

Appendix TRA

Transportation Impact Assessment

Memorandum

Date: August 26, 2020
To: Darcy Kremin, Rincon Consultants, Inc.
From: Ashlee Takushi and Ian Barnes, PE, Fehr & Peers
Subject: **Summary of Transportation Assessment for Sonoma Housing Rezone Project**

WC20-3682

Introduction and Background

Fehr & Peers has completed a transportation assessment of the Sonoma County Housing Rezone project, which aims to modify zoning at 59 Potential Sites throughout the unincorporated area of Sonoma County. The modifications to zoning allow for additional housing units to be developed beyond those currently envisioned as part of the County's adopted General Plan; accordingly, the effects of these additional housing units on the transportation system are required to be analyzed at a programmatic level. The assessment is comprised of two parts:

- An analysis of total home-based residential vehicle-miles traveled (VMT) per resident, as required by the California Environmental Quality Act (CEQA)
- An informational analysis of the program's projected effects on operations at select intersections in the County's circulation system (this analysis is not subject to CEQA per CEQA Guidelines Section 21099(b)(2))

The near-term baseline conditions (i.e. Existing Conditions) referred to in this assessment reflect conditions that prevailed prior to the COVID-19 pandemic which substantially affected transportation conditions within the study area during the spring and summer of 2020. The VMT data, traffic counts and other data used within the evaluation were collected prior to the pandemic. Subsequent forecasts of future conditions are based off models and predictions which do not account for the current, or potential on-going, effects that the pandemic may have on transportation demand. As the predominant effects of the pandemic have been an overall decrease in travel activity within the study area, this assessment likely provides a conservative estimate of transportation conditions.

The remainder of this memorandum outlines the assumptions, methods and outcomes of the analyses described.



CEQA Vehicle-Miles Traveled Analysis

Senate Bill 743 (Steinberg, 2013) instructed the State Office of Planning and Research (OPR) to update the CEQA Guidelines to remove congestion-based analysis (such as Level of Service analysis) from CEQA Transportation analysis, and to install a new metric (vehicle-miles traveled, or VMT). The intent of SB 743 was to encourage infill development, promote healthier communities through active transportation (e.g. walking and bicycling), and align CEQA Transportation analysis to aid California in meeting greenhouse gas reduction targets set by other pieces of legislation (i.e. AB 32). Ultimately, SB 743 has shifted CEQA transportation analysis from measuring the effects on a project on drivers, to measuring the environmental effects of driving generated by a project. Adopted in December 2018, Section 15064.3 of the CEQA Guidelines notes that vehicle-miles traveled (VMT) is the most appropriate metric for the analysis of impacts in the Transportation section of CEQA analysis.

VMT measures the amount of driving that a project generates. For example, a project generating 100 total (inbound and outbound) vehicle trips per day that travel an average of 5.0 miles per trip results in 500 project-generated VMT per day. VMT has historically been used in CEQA as an input for the Air Quality and Greenhouse Gas sections, but VMT can also show how efficient the connection between the transportation system and existing or proposed land uses is. For the purposes of analyzing the CEQA Transportation impacts of residential projects, the VMT generated by the project is converted to an efficiency metric by dividing the amount of VMT generated by the number of residents; efficiency metrics are used in CEQA Transportation VMT analysis because the goal of the analysis is to show whether or not a particular development will generate low enough VMT to aid the State in meeting its climate targets relative to projected growth in population, employment, etc.

The State Office of Planning and Research (OPR) has provided guidance in its *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018) as to how the analysis of VMT could be performed and what CEQA thresholds of significance could be applied. The guidance in the *Technical Advisory* is non-binding; however, County staff have given direction that the metrics, methods and thresholds provided in the *Technical Advisory* should be used in the analysis. Based on this direction from the County in its capacity as a lead agency for CEQA purposes, the VMT analysis of the proposed program includes the following approach:

- Metric: Total weekday home-based VMT per resident
- Method: Sonoma County Transportation Authority (SCTA) countywide travel demand model



- Threshold: 15 percent below regional baseline (nine-county Bay Area) total weekday home-based VMT per resident¹
- Analysis Scenario: Impacts evaluated against the near-term baseline (i.e. a Cumulative analysis is not required)

The summer 2020 version of the SCTA model has been refined to reflect a Year 2015 base year as well as to incorporate “Big Data” trip length estimates at the model gateways. The incorporation of Big Data trip length estimates provides a more precise understanding of the length of trips that occur beyond the County boundary, thus alleviating the trip length truncation issues associated with earlier versions of the model. New housing units were modeled assuming that 90 percent of the units would take the characteristics of multifamily housing, while the remaining 10 percent of the units would take the characteristics of single-family housing. These assumptions, while conservative, did not materially affect the outcomes of the VMT analysis (described further in this memorandum).

Based on data from MTC Travel Model One, the baseline value of the nine-county Bay Area average total home-based VMT per resident is 15.3. A threshold of 15 percent below this value is 13.0. The analysis is performed at the near-term baseline level; a Cumulative scenario analysis is also provided. Year 2015 conditions (as reflected in the SCTA and MTC models) was used as the baseline year because (1) the 2015 horizon year reflects conditions before the 2017 and 2019 Sonoma County wildfires and ongoing recovery effects, and (2) the 2015 horizon year reflects conditions before the COVID-19 pandemic, which has substantially altered transportation conditions in Sonoma County. Given that travel characteristics (i.e. trip lengths) in 2015 and 2016 are likely to be substantially similar as there were no major transportation network improvements nor major changes in the prevailing economic activity pattern, the Year 2015 horizon year is the most appropriate baseline year given current travel demand model information and the typical practice of avoiding the defining of baseline transportation conditions for periods when factors outside of economic activity or transportation network changes result in major disruptions to typical transportation conditions.

Potential Screening Opportunities

VMT screening is a process related to reviewing the location and operating parameters of land use projects and programs to determine if a project or program does not need to perform a VMT analysis because it is presumed to generate a low amount of VMT. The *Technical Advisory* provides a number of potential screening criteria, including:

¹ The *Technical Advisory* notes that for land use projects or programs located in the unincorporated areas of a county that is included in an MPO region, the threshold should be based on (1) the region (i.e. MPO) VMT per capita or (2) the aggregate population-weighted VMT per capita of all incorporated cities and towns in the region (i.e. MPO).



- Development in a low VMT generating area per the SCTA travel model (relative to suggested CEQA impact criteria presented in the *Technical Advisory*)
- Development located within a 0.5 mile walkshed of an existing major transit stop or existing stop along a high-quality transit corridor
- Development in infill locations that are (1) 100 percent affordable and (2) in an area where a jobs/housing imbalance exists such that the infill development would promote shorter commute trips
- Small developments that generate or attract fewer than 110 trips per day (about 17 residential units in suburban areas)

All Potential Sites under consideration do not meet the transit proximity or low VMT generating area definitions. Depending on the conditions placed on the Potential Sites, some sites may qualify for the affordable infill housing exemption, and some sites may be sufficiently small that they do not generate more than 110 trips per day. Based on the proposed zoning changes, it is anticipated that the following parcels would generate less than 110 trips per day if they were to be built out at the density proposed under the Program: GLE-2, LAR-4, PEN-1, and PEN-3. Projects on these sites may be exempted from required mitigation if a significant VMT impact is found (discussed later in this document).

Given the programmatic effort envisioned as part of the project, it was assumed that all Potential Sites would be incorporated into the analysis, including those that are small enough to potentially meet the small development screening criteria discussed above. Entitlements for development on sites rezoned as part of the program may then tier off of this transportation assessment and the EIR for the program as a whole.

Program-Level VMT Analysis

Home-based VMT per resident data from the July 2020 version of the SCTA model (the most recent available version) were output for the Base Year (Year 2015), Base Year plus Program, Cumulative (Year 2040), and Cumulative plus Program scenarios. Data from program-affected traffic analysis zones (TAZs) in the model were considered as part of the analysis. The results of the analysis are presented below in **Table 1**.

Table 1: Home-Based Residential VMT per Resident Analysis

Scenario	Program TAZs	Threshold Value	Impact?
	Total Home-Based VMT per Resident		
Base Year (Year 2015)	16.4	N/A	N/A
Base Year + Program	16.0	13.0	Yes
Cumulative (Year 2040)	14.8	N/A	N/A
Cumulative + Program	14.8	13.0	Yes

Source: Fehr & Peers, July 2020.



As noted in **Table 1**, the program's effect on VMT in the affected TAZs is a small decrease in average total home-based VMT per resident. However, the resulting value of 16.0 is greater than the threshold value of 13.0, and thus the program would result in a **significant impact**. It is noted that the net change VMT value for the "new" housing units was about 14.7, which is above the threshold value. The Cumulative scenario analysis showed a minor reduction in total home-based VMT per resident (less than 0.1); if Cumulative scenario analysis is considered to be part of the CEQA analysis, then it would also be considered a **significant impact**.

Mitigation Measures

Based on the results in **Table 1**, mitigation measures, if feasible, would need to reduce program TAZ VMT per resident by 3.0 VMT per resident, which represents a reduction of about 18.8 percent below the Base Year plus Program value of 16.0 VMT per resident. If mitigation measures were to be designed to reduce solely the net increment of change in VMT per resident (13.0), this 1.7 VMT per resident reduction represents an 11.5 percent reduction in the Base Year plus Program value of 14.7.

Transportation Demand Management (TDM) strategies work best when they are applied at a city or regional scale and when the travel characteristics of the users or tenants of a site are known. The proposed program aims to rezone 59 Potential Sites in 11 distinct subareas throughout Sonoma County, and the timeline for construction of the housing units envisioned as part of this program is unknown. Because of the large-scale geographic spread of the Potential Sites, and uncertainty regarding the buildout of the Potential Sites, the County should consider implementing a TDM ordinance or other TDM-related policies as part of the next General Plan update.

Additionally, the effectiveness of TDM measures for land use projects in unincorporated areas of Sonoma County is difficult to quantify as the literature documenting the effectiveness of land use project-level TDM strategies are generally related to suburban and urban areas, not unincorporated areas. Studies² show the maximum VMT reduction that can be expected for projects located within suburban settings in California ranges from 5 to 10 percent. The requirement to reduce daily VMT and vehicle trips by 11.5 percent (depending on the calculation method chosen) exceeds the range of trip reduction for communities similar to Sonoma County. However, while the level of VMT reduction associated with TDM measures are unlikely to mitigate the program's impact to a less-than-significant level, CEQA requires that feasible mitigation measures be implemented to reduce a project or program's level of impact.

² *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*, California Air Pollution Control Officers Association, August, 2010, page 55.



Mitigation Measure 1: TDM Program. Prior to issuance of building permits, project applicants shall develop a TDM program for the proposed project, including any anticipated phasing, and shall submit the TDM Program to the County Department of Transportation and Public Works for review and approval. The TDM Program shall identify trip reduction strategies as well as mechanisms for funding and overseeing the delivery of trip reduction programs and strategies. The TDM Program shall be designed to achieve the following trip reduction, as required to meet thresholds identified by OPR:

- Reduce daily VMT and vehicle trips, as forecast for the project, by 11.5 percent.

Trip reduction strategies may include, but are not limited to, the following:

1. Provision of bus stop improvements or on-site mobility hubs
2. Pedestrian improvements, on-site or off-site, to connect to nearby transit stops, services, schools, shops, etc.
3. Bicycle programs including bike purchase incentives, storage, maintenance programs, and on-site education program
4. Enhancements to countywide bicycle network
5. Parking reductions and/or fees set at levels sufficient to incentivize transit, active transportation, or shared modes
6. Cash allowances, passes, or other public transit subsidies and purchase incentives
7. Enhancements to bus service
8. Implementation of shuttle service
9. Establishment of carpool, buspool, or vanpool programs
10. Vanpool purchase incentives
11. Low emission vehicle purchase incentives/subsidies
12. Compliance with a future County VMT/TDM ordinance
13. Participation in a future County VMT fee program
14. Participate in future VMT exchange or mitigation bank programs

Development at Potential Sites GLE-2, LAR-4, PEN-1 and PEN-3 may be exempt from the development of a TDM program as the weekday trip generation for these developments would be less than 110 trips per weekday under the Program. As the above TDM strategies are heavily dependent on context, a matrix detailing which TDM strategies may be most effective when taking in account local contexts (by Potential Site group) has been included as **Table 2** (presented on page 8).

The VMT forecasts presented in this assessment do not take into consideration some foreseeable travel changes, including increased use of transportation network companies, such as Uber and



Lyft, nor the potential for autonomous vehicles. Although the technology for autonomous vehicles is expected to be available over the planning horizon, the federal and State legal and policy frameworks are uncertain. Initial modeling of an autonomous future indicates that with automated and connected vehicles, the capacity of the existing transportation system would increase as vehicles can travel closer together; however, these efficiencies are only realized when a high percentage of vehicles on the roadway are automated and connected. There is also the potential for vehicle travel to increase with zero-occupancy vehicles on the roadway. Additionally, the VMT forecasts are based on a model that was developed using data reflecting travel conditions before COVID-19; the effects of COVID-19 may be a near-term suppression in travel activity on the basis of reduced economic output and permanently modified travel habits.

However, a TDM program would likely not result in the 11.5 percent or 18.8 percent reductions required, and thus the impact is **significant and unavoidable**.



Table 2: Potential Effectiveness of TDM Strategies by Potential Site Group

TDM Strategy	AGU	FOR	GEY	GLE	GRA	GUE	LAR	PEN	PET	SAN	SON
1. Provision of bus stop improvements or on-site mobility hubs	M	M	M	M	M	H	H	H	L	H	H
2. Pedestrian improvements, on-site or off-site, to connect to nearby transit stops, services, schools, shops, etc.	M	H	H	M	M	H	H	H	M	H	H
3. Bicycle programs including bike purchase incentives, storage, maintenance programs, and on-site education program	M	H	H	M	M	H	H	M	M	H	M
4. Enhancements to countywide bicycle network	M	M	M	M	M	M	H	M	M	H	M
5. Parking reductions and/or fees set at levels sufficient to incentivize transit, active transportation, or shared modes	H	H	H	H	H	H	H	H	H	H	H
6. Cash allowances, passes, or other public transit subsidies and purchase incentives	H	H	H	H	H	H	H	H	M	H	H
7. Enhancements to bus service	H	H	H	H	H	H	H	H	M	H	H
8. Implementation of shuttle service	M	H	M	M	M	H	H	H	H	H	H
9. Establishment of carpool, buspool, or vanpool programs	M	M	M	M	M	H	H	H	M	H	H
10. Vanpool purchase incentives	L	L	L	L	L	M	H	M	L	H	M
11. Low emission vehicle purchase incentives/subsidies	H	H	H	H	H	H	H	H	H	H	H
12. Compliance with a future County VMT/TDM ordinance	H	H	H	H	H	H	H	H	H	H	H
13. Participation in a future County VMT fee program	H	H	H	H	H	H	H	H	H	H	H
14. Participate in future VMT exchange or mitigation bank programs	H	H	H	H	H	H	H	H	H	H	H

Notes:

Potential effectiveness ratings: L = low, M = medium, H = high

Based on CAPCOA research, global maximum VMT reduction using all TDM measures for projects in rural and suburban contexts is 5-10 percent

Potential effectiveness of strategies based on Potential Site Group density, access to transit, and nearby destinations within walking or bicycling distance

Source: Fehr & Peers, July 2020.



