				8,545				
Down Ramp L_{EQ}				1,761				
P_{FD} (Eqn 13-9)				0.635				
P_{FD} (Eqn 13-10)				0.674				
P_{FD} (Eqn 13-11)								
P_{FD}				0.674				
v_{12} (pcph)				2,743				
v_3 (pcph)				987				
v_{34} (pcph)								
v_{12a} (pcph)				2,743				
Diverge Speed Index				0.36				
Diverge Area Speed				56.7				
Outer Lanes Volume				987				
Outer Lanes Speed				71.3				
Segment Speed				59.9				
Diverge v/c ratio				0.62				
Diverge Density				14.3				
Diverge LOS				B				
Calculate On Ramp to O								
On to Off Volume (vph)						107		
PHF						0.94		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						1.0%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						0.995		
f_p						1.00		
On to Off Flow (pcph)						114		
Calculate On Ramp to M								
On to ML Volume (vph)						463		
PHF						0.93		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						0.0%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						1.000		
f_p						1.00		
On to ML Flow (pcph)						498		
Calculate Mainline to Of								
ML to Off Volume (vph)						503		
PHF						0.92		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						2.0%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						0.990		
f_p						1.00		
ML to Off Flow (pcph)						553		
Calculate General Purp								
GP to GP Volume (vph)						2,449		
PHF						0.94		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						1.0%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						0.995		
f_p						1.00		
GP to GP Flow (pcph)						2,618		

Location	7	8	9	10	11	12	13	14



Key

<> Express Lane (HOV)

No Trucks

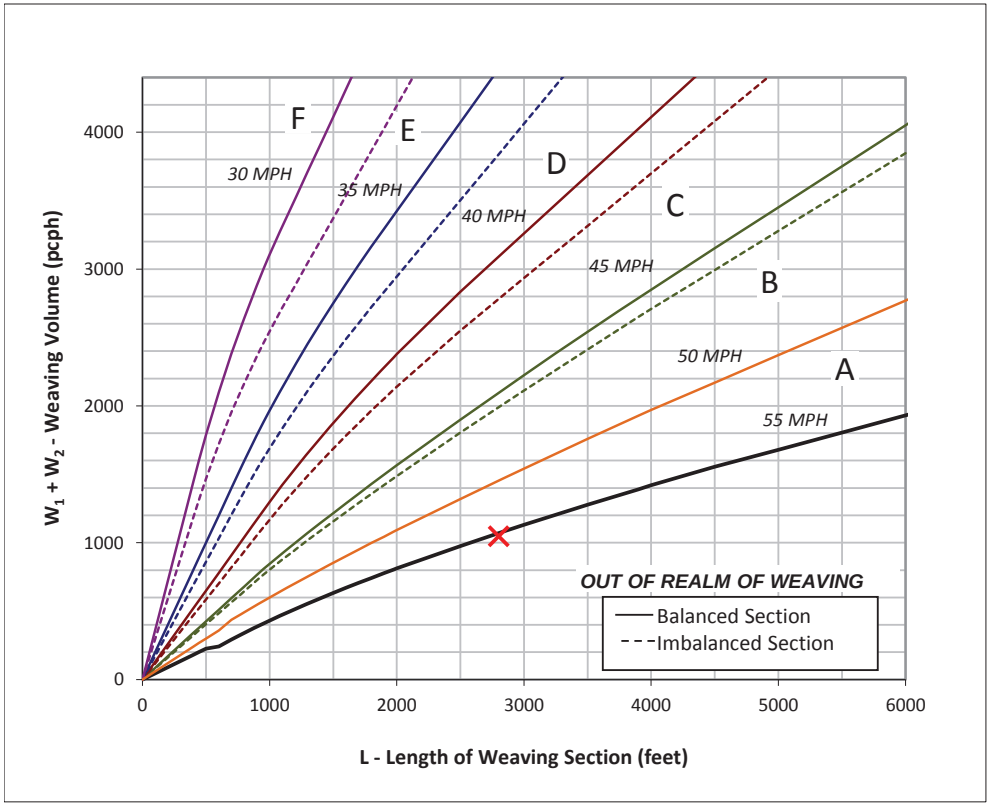
Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Weave Segme								
Weave Type						One-sided		
Weave Length						1,800		
Segment Lanes						2		
Weave Lanes						2		
Weave Flow (pcph)						1,051		
Non-Weave Flow						2,732		
Segment Flow						3,783		
Max Weave Length						5,347		
Length Check						OK		
Ideal Weave Capacity						2,079		
f_{HV}						0.995		
f_p						1.000		
Capacity Condition 1						4,136		
Capacity Condition 2						8,595		
Weave v/c ratio						0.91		
Interchange Density						1		
Lane Changes On to ML						1		
Lane Changes ML to Off						0		
Lane Changes On to Off						0		
Min Lane Change Rate						498		
Weave LC Rate						1,153		
Non-Weave LC Rate 1						1,153		
Non-Weave LC Rate 2						2,298		
Non-Weave LC Rate 3						-271		
Segment LC Rate						2,306		
Weave Intensity Factor						0.275		
Weave Speed						54.2		
Non-Weave Speed						52.3		
Segment Speed						52.8		
Weave Density						35.8		
Weave LOS						E		
Summarize Segment Op								
Segment v/c ratio	0.83	0.79	0.53	0.62	0.67	0.91	0.66	0.97
Segment Density	32.5	30.1	19.1	14.3	24.4	35.8	24.1	34.0
Segment LOS	D	D	C	B	C	E	C	D
Over Capacity								