Informational (Non-CEQA) Intersection Operations Analysis

Intersection operations analysis was performed at 20 intersections throughout Sonoma County located near the 59 Potential Sites. The 20 intersections, their locations within Sonoma County, and nearby Potential Sites are presented in **Table 3**.

Table 3: Study Intersections

No.	Intersection	Intersection Control ¹	Area of County	Adjacent/Nearby Potential Sites
1	Geyserville Ave/Canyon Rd	AWSC	Geyserville	GEY-1 through GEY-4
2	River Rd (SR 116)/Armstrong Woods Rd-First St	Signal	Guerneville ^C	GUE-1 through GUE-4
3	River Rd/Gravenstein Hwy (SR 116)	Signal	Guerneville ^C	GUE-1 through GUE-4
4	Old Redwood Hwy/Fulton Rd	SSSC	Larkfield/Wikiup	LAR-1 through LAR-8
5	Airport Blvd/Fulton Rd	Signal	Larkfield/Wikiup	LAR-1 through LAR-8
6	Old Redwood Hwy/Airport Blvd	Signal	Larkfield/Wikiup	LAR-1 through LAR-8
7	Old Redwood Hwy/Faught Rd	SSSC	Larkfield/Wikiup	LAR-1 through LAR-8
8	Old Redwood Hwy/Wikiup Dr-Mark West Commons Cir	Signal	Larkfield/Wikiup	LAR-1 through LAR-8
9	Front St (SR 116)/Mirabel Rd	SSSC	Forestville ^C	FOR-1 through FOR-6 GUE-1 through GUE-4 ²
10	Gravenstein Hwy (SR 116)/Graton Rd-Frei Rd	Signal	Graton ^C	GRA-1 through GRA-5
11	Todd Rd/Moorland Ave	SSSC	South Santa Rosa	SAN-1 through SAN-10
12	Todd Rd/South Moorland Ave/US 101 Southbound Ramps	Signal	South Santa Rosa ^C	SAN-1 through SAN-10
13	Todd Rd/Todd Rd Overcrossing	Signal	South Santa Rosa ^C	SAN-1 through SAN-10
14	Todd Rd/Santa Rosa Ave	Signal	South Santa Rosa	SAN-1 through SAN-10
15	Arnold Dr/Warm Springs Rd	AWSC	Glen Ellen	GLE-1 and GLE-2
16	Verano Ave/Riverside Dr	SSSC	Agua Caliente	AGU-1 through AGU-3
17	Adobe Rd/Petaluma Hill Rd-Main St	Signal	Penngrove	PEN-1 through PEN-9
18	Old Redwood Hwy/Main St	Signal	Penngrove	PEN-1 through PEN-9
19	Bodega Ave/Paula Ln	SSSC	Petaluma	PET-1 through PET-4
20	Broadway (SR 12)/Leveroni Rd-Napa Rd	Signal	Sonoma ^C	SON-1 through SON-4

Notes:

1. AWSC = All-Way Stop-Controlled, SSSC= Side-Street Stop-Controlled

2. Potential Sites GUE-1 through GUE-4 also contribute a substantial number of AM and PM peak hour trips to this intersection.

^C indicates a Caltrans intersection

Source: Fehr & Peers, July 2020.



Analysis Methods, Parameters and Substantial Effect Criteria

Intersection operations analysis was performed for Existing, Existing plus Program, Cumulative (Year 2040), and Cumulative plus Program Conditions. Year 2040 forecasts were developed using outputs from the SCTA travel demand model, and program-generated traffic volumes were estimated using the outputs from the Base Year (without program) and Base Year plus Program SCTA model runs. Cumulative scenario analysis was performed assuming no changes to intersection configurations or signal timings in order to assess whether they would contribute to projected operations deficiencies related to the County's Level of Service (LOS) D operations policy, and whether projects resulting from the program should contribute funds to previously-identified improvements at intersections that are projected to operate deficiently before the implementation of the program.

The analysis was performed for the weekday AM and PM peak hours, consistent with the County's *Guidelines for Traffic Impact Studies*, which use intersection LOS as a basis for measuring the operating conditions of intersections. The *Highway Capacity Manual, 6th Edition* was used as the methodology for the analysis. Delay and LOS definitions are provided in **Attachment A**. The following criteria were used in the analysis to identify substantial operations effects. Intersection improvement measures have been identified in cases where the program would result in substantial intersection operations effects.

Signalized Intersections

A substantial operation effect would occur if:

- For intersections operating acceptably before the addition of program-generated traffic (LOS D or better): The addition of program-generated traffic results in operations degrading from LOS A, B, C, or D to LOS E or F.
- For intersections operating unacceptably before the addition of program-generated traffic (LOS E or LOS F): The addition of program-generated traffic results in an increase in average delay of 5.0 seconds or more.

Stop-Controlled Intersections

A substantial operation effect would occur if:

- For intersections operating acceptably before the addition of program-generated traffic (LOS D or better): The addition of program-generated traffic results in operations degrading from LOS A, B, C, or D to LOS E or F, and the Peak Hour Signal Warrant is met.
- For side-street stop-controlled intersections operating unacceptably before the addition of program-generated traffic (LOS E or LOS F): The addition of program-generated traffic results in an increase in delay on the worst movement or approach of 5.0 seconds or more, and the Peak Hour Signal Warrant is met.



- For all-way stop-controlled intersections operating unacceptably before the addition of program-generated traffic (LOS E or LOS F): The addition of program-generated traffic results in an increase in average delay of 5.0 seconds or more, and the Peak Hour Signal Warrant is met.

Near-Term (Existing and Existing plus Program) Conditions Analysis

This section presents the results of the near-term operations analysis, comprised of Existing Conditions and Existing plus Program Conditions. Because the of the long-term nature of the program, the assumption that all development facilitated by the program would occur in the short-term is conservative.

Intersection Operations Analysis

Intersection operations for Existing Conditions were analyzed using existing signal timing data, lane configurations, and traffic volume data from the StreetLight Data traffic volume estimate database, which leverages location-based service data from cellular devices to estimate traffic volumes. Year 2019 data from non-holiday Tuesdays, Wednesdays and Thursdays from the months of February, March, April, May, September, October, and November were used to estimate traffic volumes for 2019 conditions; the estimates were compared against count data from the County's database or other studies, where available. This approach reflects conditions before the COVID-19 pandemic and associated economic and travel effects. Generally, the StreetLight Data process slightly overestimates traffic volumes against counts; however, because traditional traffic counts are performed for only one day and the StreetLight Data method uses data from nearly 90 days, the StreetLight Data method better accounts for day-to-day fluctuations in traffic volumes. Existing Conditions volumes are presented in **Attachment B** as **Figure 1**.

Intersection operations Existing with Program Conditions were analyzed by adding program-generated traffic volume (per the SCTA model) to the Existing Conditions models. Existing with Program Conditions traffic volumes are included in **Attachment B** as **Figure 2**; signal timing and lane configurations were held constant. The results of the near-term intersection operations analysis are presented in **Table 4**. Intersection analysis model outputs are provided in **Attachment C**.



Table 4: Near-Term Intersection Operations Analysis

	Intersection	Peak Hour	Existing Conditions		Existing plus Program Conditions		
			Delay ¹	LOS ²	Delay ¹	LOS ²	Δ Delay ³
1	Geyserville Ave/Canyon Rd	AM PM	8.3 8.5	A A	8.6 8.8	A A	+0.3 +0.3
2	River Rd (SR 116)/Armstrong Woods Rd-First St	AM PM	8.4 8.9	A A	9.3 9.6	A A	+0.9 +0.7
3	River Rd/Gravenstein Hwy (SR 116)	AM PM	8.7 9.7	A A	9.0 10.0	A B	+0.3 +0.3
4	Old Redwood Hwy/Fulton Rd	AM PM	3.6 (26.7) 45.9 (>120)	A (D) E (F)	3.7 (27.7) 53.0 (>120)	A (D) F (F)	+0.1 (+1.0) **
5	Airport Blvd/Fulton Rd	AM PM	>120 107.1	F F	>120 111.3	F F	+4.9 +4.2
6	Old Redwood Hwy/Airport Blvd	AM PM	58.2 19.6	E B	62.9 19.7	E B	+4.7 +0.1
7	Old Redwood Hwy/Faught Rd	AM PM	41.5 (>120) 22.2 (>120)	E (F) C (F)	46.8 (>120) 24.7 (>120)	E (F) C (F)	** **
8	Old Redwood Hwy/Wikiup Dr-Mark West Commons Cir	AM PM	16.1 15.3	B B	20.3 18.3	C B	+4.2 +3.0
9	Front St (SR 116)/Mirabel Rd	AM PM	9.7 (24.9) 4.5 (15.5)	A (C) A (C)	15.0 (39.0) 5.4 (18.8)	B (E) A (C)	+5.3 (+14.1) +0.9 (+3.3)
10	Gravenstein Hwy (SR 116)/Graton Rd-Frei Rd	AM PM	15.2 16.4	B B	15.7 16.9	B B	+0.5 +0.5
11	Todd Rd/Moorland Ave	AM PM	87.9 (>120) >120 (>120)	F (F) F (F)	>120 (>120) >120 (>120)	F (F) F (F)	** **
12	Todd Rd/South Moorland Ave/US 101 Southbound Ramps	AM PM	21.4 29.7	C C	36.1 56.7	D E	+14.7 +27.0
13	Todd Rd/Todd Rd Overcrossing	AM PM	9.0 9.6	A A	10.0 10.8	A B	+1.0 +1.2
14	Todd Rd/Santa Rosa Ave	AM PM	20.6 31.9	C C	23.0 36.8	C D	+2.4 +4.9
15	Arnold Dr/Warm Springs Rd	AM PM	11.4 11.0	B B	11.4 11.2	B B	+0.0 +0.2
16	Verano Ave/Riverside Dr	AM PM	11.3 (44.9) 31.3 (>120)	B (E) D (F)	15.3 (64.6) 53.1 (>120)	C (F) F (F)	+4.0 (+19.7) **
17	Adobe Rd/Petaluma Hill Rd-Main St	AM PM	47.4 >120	D F	53.5 >120	D F	+6.1 +4.0
18	Old Redwood Hwy/Main St	AM PM	14.0 23.8	B C	14.7 26.3	B C	+0.7 +2.5
19	Bodega Ave/Paula Ln	AM PM	1.5 (21.7) 1.0 (16.3)	A (C) A (C)	2.8 (28.7) 2.1 (20.9)	A (D) A (C)	+1.3 (+7.0) +1.1 (+4.6)



Table 4: Near-Term Intersection Operations Analysis

	Intersection	Peak Hour	Existing Conditions		Existing plus Program Conditions		
			Delay ¹	LOS ²	Delay ¹	LOS ²	Δ Delay ³
20	Broadway (SR 12)/Leveroni Rd-Napa Rd	AM	49.3	D	50.1	D	+0.8
		PM	45.8	D	46.0	D	+0.2

Notes:

Bold indicates operations below the County's LOS D standard. **Bold and highlighted** indicates a substantial operations effect.

1. Delay for signalized intersections and All-Way Stop-Controlled intersections presented whole-intersection average delay. Delay for Side-Street Stop-Controlled intersections presented as: whole-intersection average delay (delay on worst movement or single-lane approach).

2. LOS per *Highway Capacity Manual, 6th Edition*

3. Change in delay between Existing plus Program Conditions and Existing Conditions

** indicates that the Synchro program is indicating that the intersection is supersaturated, and the change in delay values are likely greater than 5.0 seconds on the worst movement or single-lane approach.

Source: Fehr & Peers, July 2020.

Signal Warrant Analysis

The Peak Hour Signal Warrant (Warrant 3B) analysis was performed for intersections that operate unacceptably with respect to the County's LOS D operations standard under Existing Conditions or Existing plus Program Conditions. Signal warrant worksheets are provided in **Attachment D**. Traffic volumes at the following intersections meet the Peak Hour Signal Warrant for the time periods noted:

- Old Redwood Highway/Fulton Road (Existing Conditions, PM peak hour)
- Front Street (SR 116)/Mirabel Road (Existing plus Program Conditions, AM peak hour)
- Todd Road/Moorland Avenue (Existing Conditions, AM and PM peak hours)

Traffic volumes at all other unsignalized intersections operating unacceptably do not meet the Peak Hour Signal Warrant under Existing Conditions or Existing plus Program Conditions.

Findings

Based on the results in **Table 4** and the Peak Hour Signal Warrant analysis, the program would have a substantial effect on intersection operations at the following locations during the time periods noted:

- Intersection 4: Old Redwood Highway/Fulton Road (PM peak hour) – The addition of traffic from Potential Sites LAR-1 through LAR-8 exacerbates unacceptable LOS F conditions by increasing delay by more than 5.0 seconds and the Peak Hour Signal Warrant is met.
- Intersection 9: Front Street (SR 116)/Mirabel Road (AM Peak hour) – The addition of traffic from Potential Sites FOR-1 through FOR-6 and Potential Sites GUE-1 through GUE-4



- causes operations to degrade from an acceptable LOS C to an unacceptable LOS E and the Peak Hour Signal Warrant is met.
- Intersection 11: Todd Road/Moorland Avenue (AM and PM peak hours) – The addition of traffic from Potential Sites SAN-1 through SAN-10 exacerbates unacceptable LOS E/F conditions by increasing delay by more than 5.0 seconds and the Peak Hour Signal Warrant is met.
 - Intersection 12: Todd Road/South Moorland Avenue/US 101 southbound ramps (PM peak hour) – The addition of traffic from Potential Sites SAN-1 through SAN-10 causes operations at the intersection to degrade from an acceptable LOS C to an unacceptable LOS E.

It is noted that the substantial effects at Old Redwood Highway/Fulton Road and Todd Road/Moorland Avenue are cases where the intersection operates unacceptably before the development at Potential Sites LAR-1 through LAR-8 and Potential Sites SAN-1 through SAN-10 (respectively). The substantial effects at Front Street (SR 116)/Mirabel Road is a case where development at Potential Sites FOR-1 through FOR-6 and Potential Sites GUE-1 through GUE-4 results in a new deficiency; a similar situation occurs for the intersection of Todd Road/South Moorland Avenue/US 101 southbound ramps with respect to the addition of traffic generated by Potential Sites SAN-1 through SAN-10.

Because all of the development is not anticipated to be built in the near-term, the substantial effects noted above may take years to materialize. Thus, no near-term intersection improvements have been identified as required, and the Cumulative scenario improvements will be the main focus of improvements for further consideration.

Cumulative (Year 2040) Conditions Analysis

This section presents the results of the Cumulative (Year 2040) operations analysis, comprised of Cumulative (without Program) Conditions and Cumulative plus Program Conditions. The Cumulative (Year 2040) horizon assumes that all long-range development (except the program being studied) from all agencies in Sonoma County is built, as modeled in the SCTA model. The analysis assumes that the transportation network and signal timing parameters are held to Existing Conditions to provide a conservative baseline and to assess if development proposed by the program should contribute to planned transportation system improvements already in the project pipeline.

Intersection Operations Analysis

Intersection operations Cumulative Conditions were analyzed by growing Existing Conditions volumes using growth factors derived from SCTA model outputs; traffic volume information for Cumulative Conditions are included in **Attachment B** as **Figure 3**. Cumulative with Program Conditions traffic volumes are included in **Attachment B** as **Figure 4**. The results of the



Cumulative intersection operations analysis are presented in **Table 5**. Intersection analysis model outputs are provided in **Attachment C**.

Table 5: Cumulative Conditions Intersection Operations Analysis

	Intersection	Peak Hour	Cumulative Conditions		Cumulative plus Program Conditions		
			Delay ¹	LOS ²	Delay ¹	LOS ²	Δ Delay ³
1	Geyserville Ave/Canyon Rd	AM PM	9.2 9.4	A A	9.5 9.8	A A	+0.3 +0.4
2	River Rd (SR 116)/Armstrong Woods Rd-First St	AM PM	10.9 10.8	B B	12.9 12.4	B B	+2.0 +1.6
3	River Rd/Gravenstein Hwy (SR 116)	AM PM	10.6 12.6	B B	11.1 14.2	B B	+0.5 +1.6
4	Old Redwood Hwy/Fulton Rd	AM PM	12.7 (113.8) >120 (>120)	B (F) F (F)	13.8 (>120) >120 (>120)	B (F) F (F)	** **
5	Airport Blvd/Fulton Rd	AM PM	>120 >120	F F	>120 >120	F F	+5.3 +4.0
6	Old Redwood Hwy/Airport Blvd	AM PM	>120 37.8	F D	>120 38.7	F D	+3.7 +0.9
7	Old Redwood Hwy/Faught Rd	AM PM	>120 (>120) >120 (>120)	F (F) F (F)	>120 (>120) >120 (>120)	F (F) F (F)	** **
8	Old Redwood Hwy/Wikiup Dr-Mark West Commons Cir	AM PM	39.2 64.9	D E	51.4 72.8	D E	+12.2 +7.9
9	Front St (SR 116)/Mirabel Rd	AM PM	100.5 (>120) 18.7 (78.4)	F (F) C (F)	>120 (>120) 31.9 (>120)	F (F) C (F)	** **
10	Gravenstein Hwy (SR 116) /Graton Rd-Frei Rd	AM PM	24.2 35.3	C D	27.1 36.7	C D	+2.9 +1.4
11	Todd Rd/Moorland Ave	AM PM	>120 (>120) >120 (>120)	F (F) F (F)	>120 (>120) >120 (>120)	F (F) F (F)	** **
12	Todd Rd/South Moorland Ave/US 101 Southbound Ramps	AM PM	41.5 75.0	D E	69.6 >120	E F	+28.1 +48.3
13	Todd Rd/Todd Rd Overcrossing	AM PM	9.7 10.1	A B	10.8 11.6	B B	+1.1 +1.5
14	Todd Rd/Santa Rosa Ave	AM PM	23.2 41.0	C D	26.4 47.3	C D	+3.2 +6.3
15	Arnold Dr/Warm Springs Rd	AM PM	13.6 13.5	B B	13.7 13.6	B B	+0.1 +0.1
16	Verano Ave/Riverside Dr	AM PM	26.6 (113.9) 91.5 (>120)	D (F) F (F)	38.8 (>120) >120 (>120)	E (F) F (F)	** **
17	Adobe Rd/Petaluma Hill Rd-Main St	AM PM	>120 >120	F F	>120 >120	F F	+12.1 +4.6



Table 5: Cumulative Conditions Intersection Operations Analysis

Intersection		Peak Hour	Cumulative Conditions	Cumulative plus Program Conditions			
			Delay ¹	LOS ²	Delay ¹	LOS ²	Δ Delay ³
18	Old Redwood Hwy/Main St	AM PM	27.4 90.0	C F	33.4 97.4	C F	+6.0 +7.4
19	Bodega Ave/Paula Ln	AM PM	2.2 (27.5) 1.5 (21.0)	A (D) A (C)	3.9 (39.4) 2.8 (28.5)	A (E) A (D)	+1.7 (+11.9) +1.3 (+7.5)
20	Broadway (SR 12)/Leveroni Rd-Napa Rd	AM	66.2	E	66.9	E	+0.7
		PM	59.3	E	59.5	E	+0.2

Notes:

Bold indicates operations below the County's LOS D standard. **Bold and highlighted** indicates a substantial operations effect.

1. Delay for signalized intersections and All-Way Stop-Controlled intersections presented whole-intersection average delay. Delay for Side-Street Stop-Controlled intersections presented as: whole-intersection average delay (delay on worst movement or single-lane approach).

2. LOS per *Highway Capacity Manual, 6th Edition*

3. Change in delay between Cumulative plus Program and Cumulative Conditions

** indicates that the Synchro program is indicating that the intersection is supersaturated, and the change in delay values are likely greater than 5.0 seconds on the worst movement or single-lane approach.

Source: Fehr & Peers, July 2020.

Signal Warrant Analysis

The Peak Hour Signal Warrant (Warrant 3B) analysis was performed for intersections that operate unacceptably with respect to the County's LOS D operations standard under Cumulative Conditions or Cumulative plus Program Conditions. Signal warrant worksheets are provided in **Attachment D**. Traffic volumes at the following intersections meet the Peak Hour Signal Warrant for the time periods noted:

- Old Redwood Highway/Fulton Road (Cumulative Conditions, AM and PM peak hours)
- Old Redwood Highway/Faught Road (Cumulative Conditions, AM and PM peak hours)
- Front Street (SR 116)/Mirabel Road (Cumulative Conditions, AM and PM peak hours)
- Todd Road/Moorland Avenue (Cumulative Conditions, AM and PM peak hours)
- Verano Avenue/Riverside Drive (Cumulative Conditions, PM peak hour)

Traffic volumes at all other unsignalized intersections operating unacceptably do not meet the Peak Hour Signal Warrant under Cumulative Conditions or Cumulative plus Program Conditions.

Findings

Based on the results in **Table 5** and the Peak Hour Signal Warrant analysis, the program would have a substantial effect on intersection operations at the following locations during the time periods noted:



- Intersection 4: Old Redwood Highway/Fulton Road (AM and PM peak hours) – The addition of traffic development at Potential Sites LAR-1 through LAR-8 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds and the Peak Hour Signal Warrant is met.
- Intersection 5: Airport Boulevard/Fulton Road (AM peak hour) – The addition of traffic development at Potential Sites LAR-1 through LAR-8 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds.
- Intersection 7: Old Redwood Highway/Faught Road (AM and PM peak hours) - The addition of traffic development at Potential Sites LAR-1 through LAR-8 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds and the Peak Hour Signal Warrant is met.
- Intersection 8: Old Redwood Highway/Wikiup Drive-Mark West Commons Circle (PM peak hour) - The addition of traffic development at Potential Sites LAR-1 through LAR-8 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds.
- Intersection 9: Front Street (SR 116)/Mirabel Road (AM and PM peak hours) – The addition of traffic development at Potential Sites FOR-1 through FOR-6 and Potential Sites GUE-1 through GUE-4 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds and the Peak Hour Signal Warrant is met.
- Intersection 11: Todd Road/Moorland Avenue (AM and PM peak hours) – The addition of traffic development at Potential Sites SAN-1 through SAN-10 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds and the Peak Hour Signal Warrant is met.
- Intersection 12: Todd Road/South Moorland Avenue/US 101 southbound ramps (AM and PM peak hours) – The addition of traffic development at Potential Sites SAN-1 through SAN-10 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds.
- Intersection 16: Verano Avenue/Riverside Drive (AM and PM peak hours) - The addition of traffic development at Potential Sites AGU-1 through AGU-3 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds and the Peak Hour Signal Warrant is met.
- Intersection 17: Old Adobe Road/Petaluma Hill Road-Main Street (AM peak hour) - The addition of traffic development at Potential Sites PEN-1 through PEN-9 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds.
- Intersection 18: Old Redwood Highway/Main Street (PM peak hour) - The addition of traffic development at Potential Sites PEN-1 through PEN-9 exacerbates unacceptable LOS F conditions by increasing the delay by more than 5.0 seconds.

It is noted that the identified substantial effects under Cumulative Conditions are almost exclusively cases where the program would exacerbate operations that would already be unacceptable prior to the addition of program traffic (i.e. intersections are projected to operate at



LOS E or F without the implementation of the program). Generally, this suggests that the projects should be conditioned to contribute a fair share amount towards improvements. The identified improvements to improve conditions at the identified locations of substantial effects are presented in the next subsection.

Improvement Measures

As noted previously, buildout of the program will take years to complete, and thus the program's effects on operations at study intersections will similarly take years to occur. Therefore, the improvements noted below have been developed to alleviate the effects of the program under Cumulative conditions. Many of the improvements, once implemented, will positively affect transportation for existing and future drivers as well as bicyclists and pedestrians. Funding arrangements should be considered on a fair-share basis as the substantial effects indicated are generally related to the exacerbation of operations estimated to be deficient prior to the addition of program-generated traffic volumes. The County may choose to require that projects directly fund the improvements, with reimbursements at later dates, or the County may choose to incorporate these improvements into the County's existing AB1600 development impact fee program.

Intersection 4 – Old Redwood Highway/Fulton Road (Potential Sites LAR-1 through LAR-8)

Old Redwood Highway/Fulton Road is a side-street stop-controlled intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours; the intersection meets the Peak Hour Signal Warrant under both the AM and PM peak hour. The improvement measure is for program-related development to fund the construction of a traffic signal or roundabout at the intersection. Construction of a signal would result in the intersection operating at LOS B conditions in both the AM and PM peak hours. Construction of a roundabout would result in LOS A operations in the AM peak hour and LOS D operations in the PM peak hour.

Intersection 5 – Old Redwood Highway/Airport Boulevard (Potential Sites LAR-1 through LAR-8)

Old Redwood Highway/Fulton Road is a signalized intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours; substantial intersection operations effects occur during the AM peak hour only. The improvement measure is for program-related development to fund periodic signal timing adjustments at the intersection. While the intersection operations would remain at an unacceptable LOS F, the signal timing adjustments would result in an average intersection delay value that is lower than the Cumulative (without Program Conditions) value (225.5 seconds of delay after retiming versus 230.4 seconds of delay under Cumulative Conditions). Major widening of the intersection would need to occur in order to return the intersection to acceptable (LOS D or better) operations.



Intersection 7 – Old Redwood Highway/Faught Road (Potential Sites LAR-1 through LAR-8)

Old Redwood Highway/Faught Road is a side-street stop-controlled intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours; the intersection meets the Peak Hour Signal Warrant under both the AM and PM peak hour. The improvement measure is for program-related development to fund the construction of a traffic signal at the intersection; a roundabout is not advised because the intersection is between two existing signalized intersections. Construction of a signal would result in the intersection operating at LOS D conditions in the AM peak hour and LOS C conditions in the PM peak hour.

Intersection 8 – Old Redwood Highway/Wikiup Drive-Mark West Commons Circle (Potential Sites LAR-1 through LAR-8)

Old Redwood Highway/Wikiup Drive-Mark West Commons Circle is a signalized intersection that operates unacceptably under Cumulative Conditions in the PM peak hour; substantial intersection operations effects occur during the PM peak hour only. The improvement measure is for program-related development to fund periodic signal timing adjustments at the intersection. Implementing signal timing adjustments would return PM peak hour operations to LOS D conditions.

Intersection 9 – Front Street (SR 116)/Mirabel Road (Potential Sites FOR-1 through FOR-6 and GUE-1 through GUE-4)

Front Street (SR 116)/Mirabel Road is a side-street stop-controlled intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours; the intersection meets the Peak Hour Signal Warrant under both the AM and PM peak hour. The improvement measure is for program-related development to fund the construction of a traffic signal or roundabout at the intersection. Construction of a signal would result in the intersection operating at LOS B conditions in both the AM and PM peak hours. Construction of a roundabout would result in LOS B operations in the AM peak hour and LOS B operations in the PM peak hour.

Intersection 11 – Todd Road/Moorland Avenue (Potential Sites SAN-1 through SAN-10)

Todd Road/Moorland Avenue is a side-street stop-controlled intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours; the intersection meets the Peak Hour Signal Warrant under both the AM and PM peak hour. The improvement measure is for program-related development to fund the construction of the following improvements:

- A traffic signal at the intersection, including protected left turns for eastbound and westbound Todd Road and split phases for the northbound and southbound movements
- Modify striping on westbound Todd Road to accommodate a left turn lane, a through lane, and a right turn lane



A roundabout is not advised because the intersection is located very near to an existing traffic signal. Construction of a signal and associate striping improvements would result in the intersection operating at LOS C conditions in the AM peak hour and LOS D in the PM peak hour.

Intersection 12 – Todd Road/South Moorland Avenue/US 101 Southbound Ramps (Potential Sites SAN-1 through SAN-10)

Todd Road/South Moorland Avenue/US 101 Southbound Ramps is a signalized intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours. The improvement measure is for program-related development to fund the following improvements:

- Modification of the traffic signal to include an eastbound right turn overlap phase
- Modification of striping on the northbound approach to include one left turn lane, one through-left turn shared lane, and one right turn lane
- Widening of westbound Todd Road leaving the intersection to accommodate two receiving lanes (would be consistent with mitigation measure proposed for Intersection 11)
- Updates to signal timing at intersection

Construction of the proposed improvements would result in LOS C operations in the AM peak hour and LOS D operations in the PM peak hour. Updates to signal timings may require corresponding updates at the nearby intersection of South Moorland Avenue/Todd Road Overcrossing.

Intersection 16 – Verano Avenue/Riverside Drive (Potential Sites AGU-1 through AGU-3)

Verano Avenue/Riverside Drive is a side-street stop-controlled intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours; the intersection meets the Peak Hour Signal Warrant in the PM peak hour only. The improvement measure is for program-related development to fund the construction of a slow-speed roundabout at the intersection. Construction of a roundabout would result in the intersection operating at LOS A conditions in the AM peak hour and LOS B conditions and PM peak hours.

Intersection 17 – Adobe Road/Petaluma Hill Road-Main Street (Potential Sites PEN-1 through PEN-9)

Adobe Road/Petaluma Hill Road-Main Street is a signalized intersection that operates unacceptably under Cumulative Conditions in both the AM and PM peak hours; substantial intersection operations effects occur during the AM peak hour only. The improvement measure is for program-related development to fund periodic signal timing adjustments at the intersection. While the intersection operations would remain at an unacceptable LOS F, the signal timing adjustments would result in an average intersection delay value that is lower than the Cumulative (without Program Conditions) value (104.8 seconds of delay after retiming versus 188.4 seconds



of delay under Cumulative Conditions). Major widening of the intersection would need to occur in order to return the intersection to acceptable (LOS D or better) operations.

Intersection 18 – Old Redwood Highway/Main Street (Potential Sites PEN-1 through PEN-9)

Old Redwood Highway/Main Street is a signalized intersection that operates unacceptably under Cumulative Conditions in the PM peak hour; substantial intersection operations effects occur during the PM peak hour only. The improvement measure is for program-related development to fund periodic signal timing adjustments at the intersection. Implementing signal timing adjustments would return PM peak hour operations to LOS D conditions.

Conclusions

Results of the VMT analysis indicate that the program would result in significant and unavoidable impacts. Mitigation measures that could be added would likely not result in a substantial enough reduction of VMT needed to meet the threshold values.