Leisch Method for Weaving Analysis

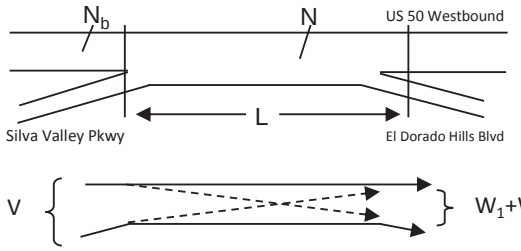
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near Term Plus Project AM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,887	Volume (vph)*	502	Volume (vph)*	542
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,926	Volume (pcph)	502	Volume (pcph)	547



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

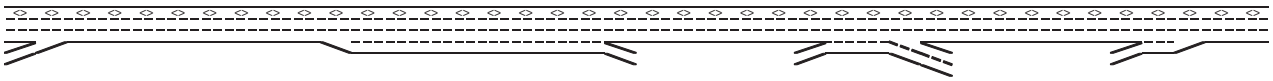
* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Project: EDH Town Center Apartments EIR **Alternative:** Near Term Plus Project Conditions
Freeway Corridor: Westbound US 50 **Time Period:** PM Peak Hour

Data Entry Value
Calculated Value

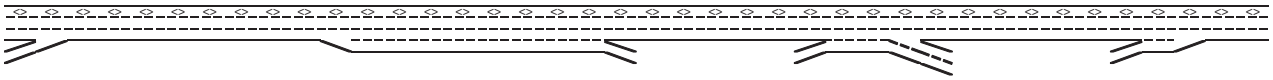
Location	7	8	9	10	11	12	13	14



Key
<> Express Lane (HOV)
No Trucks

Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Define Freeway Segmer								
Type	Merge	Basic	Basic	Diverge	Basic	Weave	Basic	Merge
Length (ft)	1,500	1,700	500	1,500	2,550	2,800	2,300	1,500
Accel Length	375							880
Decel Length				1,500				
Mainline Volume	2,810	3,150	3,150	3,150	2,282	2,282	2,160	2,160
On Ramp Volume	340					210		1,046
Off Ramp Volume				868		332		
Express Lane Volume	225	252	252	252	183	183	173	173
EL On Ramp Volume								
EL Off Ramp Volume								
Calculate Flow Rate in G								
GP Volume (vph)	2,925	2,898	2,898	2,898	2,099	2,309	1,987	3,033
PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
GP Lanes	2	2	3	3	2	3	2	2
Terrain	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GP Flow (pcph)	3,078	3,049	3,049	3,049	2,209	2,430	2,091	3,191
GP Flow (pcphpl)	1,539	1,524	1,016	1,016	1,104	810	1,045	1,596
Calculate Speed in Gen								
Lane Width (ft)	12	12	12	12	12	12	12	12
Shoulder Width	>6	>6	>6	>6	>6	>6	>6	>6
TRD	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0
f_{LW}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
f_{LC}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calc'd FFS	69.6	69.6	69.6	69.6	69.6	69.6	67.3	67.3
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in								
v/c ratio	0.65	0.65	0.43	0.43	0.47	0.34	0.44	0.68
Speed (mph)	64.7	64.8	65.0	65.0	65.0	65.0	65.0	64.5
Density (pcphpl)	23.8	23.5	15.6	15.6	17.0	12.5	16.1	24.8
LOS	C	C	B	B	B	B	B	C
Calculate Operations fo								