The informational operational analysis results suggest that several improvement measures (to be funded on a fair share basis) should be constructed to reduce the program's effect to less-than-substantial levels. Improvement measures are designed with a longer-term horizon in mind, as development under the program is not anticipated to be built in the near-term.

This concludes the transportation assessment of the Sonoma Housing Rezone project transportation assessment. Please call Ian Barnes or Ashlee Takushi at (925) 930-7100 with any questions.

Attachments

Attachment A Intersection Level of Service Definitions

Attachment B Volume Figures

Attachment C Synchro HCM 6th Edition Outputs

Attachment D Signal Warrant Analysis Worksheets

ATTACHMENT A

VEHICLE LEVEL OF SERVICE DEFINITIONS



Table A1: Signalized Intersection Level of Service Definitions

Level of Service	Description	Average Control Delay per Vehicle (seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

Source: *Highway Capacity Manual, 6th Edition*.

Table A2: Unsignalized Intersection Level of Service Definitions

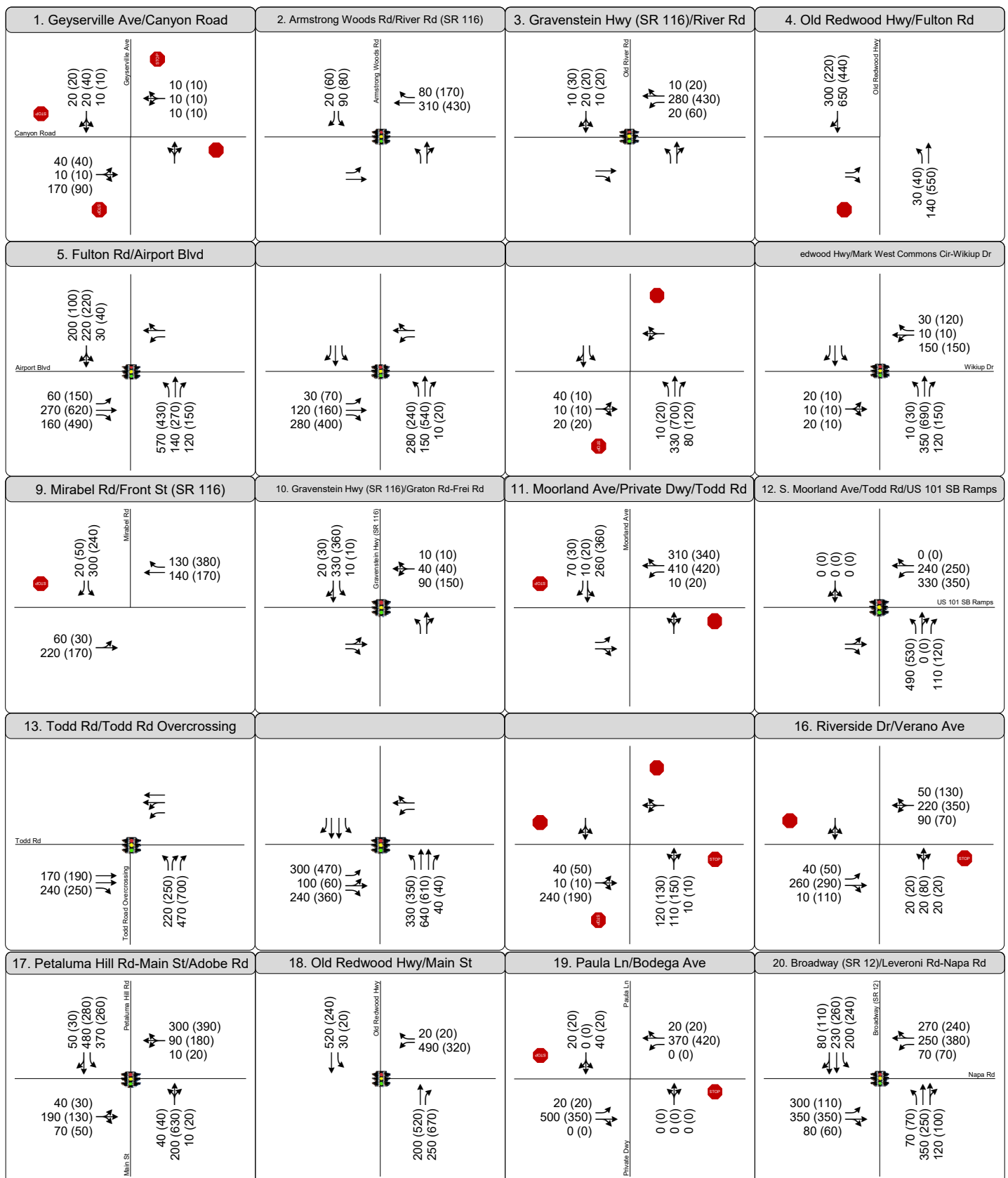
Level of Service	Description	Average Control Delay per Vehicle (seconds)
A	Little or no delay.	≤ 10.0
B	Short traffic delays.	10.1 to 15.0
C	Average traffic delays.	15.1 to 25.0
D	Long traffic delays.	25.1 to 35.0
E	Very long traffic delays.	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded.	> 50.0

Source: *Highway Capacity Manual, 6th Edition*.

ATTACHMENT B

VOLUME FIGURES





Legend:

XX (YY) = AM (PM) Peak hour Volumes

= Signalized Intersection

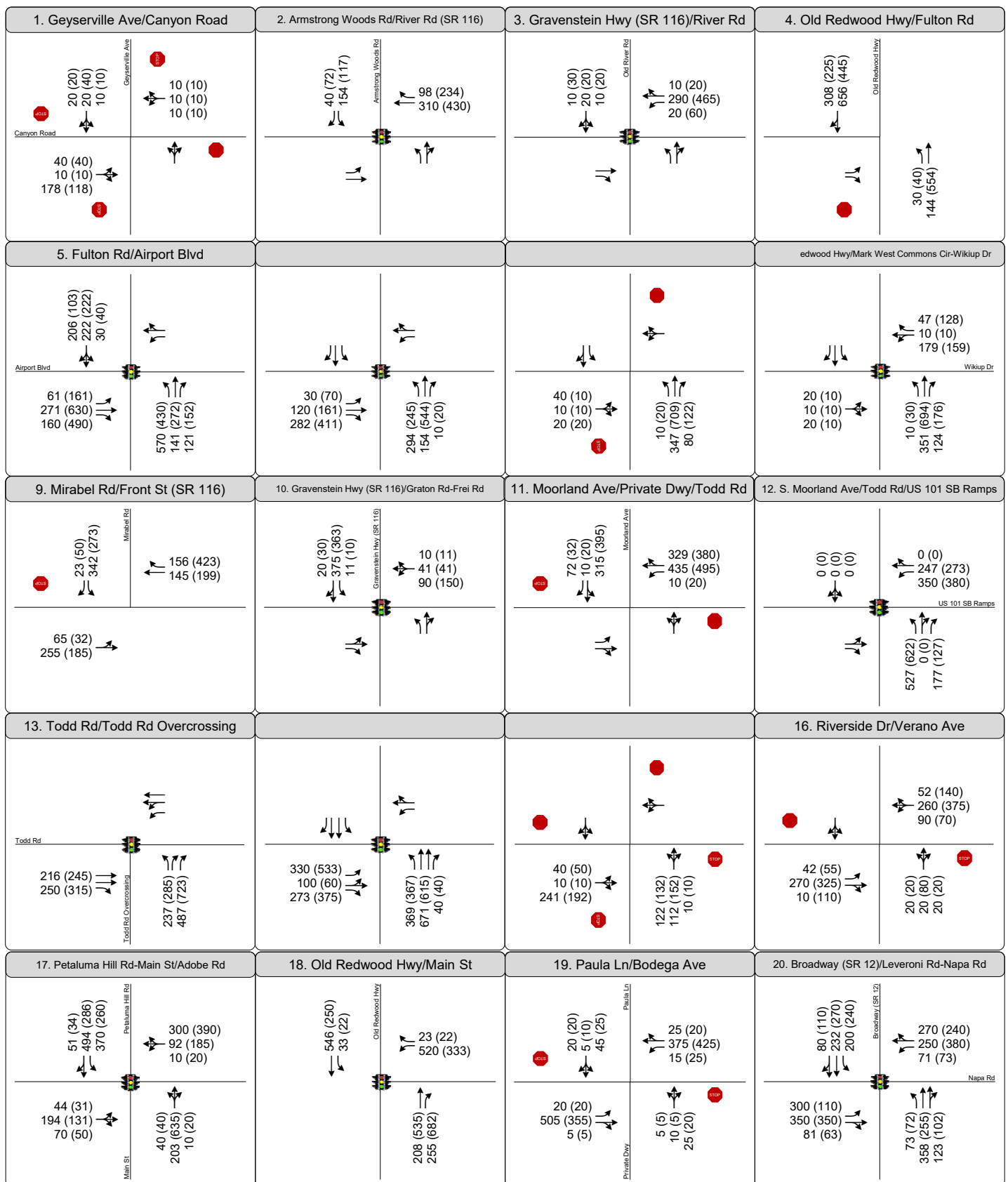
= Stop Sign on Approach



Figure 1

Existing Conditions (Year 2019)

Weekday Peak Hour Intersection Traffic Volumes,
Lane Configurations, and Intersection Control Devices



Legend:

XX (YY) = AM (PM) Peak hour Volumes

= Signalized Intersection

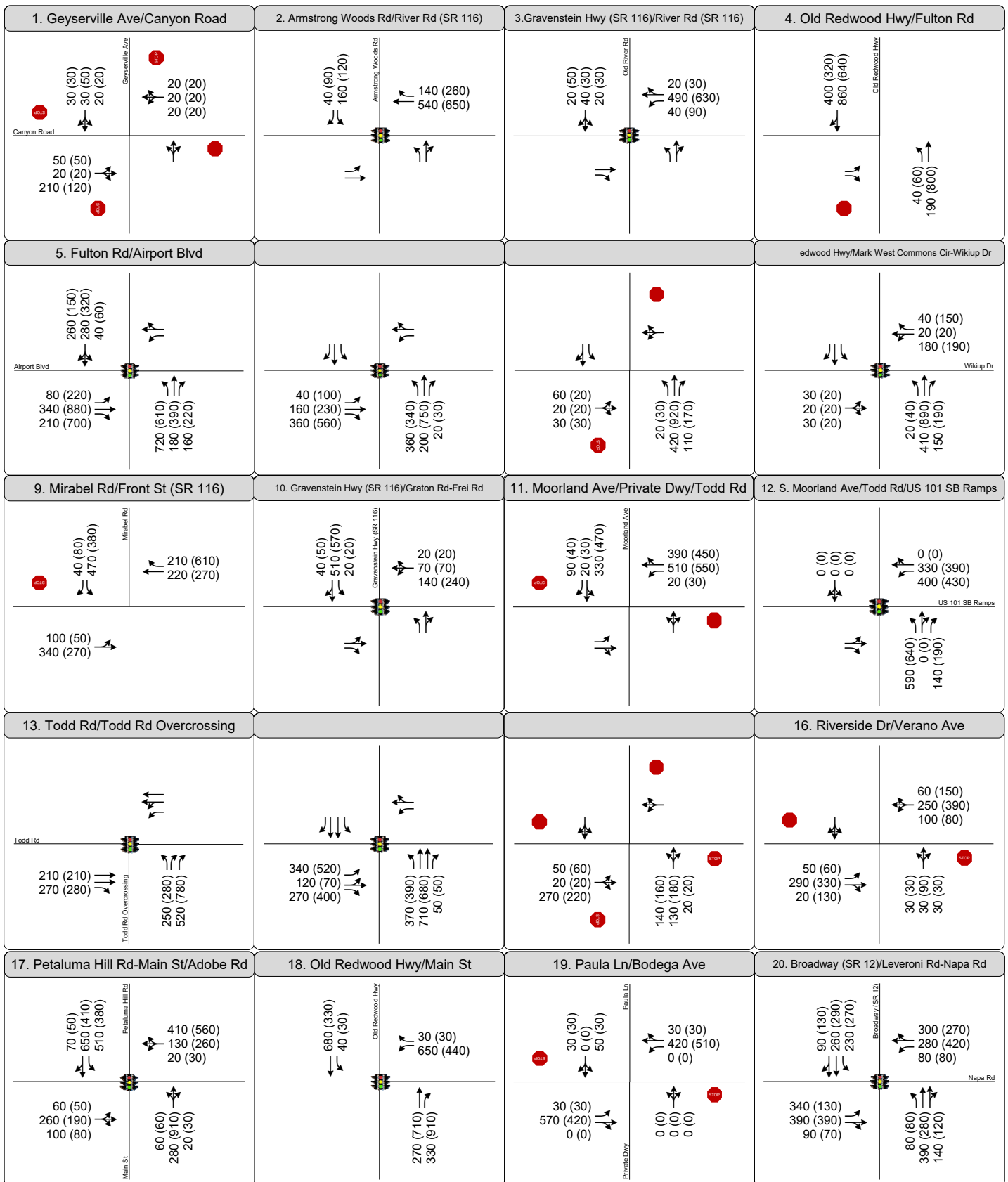
= Stop Sign on Approach

Figure 2

Existing plus Program Conditions

Weekday Peak Hour Intersection Traffic Volumes,
Lane Configurations, and Intersection Control Devices





Legend:

XX (YY) = AM (PM) Peak hour Volumes

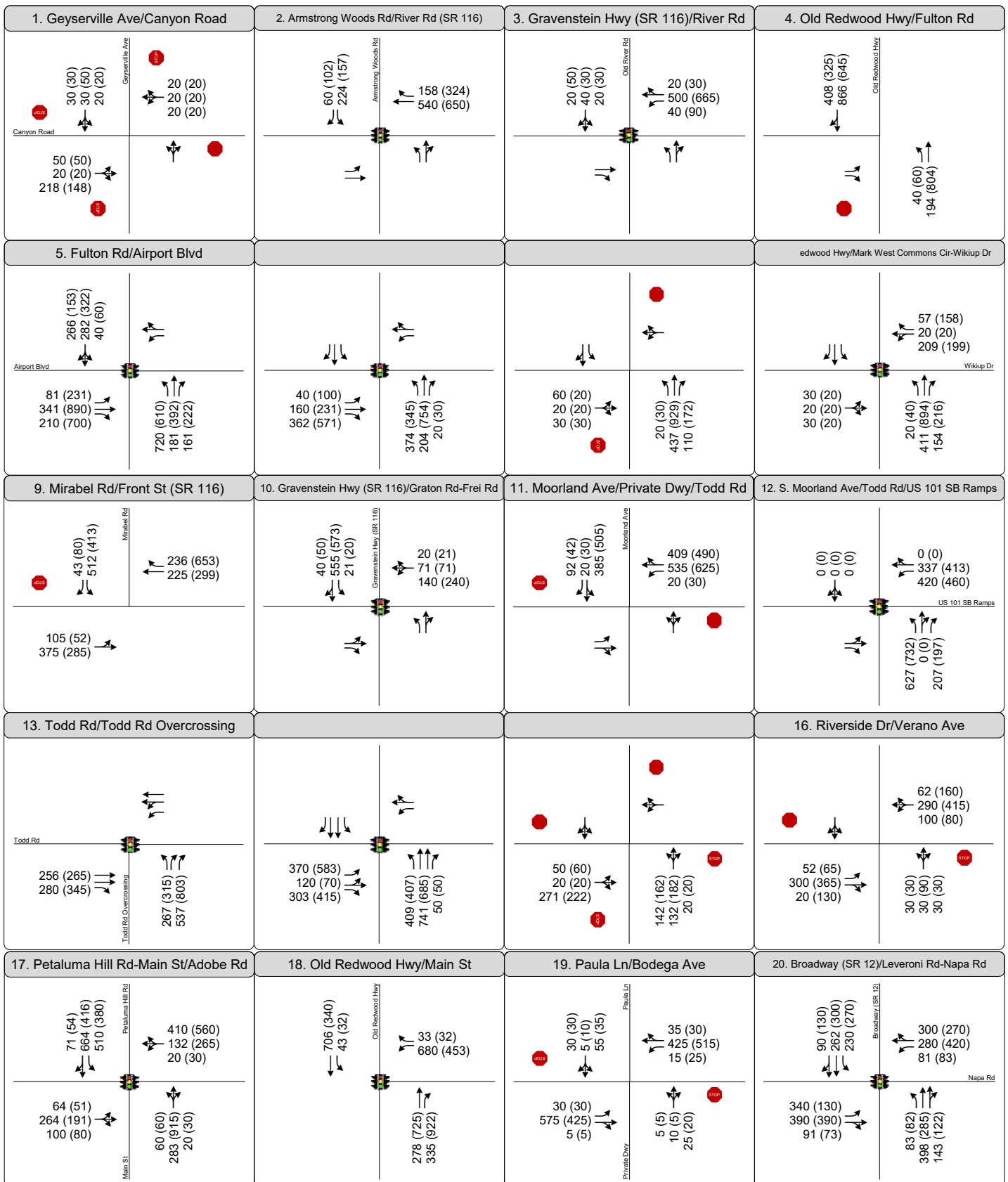
= Signalized Intersection

= Stop Sign on Approach



Figure 3

Cumulative Conditions (Year 2040)
Weekday Peak Hour Intersection Traffic Volumes,
Lane Configurations, and Intersection Control Devices



Legend:

XX (YY) = AM (PM) Peak hour Volumes

= Signalized Intersection

= Stop Sign on Approach



Figure 4

Cumulative plus Program Conditions
Weekday Peak Hour Intersection Traffic Volumes,
Lane Configurations, and Intersection Control Devices

ATTACHMENT C

SYNCHRO HCM 6TH EDITION OUTPUTS



ATTACHMENT C-1

EXISTING CONDITIONS (YEAR 2019) OUPUTS



HCM 6th AWSC
1: Geyserville Ave & Canyon Road

Existing Conditions AM

Intersection

Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	10	170	10	10	10	90	20	10	10	20	20
Future Vol, veh/h	40	10	170	10	10	10	90	20	10	10	20	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	185	11	11	11	98	22	11	11	22	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.4	7.7	8.6	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	75%	18%	33%	20%
Vol Thru, %	17%	5%	33%	40%
Vol Right, %	8%	77%	33%	40%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	220	30	50
LT Vol	90	40	10	10
Through Vol	20	10	10	20
RT Vol	10	170	10	20
Lane Flow Rate	130	239	33	54
Geometry Grp	1	1	1	1
Degree of Util (X)	0.169	0.265	0.041	0.067
Departure Headway (Hd)	4.669	3.985	4.485	4.464
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	770	904	800	803
Service Time	2.692	1.998	2.506	2.49
HCM Lane V/C Ratio	0.169	0.264	0.041	0.067
HCM Control Delay	8.6	8.4	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	1.1	0.1	0.2

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

Existing Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	300	0	0	310	80	10	20	20	90	0	20
Future Volume (veh/h)	50	300	0	0	310	80	10	20	20	90	0	20
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No				No				No		No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	326	0	0	337	42	11	22	4	98	0	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	511	981	0	0	560	471	482	294	53	463	0	300
Arrive On Green	0.08	0.52	0.00	0.00	0.30	0.30	0.19	0.19	0.19	0.19	0.00	0.19
Sat Flow, veh/h	1781	1870	0	0	1870	1572	1394	1537	279	1368	0	1569
Grp Volume(v), veh/h	54	326	0	0	337	42	11	0	26	98	0	4
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1572	1394	0	1817	1368	0	1569
Q Serve(g_s), s	0.6	3.3	0.0	0.0	5.1	0.6	0.2	0.0	0.4	2.1	0.0	0.1
Cycle Q Clear(g_c), s	0.6	3.3	0.0	0.0	5.1	0.6	0.3	0.0	0.4	2.5	0.0	0.1
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	511	981	0	0	560	471	482	0	348	463	0	300
V/C Ratio(X)	0.11	0.33	0.00	0.00	0.60	0.09	0.02	0.00	0.07	0.21	0.00	0.01
Avail Cap(c_a), veh/h	740	1809	0	0	2375	1996	973	0	989	946	0	854
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	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.1	4.5	0.0	0.0	9.9	8.3	11.0	0.0	11.0	12.0	0.0	10.8
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	1.0	0.1	0.0	0.0	0.1	0.2	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	0.1	0.7	0.0	0.0	1.7	0.2	0.1	0.0	0.1	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	4.7	0.0	0.0	10.9	8.4	11.0	0.0	11.1	12.2	0.0	10.9
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h	380				379		37		102			
Approach Delay, s/veh	4.9				10.7		11.0		12.2			
Approach LOS	A				B		B		B			
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	22.0		11.0		7.4		14.6		11.0			
Change Period (Y+Rc), s	* 4.7		* 4.7		* 4.7		* 4.7		* 4.7			
Max Green Setting (Gmax), s	* 32		* 18		* 7		* 42		* 18			
Max Q Clear Time (g_c+I1), s	5.3		4.5		2.6		7.1		2.4			
Green Ext Time (p_c), s	2.1		0.2		0.0		2.5		0.1			

Intersection Summary

HCM 6th Ctrl Delay	8.4
HCM 6th LOS	A

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

Existing Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↖	↖	↖		↖	↖			↕	
Traffic Volume (veh/h)	0	300	110	20	280	10	100	30	70	10	20	10
Future Volume (veh/h)	0	300	110	20	280	10	100	30	70	10	20	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	326	68	22	304	10	109	33	17	11	22	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	577	485	462	895	29	528	262	135	206	303	22
Arrive On Green	0.00	0.31	0.31	0.05	0.50	0.50	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	0	1870	1572	1781	1800	59	1373	1163	599	293	1348	99
Grp Volume(v), veh/h	0	326	68	22	0	314	109	0	50	35	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1572	1781	0	1859	1373	0	1762	1740	0	0
Q Serve(g_s), s	0.0	4.9	1.1	0.2	0.0	3.5	1.6	0.0	0.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.9	1.1	0.2	0.0	3.5	2.1	0.0	0.8	0.5	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.03	1.00		0.34	0.31		0.06
Lane Grp Cap(c), veh/h	0	577	485	462	0	924	528	0	396	531	0	0
V/C Ratio(X)	0.00	0.57	0.14	0.05	0.00	0.34	0.21	0.00	0.13	0.07	0.00	0.00
Avail Cap(c_a), veh/h	0	1328	1116	847	0	1320	1437	0	1564	649	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.8	8.5	6.5	0.0	5.1	10.9	0.0	10.5	10.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.1	0.0	0.0	0.2	0.2	0.0	0.1	0.1	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	0.0	1.7	0.3	0.1	0.0	0.8	0.6	0.0	0.3	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.7	8.6	6.6	0.0	5.4	11.1	0.0	10.6	10.4	0.0	0.0
LnGrp LOS	A	B	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	394					336		159		35		
Approach Delay, s/veh	10.3					5.4		11.0		10.4		
Approach LOS	B					A		B		B		
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	6.4	15.1	12.3		21.5		12.3					
Change Period (Y+Rc), s	4.7	* 4.7	* 4.7		* 4.7		* 4.7					
Max Green Setting (Gmax), s	24	* 24	* 10		* 24		* 30					
Max Q Clear Time (g_c+I), s	12.2	6.9	2.5		5.5		4.1					
Green Ext Time (p_c), s	0.0	2.1	0.0		1.8		0.6					

Intersection Summary

HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Old Redwood Hwy & Fulton Rd

Existing Conditions AM

Intersection							
Int Delay, s/veh	3.6						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	130	30	30	140	650	300	
Future Vol, veh/h	130	30	30	140	650	300	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	Stop	-	None	-	None	
Storage Length	0	90	70	-	-	100	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	141	33	33	152	707	326	
Major/Minor	Minor2		Major1		Major2		
Conflicting Flow All	925	707	1033	0	-	0	
Stage 1	707	-	-	-	-	-	
Stage 2	218	-	-	-	-	-	
Critical Hdwy	6.42	6.22	4.12	-	-	-	
Critical Hdwy Stg 1	5.42	-	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	-	
Follow-up Hdwy	3.518	3.318	2.218	-	-	-	
Pot Cap-1 Maneuver	299	435	673	-	-	-	
Stage 1	489	-	-	-	-	-	
Stage 2	818	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	284	435	673	-	-	-	
Mov Cap-2 Maneuver	284	-	-	-	-	-	
Stage 1	465	-	-	-	-	-	
Stage 2	818	-	-	-	-	-	
Approach	EB		NB		SB		
HCM Control Delay, s	26.7		1.9		0		
HCM LOS	D						
Minor Lane/Major Mvmt	NBL		NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	673		-	284	435	-	-
HCM Lane V/C Ratio	0.048		-	0.498	0.075	-	-
HCM Control Delay (s)	10.6		-	29.6	13.9	-	-
HCM Lane LOS	B		-	D	B	-	-
HCM 95th %tile Q(veh)	0.2		-	2.6	0.2	-	-

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Existing Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	270	160	180	480	20	570	140	120	30	220	200
Future Volume (veh/h)	60	270	160	180	480	20	570	140	120	30	220	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	293	38	196	522	21	620	152	34	33	239	194
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	84	378	316	227	497	20	496	521	437	23	164	133
Arrive On Green	0.05	0.20	0.20	0.13	0.28	0.28	0.28	0.28	0.28	0.19	0.19	0.19
Sat Flow, veh/h	1781	1870	1565	1781	1785	72	1781	1870	1571	122	886	719
Grp Volume(v), veh/h	65	293	38	196	0	543	620	152	34	466	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1565	1781	0	1857	1781	1870	1571	1728	0	0
Q Serve(g_s), s	3.9	16.0	2.1	11.6	0.0	30.0	30.0	6.9	1.7	20.0	0.0	0.0
Cycle Q Clear(g_c), s	3.9	16.0	2.1	11.6	0.0	30.0	30.0	6.9	1.7	20.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		1.00	0.07		0.42
Lane Grp Cap(c), veh/h	84	378	316	227	0	517	496	521	437	321	0	0
V/C Ratio(X)	0.77	0.78	0.12	0.86	0.00	1.05	1.25	0.29	0.08	1.45	0.00	0.00
Avail Cap(c_a), veh/h	331	521	436	331	0	517	496	521	437	321	0	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(l)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	50.8	40.7	35.2	46.1	0.0	38.9	38.9	30.6	28.7	43.9	0.0	0.0
Incr Delay (d2), s/veh	5.6	3.1	0.1	10.8	0.0	53.6	128.6	0.1	0.0	220.7	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	1.8	7.4	0.8	5.7	0.0	20.8	30.1	3.0	0.6	28.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	43.8	35.2	56.9	0.0	92.5	167.5	30.7	28.7	264.6	0.0	0.0
LnGrp LOS	E	D	D	E	A	F	F	C	C	F	A	A
Approach Vol, veh/h		396			739			806			466	
Approach Delay, s/veh		45.1			83.0			135.9			264.6	
Approach LOS		D			F			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.1	27.8		25.1	10.9	36.0		35.8				
Change Period (Y+Rc), s	5.4	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	20.0	30.0		20.0	20.0	30.0		30.0				
Max Q Clear Time (g_c+I1), s	13.6	18.0		22.0	5.9	32.0		32.0				
Green Ext Time (p_c), s	0.1	0.8		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 129.6

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

Existing Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	120	280	30	240	30	280	150	10	30	660	60
Future Volume (veh/h)	30	120	280	30	240	30	280	150	10	30	660	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	130	57	33	261	28	304	163	6	33	717	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	369	309	45	312	33	339	965	813	45	656	552
Arrive On Green	0.03	0.20	0.20	0.03	0.19	0.19	0.19	0.52	0.52	0.03	0.35	0.35
Sat Flow, veh/h	1781	1870	1565	1781	1659	178	1781	1870	1577	1781	1870	1574
Grp Volume(v), veh/h	33	130	57	33	0	289	304	163	6	33	717	23
Grp Sat Flow(s),veh/h/ln	1781	1870	1565	1781	0	1837	1781	1870	1577	1781	1870	1574
Q Serve(g_s), s	1.6	5.1	2.6	1.6	0.0	13.0	14.3	4.0	0.2	1.6	30.0	0.8
Cycle Q Clear(g_c), s	1.6	5.1	2.6	1.6	0.0	13.0	14.3	4.0	0.2	1.6	30.0	0.8
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	45	369	309	45	0	345	339	965	813	45	656	552
V/C Ratio(X)	0.73	0.35	0.18	0.73	0.00	0.84	0.90	0.17	0.01	0.73	1.09	0.04
Avail Cap(c_a), veh/h	250	874	732	250	0	558	416	965	813	208	656	552
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.4	29.6	28.6	41.4	0.0	33.5	33.8	11.0	10.1	41.4	27.8	18.3
Incr Delay (d2), s/veh	8.0	0.2	0.1	8.1	0.0	2.9	16.9	0.0	0.0	8.0	63.4	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.2	1.0	0.8	0.0	6.0	7.5	1.5	0.1	0.8	24.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	29.8	28.7	49.5	0.0	36.4	50.7	11.0	10.1	49.4	91.2	18.3
LnGrp LOS	D	C	C	D	A	D	D	B	B	D	F	B
Approach Vol, veh/h	220			322			473			773		
Approach Delay, s/veh	32.5			37.7			36.5			87.2		
Approach LOS	C			D			D			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	22.3	21.4	35.1	7.6	21.5	7.3	49.2				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+I), s	13.6	7.1	16.3	32.0	3.6	15.0	3.6	6.0				
Green Ext Time (p_c), s	0.0	0.2	0.1	0.0	0.0	0.5	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay 58.2

HCM 6th LOS E

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection												
Int Delay, s/veh	41.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑	↕		↕	
Traffic Vol, veh/h	40	10	20	140	10	10	10	330	80	20	850	20
Future Vol, veh/h	40	10	20	140	10	10	10	330	80	20	850	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	22	152	11	11	11	359	87	22	924	22