GP_{IN} Vol (pcph)	2,720		3,049			2,196		2,107
GP_{IN} Cap (pcph)	4,700		4,700			4,700		4,700
GP_{IN} v/c ratio	0.58		0.65			0.47		0.45
Calculate Operations fo								
GP_{OUT} Vol (pcph)				2,084		2,086		
GP_{OUT} Cap (pcph)				4,700		4,700		
GP_{OUT} v/c ratio				0.44		0.44		

Location	7	8	9	10	11	12	13	14

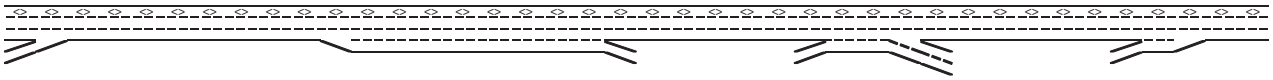


Key

<> Express Lane (HOV)

No Trucks

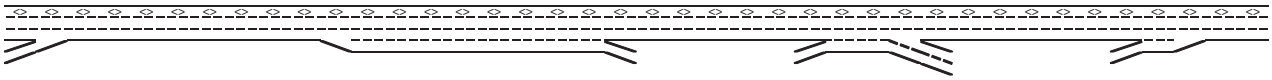
Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Flow Rate in E								
EL Volume (vph)	225	252	252	252	183	183	173	173
PHF	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Express Lanes	1	1	1	1	1	1	1	1
Terrain	Level	Grade	Level	Level	Level	Level	Level	Level
Grade %	0.0%	-7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grade Length (mi)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Truck & Bus %	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
RV %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
E_T	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
E_R	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
f_{HV}	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
f_P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EL Flow (pcph)	252	283	283	283	205	205	194	194
EL Flow (pcphpl)	252	283	283	283	205	205	194	194
Calculate Speed in Expr								
Lane Width (ft)								
Shoulder Width								
TRD								
f_{LW}								
f_{LC}								
Calc'd FFS								
Measured FFS	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
FFS	65	65	65	65	65	65	65	65
Calculate Operations in								
EL_{IN} v/c ratio	0.14	0.16	0.16	0.16	0.12	0.12	0.11	0.11
Calculate On Ramp Flow								
On Volume (vph)	340					210		1,046
PHF	0.96					0.9		0.97
Total Lanes	1					1		1
Terrain	Level					Level		Level
Grade %	0.0%					0.0%		0.0%
Grade Length (mi)	0.00					0.00		0.00
Truck & Bus %	2.0%					0.0%		1.0%
RV %	0.0%					0.0%		0.0%
E_T	1.5					1.5		1.5
E_R	1.2					1.2		1.2
f_{HV}	0.990					1.000		0.995
f_P	1.00					1.00		1.00
On Flow (pcph)	358					233		1,084
On Flow (pcphpl)	358					233		1,084
Calculate On Ramp Roa								
On Ramp Type	Right					Right		Right
On Ramp Speed (mph)	45					45		45
On Ramp Cap (pcph)	2,100					2,100		2,100
On Ramp v/c ratio	0.17					0.11		0.52