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1415	1447	935	1377	1371	359	946	0	0	446	0	0
Stage 1	979	979	-	381	381	-	-	-	-	-	-	-
Stage 2	436	468	-	996	990	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	115	131	322	~ 122	146	685	725	-	-	1114	-	-
Stage 1	301	328	-	641	613	-	-	-	-	-	-	-
Stage 2	599	561	-	294	324	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	102	124	322	~ 102	138	685	725	-	-	1114	-	-
Mov Cap-2 Maneuver	102	124	-	~ 102	138	-	-	-	-	-	-	-
Stage 1	296	314	-	631	604	-	-	-	-	-	-	-
Stage 2	570	553	-	254	310	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	65	\$ 369.4	0.2	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	725	-	-	131 110	1114	-	-
HCM Lane V/C Ratio	0.015	-	-	0.581 1.581	0.02	-	-
HCM Control Delay (s)	10	-	-	65\$ 369.4	8.3	0	-
HCM Lane LOS	B	-	-	F F	A A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.9 13	0.1	-	-

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

Existing Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	10	20	150	10	30	10	350	120	150	790	10
Future Volume (veh/h)	20	10	20	150	10	30	10	350	120	150	790	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	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	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	11	5	163	11	7	11	380	53	163	859	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	170	71	18	376	15	248	20	754	635	209	951	802
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	0.40	0.40	0.12	0.51	0.51
Sat Flow, veh/h	293	447	112	1411	95	1560	1781	1870	1575	1781	1870	1577
Grp Volume(v), veh/h	38	0	0	174	0	7	11	380	53	163	859	6
Grp Sat Flow(s),veh/h/ln	853	0	0	1506	0	1560	1781	1870	1575	1781	1870	1577
Q Serve(g_s), s	0.1	0.0	0.0	0.0	0.0	0.2	0.3	7.0	1.0	4.1	19.3	0.1
Cycle Q Clear(g_c), s	5.0	0.0	0.0	4.9	0.0	0.2	0.3	7.0	1.0	4.1	19.3	0.1
Prop In Lane	0.58		0.13	0.94		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	259	0	0	391	0	248	20	754	635	209	951	802
V/C Ratio(X)	0.15	0.00	0.00	0.45	0.00	0.03	0.54	0.50	0.08	0.78	0.90	0.01
Avail Cap(c_a), veh/h	412	0	0	929	0	846	463	1216	1024	463	1216	1026
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(l)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.8	0.0	0.0	18.4	0.0	16.4	22.7	10.3	8.5	19.8	10.3	5.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.0	8.1	0.2	0.0	2.4	7.0	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	0.3	0.0	0.0	1.6	0.0	0.1	0.2	2.2	0.3	1.6	6.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	0.0	0.0	18.7	0.0	16.4	30.8	10.5	8.5	22.2	17.3	5.6
LnGrp LOS	B	A	A	B	A	B	C	B	A	C	B	A
Approach Vol, veh/h		38			181			444			1028	
Approach Delay, s/veh		16.9			18.6			10.8			18.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.9	5.6	28.6		11.9	10.5	23.7				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		12.0	12.0	30.0		25.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s		7.0	2.3	21.3		6.9	6.1	9.0				
Green Ext Time (p_c), s		0.0	0.0	2.2		0.6	0.1	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			16.1									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection

Int Delay, s/veh 9.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔	↔	↔	↔
Traffic Vol, veh/h	60	220	140	130	300	20
Future Vol, veh/h	60	220	140	130	300	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	239	152	141	326	22

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	152	0	0 521 152
Stage 1	-	-	- 152 -
Stage 2	-	-	- 369 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1429	-	- 516 894
Stage 1	-	-	- 876 -
Stage 2	-	-	- 699 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1429	-	- 489 894
Mov Cap-2 Maneuver	-	-	- 489 -
Stage 1	-	-	- 830 -
Stage 2	-	-	- 699 -

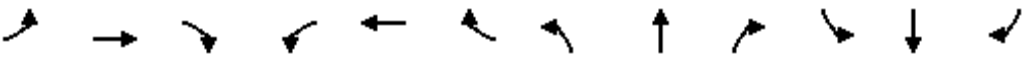
Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	24.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1429	-	-	-	489	894
HCM Lane V/C Ratio	0.046	-	-	-	0.667	0.024
HCM Control Delay (s)	7.6	0	-	-	25.9	9.1
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	0.1	-	-	-	4.9	0.1

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

Existing Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩		↩		↩	↩		↩	↩	
Traffic Volume (veh/h)	30	50	110	90	40	10	70	290	110	10	330	20
Future Volume (veh/h)	30	50	110	90	40	10	70	290	110	10	330	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	54	29	98	43	9	76	315	113	11	359	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	290	359	305	118	19	284	531	191	61	491	27
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.16	0.41	0.41	0.03	0.28	0.28
Sat Flow, veh/h	459	1268	1568	788	513	83	1781	1312	471	1781	1754	98
Grp Volume(v), veh/h	87	0	29	150	0	0	76	0	428	11	0	379
Grp Sat Flow(s),veh/h/ln	1727	0	1568	1385	0	0	1781	0	1782	1781	0	1852
Q Serve(g_s), s	0.0	0.0	0.7	3.0	0.0	0.0	1.8	0.0	9.0	0.3	0.0	8.9
Cycle Q Clear(g_c), s	1.8	0.0	0.7	4.8	0.0	0.0	1.8	0.0	9.0	0.3	0.0	8.9
Prop In Lane	0.38		1.00	0.65		0.06	1.00		0.26	1.00		0.05
Lane Grp Cap(c), veh/h	499	0	359	441	0	0	284	0	722	61	0	518
V/C Ratio(X)	0.17	0.00	0.08	0.34	0.00	0.00	0.27	0.00	0.59	0.18	0.00	0.73
Avail Cap(c_a), veh/h	1824	0	1635	592	0	0	595	0	1859	1858	0	966
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(l)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	14.5	16.1	0.0	0.0	17.7	0.0	11.2	22.5	0.0	15.6
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.0	0.5	0.0	0.8	1.4	0.0	2.0
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	0.7	0.0	0.2	1.2	0.0	0.0	0.6	0.0	2.6	0.1	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	0.0	14.6	16.6	0.0	0.0	18.2	0.0	11.9	23.9	0.0	17.6
LnGrp LOS	B	A	B	B	A	A	B	A	B	C	A	B
Approach Vol, veh/h		116			150			504			390	
Approach Delay, s/veh		15.0			16.6			12.9			17.8	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	19.2		16.4	6.3	25.2		16.4				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	3.8	10.9		6.8	2.3	11.0		3.8				
Green Ext Time (p_c), s	0.1	1.7		0.4	0.0	2.7		0.6				

Intersection Summary

HCM 6th Ctrl Delay 15.2

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
11: Private Dwy/Moorland Ave & Todd Rd

Existing Conditions AM

Intersection												
Int Delay, s/veh	87.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	360	10	10	410	310	10	10	10	260	10	70
Future Vol, veh/h	50	360	10	10	410	310	10	10	10	260	10	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	391	11	11	446	337	11	11	11	283	11	76
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	783	0	0	402	0	0	1185	1310	397	1153	1147	615
Stage 1	-	-	-	-	-	-	505	505	-	637	637	-
Stage 2	-	-	-	-	-	-	680	805	-	516	510	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	835	-	-	1157	-	-	166	159	652	~ 174	199	491
Stage 1	-	-	-	-	-	-	549	540	-	465	471	-
Stage 2	-	-	-	-	-	-	441	395	-	542	538	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	835	-	-	1157	-	-	126	147	652	~ 152	184	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	126	147	-	~ 152	184	-
Stage 1	-	-	-	-	-	-	513	505	-	435	466	-
Stage 2	-	-	-	-	-	-	361	391	-	488	503	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.1			28.7			\$ 388.8		
HCM LOS							D			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	184	835	-	-	1157	-	-	153	491			
HCM Lane V/C Ratio	0.177	0.065	-	-	0.009	-	-	1.918	0.155			
HCM Control Delay (s)	28.7	9.6	-	-	8.1	-	-	\$ 486.1	13.7			
HCM Lane LOS	D	A	-	-	A	-	-	F	B			
HCM 95th %tile Q(veh)	0.6	0.2	-	-	0	-	-	22.5	0.5			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

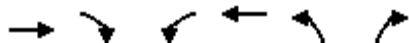
Existing Conditions AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩	↩	↩		↩	↩	↩		↩	
Traffic Volume (veh/h)	0	290	340	330	240	0	490	0	110	0	0	0
Future Volume (veh/h)	0	290	340	330	240	0	490	0	110	0	0	0
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	315	113	359	261	0	533	0	81	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	414	351	475	498	0	611	0	1088	0	3	0
Arrive On Green	0.00	0.22	0.22	0.27	0.27	0.00	0.34	0.00	0.34	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	315	113	359	261	0	533	0	81	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	8.6	3.3	10.1	6.5	0.0	15.3	0.0	0.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	8.6	3.3	10.1	6.5	0.0	15.3	0.0	0.9	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	414	351	475	498	0	611	0	1088	0	3	0
V/C Ratio(X)	0.00	0.76	0.32	0.76	0.52	0.00	0.87	0.00	0.07	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	686	582	980	1029	0	817	0	1454	0	275	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(l)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	19.9	17.8	18.4	17.0	0.0	16.8	0.0	12.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.9	0.5	2.5	0.9	0.0	8.0	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.6	1.1	3.9	2.5	0.0	6.7	0.0	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	22.8	18.3	20.9	17.9	0.0	24.8	0.0	12.1	0.0	0.0	0.0
LnGrp LOS	A	C	B	C	B	A	C	A	B	A	A	A
Approach Vol, veh/h		428			620			614			0	
Approach Delay, s/veh		21.6			19.6			23.1			0.0	
Approach LOS		C			B			C				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		0.0		15.3		21.7		17.5				
Change Period (Y+Rc), s		3.0		3.2		3.0		3.0				
Max Green Setting (Gmax), s		8.0		20.0		25.0		30.0				
Max Q Clear Time (g_c+I1), s		0.0		10.6		17.3		12.1				
Green Ext Time (p_c), s		0.0		1.5		1.4		2.4				
Intersection Summary												
HCM 6th Ctrl Delay				21.4								
HCM 6th LOS				C								
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

Existing Conditions AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	170	240	350	250	220	470
Future Volume (veh/h)	170	240	350	250	220	470
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	185	56	380	272	239	272
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	476	212	961	505	409	1393
Arrive On Green	0.13	0.13	0.27	0.27	0.23	0.23
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	185	56	380	272	239	272
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	1.4	0.9	2.5	3.6	3.4	1.5
Cycle Q Clear(g_c), s	1.4	0.9	2.5	3.6	3.4	1.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	476	212	961	505	409	1393
V/C Ratio(X)	0.39	0.26	0.40	0.54	0.58	0.20
Avail Cap(c_a), veh/h	2481	1107	1866	979	871	2116
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	11.3	11.1	8.5	8.9	9.8	4.0
Incr Delay (d2), s/veh	0.5	0.7	0.3	0.9	1.3	0.1
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	0.3	0.7	1.1	1.0	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.8	11.8	8.8	9.8	11.1	4.0
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	241			652	511	
Approach Delay, s/veh	11.8			9.2	7.4	
Approach LOS	B			A	A	
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	7.3		11.2		10.1	
Change Period (Y+Rc), s	3.5		3.5		3.5	
Max Green Setting (Gmax), s	20.0		15.0		14.0	
Max Q Clear Time (g_c+I1), s	3.4		5.6		5.4	
Green Ext Time (p_c), s	1.1		2.2		1.3	

Intersection Summary

HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

Existing Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	100	240	20	30	30	330	640	40	50	310	240
Future Volume (veh/h)	300	100	240	20	30	30	330	640	40	50	310	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	218	261	52	22	33	1	359	696	17	54	337	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	352	296	75	76	2	415	1201	532	73	540	238
Arrive On Green	0.19	0.19	0.19	0.04	0.04	0.04	0.23	0.34	0.34	0.04	0.15	0.15
Sat Flow, veh/h	1781	1870	1572	1781	1806	55	1781	3554	1573	1781	3554	1569
Grp Volume(v), veh/h	218	261	52	22	0	34	359	696	17	54	337	56
Grp Sat Flow(s), veh/h/ln	1781	1870	1572	1781	0	1861	1781	1777	1573	1781	1777	1569
Q Serve(g_s), s	6.1	7.1	1.5	0.6	0.0	1.0	10.4	8.7	0.4	1.6	4.8	1.7
Cycle Q Clear(g_c), s	6.1	7.1	1.5	0.6	0.0	1.0	10.4	8.7	0.4	1.6	4.8	1.7
Prop In Lane	1.00		1.00	1.00		0.03	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	335	352	296	75	0	78	415	1201	532	73	540	238
V/C Ratio(X)	0.65	0.74	0.18	0.29	0.00	0.43	0.87	0.58	0.03	0.74	0.62	0.23
Avail Cap(c_a), veh/h	596	626	526	331	0	346	563	1586	702	331	1057	467
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	20.6	18.3	25.0	0.0	25.1	19.8	14.7	11.9	25.5	21.4	20.1
Incr Delay (d2), s/veh	0.8	1.2	0.1	0.8	0.0	1.4	8.2	0.2	0.0	5.2	0.4	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.9	0.5	0.3	0.0	0.4	4.7	3.0	0.1	0.7	1.8	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	21.8	18.4	25.8	0.0	26.5	28.0	14.8	11.9	30.7	21.8	20.2
LnGrp LOS	C	C	B	C	A	C	C	B	B	C	C	C
Approach Vol, veh/h	531			56			1072			447		
Approach Delay, s/veh	21.1			26.2			19.2			22.7		
Approach LOS	C			C			B			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	15.2			17.6			13.6			7.4		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	9.1			12.4			6.8			3.0		
Green Ext Time (p_c), s	0.7			0.2			0.8			0.0		

Intersection Summary

HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection

Intersection Delay, s/veh 11.4

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	10	240	10	10	10	120	110	10	10	190	40
Future Vol, veh/h	40	10	240	10	10	10	120	110	10	10	190	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	261	11	11	11	130	120	11	11	207	43
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	9.1	11.6	11.2
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	14%	33%	4%
Vol Thru, %	46%	3%	33%	79%
Vol Right, %	4%	83%	33%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	290	30	240
LT Vol	120	40	10	10
Through Vol	110	10	10	190
RT Vol	10	240	10	40
Lane Flow Rate	261	315	33	261
Geometry Grp	1	1	1	1
Degree of Util (X)	0.384	0.43	0.052	0.373
Departure Headway (Hd)	5.3	4.912	5.694	5.144
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	678	738	627	699
Service Time	3.337	2.912	3.743	3.18
HCM Lane V/C Ratio	0.385	0.427	0.053	0.373
HCM Control Delay	11.6	11.6	9.1	11.2
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.8	2.2	0.2	1.7