Key
<> Express Lane (HOV)
No Trucks

Location	7	8	9	10	11	12	13	14
Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Off Ramp Flo								
Off Volume (vph)				868		332		
PHF				0.9		0.97		
Total Lanes				1		2		
Terrain				Level		Level		
Grade %				0.0%		0.0%		
Grade Length (mi)				0.00		0.00		
Truck & Bus %				0.0%		1.0%		
RV %				0.0%		0.0%		
E_T				1.5		1.5		
E_R				1.2		1.2		
f_{HV}				1.000		0.995		
f_P				1.00		1.00		
Off Flow (pcph)				964		344		
Off Flow (pcphpl)				964		172		
Calculate Off Ramp Roa								
Off Ramp Type				Right		Right		
Off Ramp Speed				45		25		
Off Ramp Cap (pcph)				2,100		3,800		
Off Ramp v/c ratio				0.46		0.09		
Determine Adjacent Ra								
Up Type				On		Off		
Up Distance				5,200		2,550		
Up Flow (pcph)				358		964		
Down Type				On		No		
Down Distance				1,500				
Down Flow (pcph)				1,084				
Calculate Merge Influen								
Effective v_P (pcph)	2,720							2,107
Up Ramp L_{EQ}								
Down Ramp L_{EQ}								
P_{FM} (Eqn 13-3)	0.588							0.602
P_{FM} (Eqn 13-4)						#VALUE!		
P_{FM} (Eqn 13-5)								
P_{FM}	1.000							1.000
v_{12} (pcph)	2,720							2,107
v_3 (pcph)								
v_{34} (pcph)								
v_{12a} (pcph)	2,720							2,107
v_{R12a} (pcph)	3,078							3,191
Merge Speed Index	0.37							0.34
Merge Area Speed	56.4							57.3
Outer Lanes Volume								
Outer Lanes Speed								
Segment Speed	56.4							57.3
Merge v/c ratio	0.67							0.69
Merge Density	27.0							24.4
Merge LOS	C							C

Location	7	8	9	10	11	12	13	14



Key

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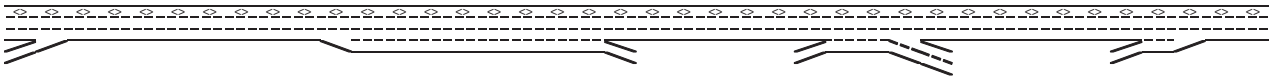
No Trucks

Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate Diverge Influe								
Effective v_P (pcph)				3,049				
Up Ramp L_{EQ}				5,274				
Down Ramp L_{EQ}				1,556				
P_{FD} (Eqn 13-9)				0.639				
P_{FD} (Eqn 13-10)				0.640				
P_{FD} (Eqn 13-11)								
P_{FD}				0.640				
v_{12} (pcph)				2,298				
v_3 (pcph)				751				
v_{34} (pcph)								
v_{12a} (pcph)				2,298				
Diverge Speed Index				0.38				
Diverge Area Speed				56.1				
Outer Lanes Volume				751				
Outer Lanes Speed				71.3				
Segment Speed				59.3				
Diverge v/c ratio				0.52				
Diverge Density				10.5				
Diverge LOS				B				
Calculate On Ramp to C								
On to Off Volume (vph)						88		
PHF						0.96		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						0.5%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						0.998		
f_P						1.00		
On to Off Flow (pcph)						91		
Calculate On Ramp to M								
On to ML Volume (vph)						122		
PHF						0.9		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						0.0%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						1.000		
f_P						1.00		
On to ML Flow (pcph)						136		
Calculate Mainline to O								
ML to Off Volume (vph)						244		
PHF						0.97		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						1.0%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						0.995		
f_P						1.00		
ML to Off Flow (pcph)						253		