HCM 6th TWSC
16: Riverside Dr & Verano Ave

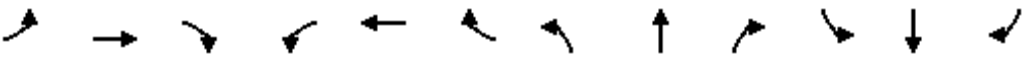
Existing Conditions AM

Intersection												
Int Delay, s/veh	11.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	260	10	90	220	50	20	20	20	120	20	40
Future Vol, veh/h	40	260	10	90	220	50	20	20	20	120	20	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	283	11	98	239	54	22	22	22	130	22	43
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	293	0	0	294	0	0	870	864	289	859	842	266
Stage 1	-	-	-	-	-	-	375	375	-	462	462	-
Stage 2	-	-	-	-	-	-	495	489	-	397	380	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1269	-	-	1268	-	-	272	292	750	277	301	773
Stage 1	-	-	-	-	-	-	646	617	-	580	565	-
Stage 2	-	-	-	-	-	-	556	549	-	629	614	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1269	-	-	1268	-	-	218	256	750	228	264	773
Mov Cap-2 Maneuver	-	-	-	-	-	-	218	256	-	228	264	-
Stage 1	-	-	-	-	-	-	624	596	-	560	512	-
Stage 2	-	-	-	-	-	-	456	498	-	569	593	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			2			20			44.9		
HCM LOS							C			E		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	305	1269	-	-	1268	-	-	275				
HCM Lane V/C Ratio	0.214	0.034	-	-	0.077	-	-	0.711				
HCM Control Delay (s)	20	7.9	-	-	8.1	0	-	44.9				
HCM Lane LOS	C	A	-	-	A	A	-	E				
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0.2	-	-	4.9				

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Existing Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (veh/h)	40	190	70	10	90	300	40	200	10	370	480	50
Future Volume (veh/h)	40	190	70	10	90	300	40	200	10	370	480	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	207	59	11	98	158	43	217	9	402	522	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	117	290	77	81	151	228	57	285	12	486	458	44
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.19	0.19	0.19	0.27	0.27	0.27
Sat Flow, veh/h	155	1272	337	28	660	997	295	1488	62	1781	1679	161
Grp Volume(v), veh/h	309	0	0	267	0	0	269	0	0	402	0	572
Grp Sat Flow(s),veh/h/ln	1763	0	0	1685	0	0	1845	0	0	1781	0	1840
Q Serve(g_s), s	0.7	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	10.6	0.0	13.7
Cycle Q Clear(g_c), s	8.0	0.0	0.0	7.3	0.0	0.0	6.9	0.0	0.0	10.6	0.0	13.7
Prop In Lane	0.14		0.19	0.04		0.59	0.16		0.03	1.00		0.09
Lane Grp Cap(c), veh/h	484	0	0	459	0	0	354	0	0	486	0	502
V/C Ratio(X)	0.64	0.00	0.00	0.58	0.00	0.00	0.76	0.00	0.00	0.83	0.00	1.14
Avail Cap(c_a), veh/h	898	0	0	1022	0	0	698	0	0	486	0	502
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(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	0.0	17.8	0.0	0.0	19.2	0.0	0.0	17.1	0.0	18.2
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.0	0.0	2.5	0.0	0.0	10.6	0.0	84.2
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	2.9	0.0	0.0	2.4	0.0	0.0	3.0	0.0	0.0	5.1	0.0	16.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.5	0.0	0.0	18.2	0.0	0.0	21.7	0.0	0.0	27.7	0.0	102.5
LnGrp LOS	B	A	A	B	A	A	C	A	A	C	A	F
Approach Vol, veh/h	309			267			269			974		
Approach Delay, s/veh	18.5			18.2			21.7			71.6		
Approach LOS	B			B			C			E		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	14.2			16.9			19.1			16.9		
Change Period (Y+Rc), s	4.6			* 5.4			5.4			5.4		
Max Green Setting (Gmax), s	19.0			* 24			13.7			28.7		
Max Q Clear Time (g_c+I1), s	8.9			10.0			15.7			9.3		
Green Ext Time (p_c), s	0.9			0.6			0.0			0.5		

Intersection Summary

HCM 6th Ctrl Delay 47.4

HCM 6th LOS D

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary 18: Old Redwood Hwy & Main St

Existing Conditions AM



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	490	20	200	250	30	520
Future Volume (veh/h)	490	20	200	250	30	520
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	533	8	217	272	33	565
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	600	534	414	351	54	751
Arrive On Green	0.34	0.34	0.22	0.22	0.03	0.40
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	533	8	217	272	33	565
Grp Sat Flow(s), veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	11.7	0.1	4.2	6.7	0.8	10.7
Cycle Q Clear(g_c), s	11.7	0.1	4.2	6.7	0.8	10.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	600	534	414	351	54	751
V/C Ratio(X)	0.89	0.01	0.52	0.78	0.61	0.75
Avail Cap(c_a), veh/h	1293	1151	1358	1151	517	1358
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	13.0	9.1	14.2	15.1	19.8	10.6
Incr Delay (d2), s/veh	1.8	0.0	0.4	1.4	4.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	1.4	2.0	0.3	3.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.8	9.1	14.6	16.5	23.8	11.2
LnGrp LOS	B	A	B	B	C	B
Approach Vol, veh/h	541		489			598
Approach Delay, s/veh	14.7		15.7			11.9
Approach LOS	B		B			B
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.5	15.3		18.5		22.8
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	12.8	8.7		13.7		12.7
Green Ext Time (p_c), s	0.0	0.5		0.3		1.0

Intersection Summary

HCM 6th Ctrl Delay	14.0
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

Existing Conditions AM

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	500	0	0	370	20	0	0	0	40	0	20
Future Vol, veh/h	20	500	0	0	370	20	0	0	0	40	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	543	0	0	402	22	0	0	0	43	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	424	0	0	543	0	0	1011	1011	543	1000	1000	413
Stage 1	-	-	-	-	-	-	587	587	-	413	413	-
Stage 2	-	-	-	-	-	-	424	424	-	587	587	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1135	-	-	1026	-	-	218	240	540	222	243	639
Stage 1	-	-	-	-	-	-	496	497	-	616	594	-
Stage 2	-	-	-	-	-	-	608	587	-	496	497	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1135	-	-	1026	-	-	208	235	540	219	238	639
Mov Cap-2 Maneuver	-	-	-	-	-	-	208	235	-	219	238	-
Stage 1	-	-	-	-	-	-	487	488	-	604	594	-
Stage 2	-	-	-	-	-	-	587	587	-	486	488	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	21.7
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1135	-	-	1026	-	-	280
HCM Lane V/C Ratio	-	0.019	-	-	-	-	-	0.233
HCM Control Delay (s)	0	8.2	-	-	0	-	-	21.7
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.9

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

Existing Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	350	80	70	250	270	70	350	120	200	230	80
Future Volume (veh/h)	300	350	80	70	250	270	70	350	120	200	230	80
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	326	380	80	76	272	261	76	380	98	217	250	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	362	622	131	172	270	259	172	493	126	250	634	142
Arrive On Green	0.20	0.42	0.42	0.10	0.31	0.31	0.10	0.18	0.18	0.14	0.22	0.22
Sat Flow, veh/h	1781	1497	315	1781	875	840	1781	2795	712	1781	2879	644
Grp Volume(v), veh/h	326	0	460	76	0	533	76	240	238	217	152	155
Grp Sat Flow(s),veh/h/ln	1781	0	1812	1781	0	1714	1781	1777	1730	1781	1777	1746
Q Serve(g_s), s	17.9	0.0	20.0	4.0	0.0	31.0	4.0	12.9	13.2	12.0	7.3	7.6
Cycle Q Clear(g_c), s	17.9	0.0	20.0	4.0	0.0	31.0	4.0	12.9	13.2	12.0	7.3	7.6
Prop In Lane	1.00		0.17	1.00		0.49	1.00		0.41	1.00		0.37
Lane Grp Cap(c), veh/h	362	0	754	172	0	529	172	313	305	250	391	384
V/C Ratio(X)	0.90	0.00	0.61	0.44	0.00	1.01	0.44	0.77	0.78	0.87	0.39	0.40
Avail Cap(c_a), veh/h	461	0	754	461	0	529	195	478	465	284	478	470
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	0.0	23.0	42.8	0.0	34.7	42.8	39.4	39.5	42.3	33.4	33.5
Incr Delay (d2), s/veh	17.4	0.0	1.4	1.8	0.0	40.8	1.8	4.0	4.7	22.0	0.6	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	9.2	0.0	8.2	1.8	0.0	18.2	1.8	5.7	5.8	6.7	3.2	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	0.0	24.4	44.6	0.0	75.5	44.6	43.3	44.2	64.3	34.0	34.2
LnGrp LOS	E	A	C	D	A	F	D	D	D	E	C	C
Approach Vol, veh/h		786			609			554			524	
Approach Delay, s/veh		37.7			71.7			43.9			46.6	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.7	27.1	24.4	35.2	18.1	22.7	13.7	45.9				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	6.0	9.6	19.9	33.0	14.0	15.2	6.0	22.0				
Green Ext Time (p_c), s	0.1	1.5	0.5	0.0	0.1	2.0	0.1	1.8				

Intersection Summary

HCM 6th Ctrl Delay 49.3

HCM 6th LOS D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th AWSC
1: Geyserville Ave & Canyon Road

Existing Conditions PM

Intersection

Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	10	90	10	10	10	130	40	10	10	40	20
Future Vol, veh/h	40	10	90	10	10	10	130	40	10	10	40	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	98	11	11	11	141	43	11	11	43	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	7.8	9.1	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	72%	29%	33%	14%
Vol Thru, %	22%	7%	33%	57%
Vol Right, %	6%	64%	33%	29%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	140	30	70
LT Vol	130	40	10	10
Through Vol	40	10	10	40
RT Vol	10	90	10	20
Lane Flow Rate	196	152	33	76
Geometry Grp	1	1	1	1
Degree of Util (X)	0.247	0.181	0.042	0.094
Departure Headway (Hd)	4.542	4.277	4.606	4.428
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	790	840	777	810
Service Time	2.566	2.298	2.634	2.454
HCM Lane V/C Ratio	0.248	0.181	0.042	0.094
HCM Control Delay	9.1	8.2	7.8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	0.7	0.1	0.3

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

Existing Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	360	0	0	430	170	10	30	20	80	0	60
Future Volume (veh/h)	50	360	0	0	430	170	10	30	20	80	0	60
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	391	0	0	467	92	11	33	4	87	0	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	519	1103	0	0	723	609	458	327	40	438	0	313
Arrive On Green	0.10	0.59	0.00	0.00	0.39	0.39	0.20	0.20	0.18	0.20	0.00	0.18
Sat Flow, veh/h	1781	1870	0	0	1870	1575	1386	1634	198	1355	0	1566
Grp Volume(v), veh/h	54	391	0	0	467	92	11	0	37	87	0	11
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1575	1386	0	1832	1355	0	1566
Q Serve(g_s), s	0.6	4.1	0.0	0.0	7.8	1.4	0.2	0.0	0.6	2.1	0.0	0.2
Cycle Q Clear(g_c), s	0.6	4.1	0.0	0.0	7.8	1.4	0.5	0.0	0.6	2.8	0.0	0.2
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	519	1103	0	0	723	609	458	0	366	438	0	313
V/C Ratio(X)	0.10	0.35	0.00	0.00	0.65	0.15	0.02	0.00	0.10	0.20	0.00	0.04
Avail Cap(c_a), veh/h	704	1607	0	0	3573	3008	862	0	900	833	0	770
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	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.5	4.0	0.0	0.0	9.5	7.6	12.5	0.0	12.5	13.6	0.0	12.6
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	1.0	0.1	0.0	0.0	0.1	0.2	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	0.1	0.9	0.0	0.0	2.6	0.4	0.1	0.0	0.2	0.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.6	4.2	0.0	0.0	10.5	7.7	12.5	0.0	12.6	13.8	0.0	12.6
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h	445				559		48				98	
Approach Delay, s/veh	4.4				10.1		12.6				13.6	
Approach LOS	A				B		B				B	
Timer - Assigned Phs	2		4		5	6	8					
Phs Duration (G+Y+Rc), s	26.5		11.6		7.7	18.7	11.6					
Change Period (Y+Rc), s	* 4.7		* 4.7		* 4.7	* 4.7	* 4.7					
Max Green Setting (Gmax), s	* 32		* 18		* 7	* 72	* 18					
Max Q Clear Time (g_c+I1), s	6.1		4.8		2.6	9.8	2.6					
Green Ext Time (p_c), s	2.6		0.2		0.0	3.9	0.1					

Intersection Summary

HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

Existing Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↗		↖	↗			↕	
Traffic Volume (veh/h)	0	340	120	60	430	20	140	10	30	20	20	30
Future Volume (veh/h)	0	340	120	60	430	20	140	10	30	20	20	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	370	78	65	467	20	152	11	7	22	22	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	586	493	568	988	42	519	250	159	253	217	53
Arrive On Green	0.00	0.31	0.31	0.14	0.56	0.54	0.23	0.23	0.22	0.23	0.23	0.22
Sat Flow, veh/h	0	1870	1572	1781	1780	76	1367	1068	680	500	929	227
Grp Volume(v), veh/h	0	370	78	65	0	487	152	0	18	51	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1572	1781	0	1856	1367	0	1748	1656	0	0
Q Serve(g_s), s	0.0	6.4	1.4	0.7	0.0	6.0	2.5	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.4	1.4	0.7	0.0	6.0	3.4	0.0	0.3	0.8	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.04	1.00		0.39	0.43		0.14
Lane Grp Cap(c), veh/h	0	586	493	568	0	1030	519	0	409	523	0	0
V/C Ratio(X)	0.00	0.63	0.16	0.11	0.00	0.47	0.29	0.00	0.04	0.10	0.00	0.00
Avail Cap(c_a), veh/h	0	1218	1024	781	0	1209	1305	0	1415	600	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.1	9.4	5.9	0.0	5.1	12.3	0.0	11.4	11.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.1	0.1	0.0	0.3	0.3	0.0	0.0	0.1	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	0.0	2.3	0.4	0.2	0.0	1.4	1.0	0.0	0.1	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.3	9.6	6.0	0.0	5.4	12.7	0.0	11.4	11.6	0.0	0.0
LnGrp LOS	A	B	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	448		552			170			51			
Approach Delay, s/veh	11.8		5.5			12.5			11.6			
Approach LOS	B		A			B			B			
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	9.2	15.9	12.9		25.1		12.9					
Change Period (Y+Rc), s	4.7	* 4.7	* 4.7		* 4.7		* 4.7					
Max Green Setting (Gmax), s	24	* 24	* 10		* 24		* 30					
Max Q Clear Time (g_c+I), s	8.4	8.4	2.8		8.0		5.4					
Green Ext Time (p_c), s	0.1	2.3	0.1		3.0		0.5					

Intersection Summary

HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Old Redwood Hwy & Fulton Rd