Location	7	8	9	10	11	12	13	14



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No Trucks

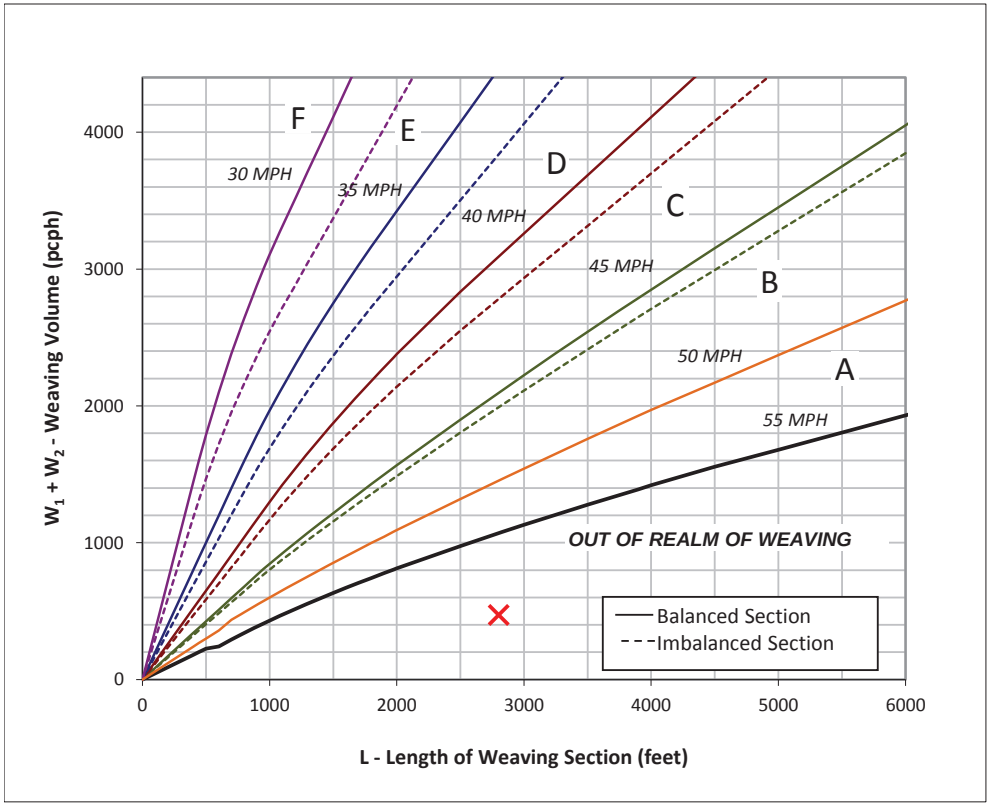
Name	Bass Lake Rd on-ramp	Bass Lake Rd to lane add	Lane add to Silva Valley Pkwy	Silva Valley Pkwy off-ramp	Silva Valley Pkwy off to on-ramp	Silva Valley Pkwy to El Dorado Hills Blvd	El Dorado Hills Blvd off to on	El Dorado Hilld Blvd on-ramp
Calculate General Purpo								
GP to GP Volume (vph)						1,855		
PHF						0.96		
Terrain						Level		
Grade %						0.0%		
Grade Length (mi)						0.00		
Truck & Bus %						2.0%		
RV %						0.0%		
E_T						1.5		
E_R						1.2		
f_{HV}						0.990		
f_P						1.00		
GP to GP Flow (pcph)						1,952		
Calculate Weave Segme								
Weave Type						One-sided		
Weave Length						1,800		
Segment Lanes						2		
Weave Lanes						2		
Weave Flow (pcph)						389		
Non-Weave Flow						2,043		
Segment Flow						2,432		
Max Weave Length						4,132		
Length Check						OK		
Ideal Weave Capacity						2,172		
f_{HV}						0.991		
f_P						1.000		
Capacity Condition 1						4,306		
Capacity Condition 2						14,868		
Weave v/c ratio						0.56		
Interchange Density						2		
Lane Changes On to ML						1		
Lane Changes ML to Off						0		
Lane Changes On to Off						0		
Min Lane Change Rate						136		
Weave LC Rate						773		
Non-Weave LC Rate 1						1,011		
Non-Weave LC Rate 2						2,145		
Non-Weave LC Rate 3						27		
Segment LC Rate						1,784		
Weave Intensity Factor						0.224		
Weave Speed						55.8		
Non-Weave Speed						58.2		
Segment Speed						57.8		
Weave Density						21.0		
Weave LOS						C		
Summarize Segment Op								
Segment v/c ratio	0.67	0.65	0.43	0.52	0.47	0.56	0.44	0.69
Segment Density	27.0	23.5	15.6	10.5	17.0	21.0	16.1	24.4
Segment LOS	C	C	B	B	B	C	B	C
Over Capacity								

Leisch Method for Weaving Analysis

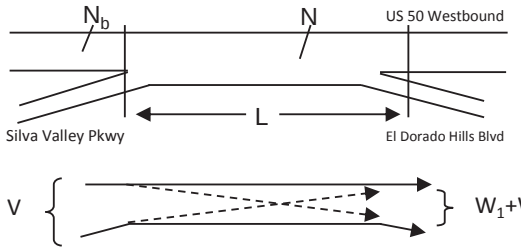
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	2
Length of Weaving Section (feet)	L	2,800

Project Information	
Project	EDH Town Center Apartments EIR
Scenario	Near Term Plus Project PM Peak Hour
Freeway	US 50 Westbound
On-ramp	Silva Valley Pkwy
Off-ramp	El Dorado Hills Blvd

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,492	Volume (vph)*	174	Volume (vph)*	296
Truck Percentage	2%	Truck Percentage	0%	Truck Percentage	1%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	2,517	Volume (pcph)	174	Volume (pcph)	298



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**

   If optional exit lane, then "Y". Otherwise "N".

2. In the chart to the left, which two speed curves is the red "x" between?

   55 MPH and **-**

   If left of the 30 MPH curve, LOS is F. Select "-".

   If below the 55 MPH curve, out of the realm of weaving.

3. Interpolated Weaving Speed (S_w, mph) **-**
4. Weaving Intensity Factor (k) **-**
5. Service Volume (SV, pcph)

   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **-**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	351	353	100.6%	68.5	26.4	E
	Through	709	726	102.4%	13.3	2.0	B
	Right Turn	30	31	102.0%	7.6	3.9	A
	Subtotal	1,090	1,110	101.8%	30.2	8.9	C
SB	Left Turn	110	111	100.5%	82.4	17.5	F
	Through	1,347	1,393	103.4%	53.2	23.8	D
	Right Turn	300	308	102.5%	48.4	25.3	D
	Subtotal	1,757	1,812	103.1%	54.2	23.6	D
EB	Left Turn	70	77	110.3%	97.6	34.6	F
	Through	70	74	105.4%	137.4	48.0	F
	Right Turn	21	22	106.2%	20.1	18.9	C
	Subtotal	161	173	107.6%	105.0	41.7	F
WB	Left Turn	20	18	90.0%	47.2	14.8	D
	Through	50	55	109.8%	51.8	8.9	D
	Right Turn	50	54	108.0%	22.9	7.6	C
	Subtotal	120	127	105.8%	38.2	6.7	D
Total		3,128	3,222	103.0%	47.8	15.2	D

Intersection 1 **El Dorado Hills Blvd/Saratoga Wy-Park Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	227	228	100.4%	67.6	12.2	E
	Through	1,300	1,288	99.1%	32.9	2.1	C
	Right Turn	71	75	105.2%	28.8	4.7	C
	Subtotal	1,598	1,591	99.6%	38.0	3.4	D
SB	Left Turn	150	154	102.6%	88.6	32.8	F
	Through	907	915	100.9%	41.2	9.7	D
	Right Turn	80	80	99.6%	17.7	6.3	B
	Subtotal	1,137	1,149	101.0%	46.4	13.1	D
EB	Left Turn	240	233	97.2%	71.9	35.1	E
	Through	100	97	97.2%	80.4	38.1	F
	Right Turn	461	464	100.7%	43.7	33.5	D
	Subtotal	801	795	99.2%	56.7	34.4	E
WB	Left Turn	61	60	98.5%	41.0	8.4	D
	Through	90	91	101.0%	65.0	27.6	E
	Right Turn	260	264	101.7%	48.7	28.4	D
	Subtotal	411	415	101.1%	51.2	24.2	D
Total		3,947	3,950	100.1%	45.8	9.3	D