Existing Conditions PM

Intersection						
Int Delay, s/veh	45.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	270	50	40	550	440	220
Future Vol, veh/h	270	50	40	550	440	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	90	70	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	293	54	43	598	478	239
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1162	478	717	0	-	0
Stage 1	478	-	-	-	-	-
Stage 2	684	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 216	587	884	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 205	587	884	-	-	-
Mov Cap-2 Maneuver	~ 205	-	-	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	224.3	0.6		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	884	-	205	587	-	-
HCM Lane V/C Ratio	0.049	-	1.432	0.093	-	-
HCM Control Delay (s)	9.3	-	263.7	11.8	-	-
HCM Lane LOS	A	-	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	17.4	0.3	-	-
Notes						
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Existing Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	620	490	120	310	30	430	270	150	40	220	100
Future Volume (veh/h)	150	620	490	120	310	30	430	270	150	40	220	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	163	674	284	130	337	30	467	293	41	43	239	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	532	447	185	449	40	503	528	444	38	209	86
Arrive On Green	0.12	0.28	0.28	0.10	0.27	0.25	0.28	0.28	0.28	0.19	0.19	0.18
Sat Flow, veh/h	1781	1870	1571	1781	1691	151	1781	1870	1571	201	1115	457
Grp Volume(v), veh/h	163	674	284	130	0	367	467	293	41	380	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1571	1781	0	1841	1781	1870	1571	1773	0	0
Q Serve(g_s), s	9.9	32.0	17.8	7.9	0.0	20.6	28.7	15.0	2.2	21.1	0.0	0.0
Cycle Q Clear(g_c), s	9.9	32.0	17.8	7.9	0.0	20.6	28.7	15.0	2.2	21.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		1.00	0.11		0.26
Lane Grp Cap(c), veh/h	218	532	447	185	0	489	503	528	444	332	0	0
V/C Ratio(X)	0.75	1.27	0.64	0.70	0.00	0.75	0.93	0.55	0.09	1.14	0.00	0.00
Avail Cap(c_a), veh/h	345	532	447	339	0	605	503	528	444	332	0	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	47.7	40.3	35.2	48.8	0.0	38.0	39.3	34.4	29.8	45.9	0.0	0.0
Incr Delay (d2), s/veh	1.9	134.8	2.3	1.8	0.0	3.0	23.3	0.8	0.0	94.1	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	4.4	33.9	6.8	3.6	0.0	9.4	15.2	6.7	0.8	17.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.6	175.1	37.5	50.6	0.0	41.0	62.6	35.1	29.8	139.9	0.0	0.0
LnGrp LOS	D	F	D	D	A	D	E	D	C	F	A	A
Approach Vol, veh/h		1121			497			801			380	
Approach Delay, s/veh		122.0			43.5			50.8			139.9	
Approach LOS		F			D			D			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.7	36.0		25.1	17.8	33.9		35.8				
Change Period (Y+Rc), s	5.8	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	19.6	30.0		20.0	20.0	35.0		30.0				
Max Q Clear Time (g_c+I1), s	9.9	34.0		23.1	11.9	22.6		30.7				
Green Ext Time (p_c), s	0.1	0.0		0.0	0.1	1.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			90.1									
HCM 6th LOS			F									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

Existing Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	160	400	20	90	30	240	540	20	50	400	50
Future Volume (veh/h)	70	160	400	20	90	30	240	540	20	50	400	50
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	174	90	22	98	20	261	587	10	54	435	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	144	303	257	59	148	30	350	794	673	114	546	463
Arrive On Green	0.08	0.16	0.16	0.03	0.10	0.09	0.20	0.42	0.42	0.06	0.29	0.29
Sat Flow, veh/h	1781	1870	1585	1781	1507	308	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	76	174	90	22	0	118	261	587	10	54	435	18
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1815	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.1	4.3	2.5	0.6	0.0	3.2	7.0	13.3	0.2	1.5	10.8	0.4
Cycle Q Clear(g_c), s	2.1	4.3	2.5	0.6	0.0	3.2	7.0	13.3	0.2	1.5	10.8	0.4
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	144	303	257	59	0	178	350	794	673	114	546	463
V/C Ratio(X)	0.53	0.57	0.35	0.38	0.00	0.66	0.75	0.74	0.01	0.47	0.80	0.04
Avail Cap(c_a), veh/h	473	1533	1299	444	0	956	744	1151	976	391	1151	976
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	19.6	18.8	23.9	0.0	22.0	19.1	12.2	8.4	22.8	16.5	12.8
Incr Delay (d2), s/veh	1.1	0.6	0.3	1.5	0.0	1.6	1.2	0.6	0.0	1.1	1.0	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	0.8	1.7	0.8	0.3	0.0	1.3	2.6	4.4	0.1	0.6	4.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	20.2	19.1	25.4	0.0	23.6	20.3	12.8	8.4	24.0	17.5	12.8
LnGrp LOS	C	C	B	C	A	C	C	B	A	C	B	B
Approach Vol, veh/h	340			140			858			507		
Approach Delay, s/veh	20.6			23.9			15.0			18.0		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	12.2	13.9	18.8	8.1	9.8	7.2	25.5				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+I), s	12.6	6.3	9.0	12.8	4.1	5.2	3.5	15.3				
Green Ext Time (p_c), s	0.0	0.3	0.1	0.8	0.0	0.2	0.0	1.1				

Intersection Summary

HCM 6th Ctrl Delay 17.6

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection												
Int Delay, s/veh	22.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	10	20	70	10	20	20	700	120	30	700	30
Future Vol, veh/h	10	10	20	70	10	20	20	700	120	30	700	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	11	22	76	11	22	22	761	130	33	761	33
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1731	1779	778	1665	1665	761	794	0	0	891	0	0
Stage 1	844	844	-	805	805	-	-	-	-	-	-	-
Stage 2	887	935	-	860	860	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	69	82	396	77	97	405	827	-	-	761	-	-
Stage 1	358	379	-	376	395	-	-	-	-	-	-	-
Stage 2	339	344	-	351	373	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	55	74	396	~ 60	87	405	827	-	-	761	-	-
Mov Cap-2 Maneuver	55	74	-	~ 60	87	-	-	-	-	-	-	-
Stage 1	348	349	-	366	384	-	-	-	-	-	-	-
Stage 2	303	335	-	296	344	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	58.4		\$ 357.9		0.2		0.4					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	827	-	-	109	75	761	-	-				
HCM Lane V/C Ratio	0.026	-	-	0.399	1.449	0.043	-	-				
HCM Control Delay (s)	9.5	-	-	58.4	\$ 357.9	9.9	0	-				
HCM Lane LOS	A	-	-	F	F	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	1.7	8.8	0.1	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

Existing Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	10	10	150	10	120	30	690	150	80	650	10
Future Volume (veh/h)	10	10	10	150	10	120	30	690	150	80	650	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.99	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	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	11	2	163	11	32	33	750	101	87	707	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	166	131	17	398	17	278	96	888	749	152	946	798
Arrive On Green	0.18	0.18	0.17	0.18	0.18	0.18	0.05	0.47	0.47	0.09	0.51	0.51
Sat Flow, veh/h	288	737	93	1380	93	1563	1781	1870	1577	1781	1870	1577
Grp Volume(v), veh/h	24	0	0	174	0	32	33	750	101	87	707	6
Grp Sat Flow(s),veh/h/ln	1118	0	0	1473	0	1563	1781	1870	1577	1781	1870	1577
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.8	0.8	16.1	1.6	2.2	13.8	0.1
Cycle Q Clear(g_c), s	4.9	0.0	0.0	4.9	0.0	0.8	0.8	16.1	1.6	2.2	13.8	0.1
Prop In Lane	0.46		0.08	0.94		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	314	0	0	415	0	278	96	888	749	152	946	798
V/C Ratio(X)	0.08	0.00	0.00	0.42	0.00	0.11	0.34	0.84	0.13	0.57	0.75	0.01
Avail Cap(c_a), veh/h	466	0	0	952	0	873	509	1270	1070	509	1270	1071
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	0.0	0.0	17.5	0.0	15.8	20.9	10.5	6.8	20.2	9.0	5.6
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.0	0.1	0.8	2.6	0.0	1.3	1.0	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	0.2	0.0	0.0	1.6	0.0	0.2	0.3	5.1	0.4	0.8	3.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	0.0	0.0	17.7	0.0	15.9	21.7	13.2	6.8	21.4	10.0	5.6
LnGrp LOS	B	A	A	B	A	B	C	B	A	C	B	A
Approach Vol, veh/h		24			206			884			800	
Approach Delay, s/veh		15.8			17.4			12.8			11.2	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.2	6.5	27.2		12.2	7.9	25.8				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		12.0	12.0	30.0		25.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s		6.9	2.8	15.8		6.9	4.2	18.1				
Green Ext Time (p_c), s		0.0	0.0	2.1		0.6	0.0	2.2				
Intersection Summary												
HCM 6th Ctrl Delay			12.7									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection

Int Delay, s/veh 4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↑	↗	↖	↗
Traffic Vol, veh/h	30	170	170	380	240	50
Future Vol, veh/h	30	170	170	380	240	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	185	185	413	261	54

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	185	0	0 436 185
Stage 1	-	-	- 185 -
Stage 2	-	-	- 251 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1390	-	- 578 857
Stage 1	-	-	- 847 -
Stage 2	-	-	- 791 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1390	-	- 563 857
Mov Cap-2 Maneuver	-	-	- 563 -
Stage 1	-	-	- 825 -
Stage 2	-	-	- 791 -

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1390	-	-	-	563	857
HCM Lane V/C Ratio	0.023	-	-	-	0.463	0.063
HCM Control Delay (s)	7.7	0	-	-	16.8	9.5
HCM Lane LOS	A	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	-	-	-	2.4	0.2

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

Existing Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	20	80	150	40	10	100	400	70	10	360	30
Future Volume (veh/h)	20	20	80	150	40	10	100	400	70	10	360	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	22	21	163	43	9	109	435	74	11	391	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	241	383	370	85	14	352	739	126	85	557	43
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.22	0.20	0.48	0.44	0.05	0.32	0.29
Sat Flow, veh/h	695	989	1569	1010	349	59	1781	1556	265	1781	1714	131
Grp Volume(v), veh/h	44	0	21	215	0	0	109	0	509	11	0	421
Grp Sat Flow(s),veh/h/ln	1683	0	1569	1418	0	0	1781	0	1821	1781	0	1845
Q Serve(g_s), s	0.0	0.0	0.5	6.1	0.0	0.0	2.7	0.0	10.5	0.3	0.0	10.3
Cycle Q Clear(g_c), s	0.9	0.0	0.5	7.1	0.0	0.0	2.7	0.0	10.5	0.3	0.0	10.3
Prop In Lane	0.50		1.00	0.76		0.04	1.00		0.15	1.00		0.07
Lane Grp Cap(c), veh/h	516	0	383	469	0	0	352	0	865	85	0	600
V/C Ratio(X)	0.09	0.00	0.05	0.46	0.00	0.00	0.31	0.00	0.59	0.13	0.00	0.70
Avail Cap(c_a), veh/h	1696	0	1567	604	0	0	578	0	1833	1755	0	961
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	0.0	14.9	17.4	0.0	0.0	17.6	0.0	10.0	23.5	0.0	15.3
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.7	0.0	0.0	0.5	0.0	0.6	0.7	0.0	1.5
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	0.4	0.0	0.2	2.0	0.0	0.0	1.0	0.0	3.0	0.1	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	0.0	15.0	18.1	0.0	0.0	18.1	0.0	10.6	24.2	0.0	16.8
LnGrp LOS	B	A	B	B	A	A	B	A	B	C	A	B
Approach Vol, veh/h		65			215			618			432	
Approach Delay, s/veh		15.1			18.1			11.9			17.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.2	20.7		16.6	6.4	28.4		16.6				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	4.7	12.3		9.1	2.3	12.5		2.9				
Green Ext Time (p_c), s	0.2	1.9		0.6	0.0	3.3		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			14.7									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th TWSC
11: Private Dwy/Moorland Ave & Todd Rd

Existing Conditions PM

Intersection												
Int Delay, s/veh	349											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	520	10	20	420	340	10	20	20	360	20	30
Future Vol, veh/h	50	520	10	20	420	340	10	20	20	360	20	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	565	11	22	457	370	11	22	22	391	22	33
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	827	0	0	576	0	0	1393	1550	571	1387	1370	642
Stage 1	-	-	-	-	-	-	679	679	-	686	686	-
Stage 2	-	-	-	-	-	-	714	871	-	701	684	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	804	-	-	997	-	-	119	114	520	~ 120	146	474
Stage 1	-	-	-	-	-	-	441	451	-	438	448	-
Stage 2	-	-	-	-	-	-	422	368	-	429	449	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	804	-	-	997	-	-	91	104	520	~ 90	133	474
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	104	-	~ 90	133	-
Stage 1	-	-	-	-	-	-	411	421	-	409	438	-
Stage 2	-	-	-	-	-	-	365	360	-	~ 364	419	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.2			43.2			\$ 1542.6		
HCM LOS							E			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	147	804	-	-	997	-	-	92	474			
HCM Lane V/C Ratio	0.37	0.068	-	-	0.022	-	-	4.49	0.069			
HCM Control Delay (s)	43.2	9.8	-	-	8.7	-	-	\$ 1663.3	13.2			
HCM Lane LOS	E	A	-	-	A	-	-	F	B			
HCM 95th %tile Q(veh)	1.6	0.2	-	-	0.1	-	-	43.7	0.2			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

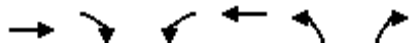
Existing Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	350	550	350	250	0	530	0	120	0	0	0
Future Volume (veh/h)	0	350	550	350	250	0	530	0	120	0	0	0
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	380	265	380	272	0	576	0	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	437	370	450	472	0	601	0	1070	0	3	0
Arrive On Green	0.00	0.23	0.23	0.25	0.25	0.00	0.34	0.00	0.34	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	380	265	380	272	0	576	0	87	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	13.3	10.5	13.8	8.7	0.0	21.6	0.0	1.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	13.3	10.5	13.8	8.7	0.0	21.6	0.0	1.3	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	437	370	450	472	0	601	0	1070	0	3	0
V/C Ratio(X)	0.00	0.87	0.72	0.84	0.58	0.00	0.96	0.00	0.08	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	527	447	759	797	0	628	0	1117	0	192	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	25.1	24.0	24.2	22.3	0.0	22.1	0.0	15.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	12.7	4.3	4.5	1.1	0.0	25.4	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.0	4.1	5.9	3.7	0.0	12.5	0.0	0.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	37.7	28.3	28.6	23.4	0.0	47.4	0.0	15.4	0.0	0.0	0.0
LnGrp LOS	A	D	C	C	C	A	D	A	B	A	A	A
Approach Vol, veh/h	645				652				663		0	
Approach Delay, s/veh	33.9				26.4				43.2		0.0	
Approach LOS	C				C				D			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	0.0		19.9		27.0		21.2					
Change Period (Y+Rc), s	3.0		3.2		3.0		3.0					
Max Green Setting (Gmax), s	8.0		20.0		25.0		30.0					
Max Q Clear Time (g_c+I1), s	0.0		15.3		23.6		15.8					
Green Ext Time (p_c), s	0.0		1.4		0.4		2.4					
Intersection Summary												
HCM 6th Ctrl Delay			34.6									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

Existing Conditions PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↕↑	↖	↗↗
Traffic Volume (veh/h)	190	250	380	360	250	700
Future Volume (veh/h)	190	250	380	360	250	700
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	55	449	340	272	434
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	440	196	990	520	419	1432
Arrive On Green	0.12	0.12	0.28	0.28	0.24	0.24
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	207	55	449	340	272	434
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	1.8	1.0	3.4	5.3	4.6	3.0
Cycle Q Clear(g_c), s	1.8	1.0	3.4	5.3	4.6	3.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	440	196	990	520	419	1432
V/C Ratio(X)	0.47	0.28	0.45	0.65	0.65	0.30
Avail Cap(c_a), veh/h	2096	935	1562	820	727	1914
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	13.5	13.1	9.9	10.5	11.4	4.6
Incr Delay (d2), s/veh	0.8	0.8	0.3	1.4	1.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.3	1.0	1.8	1.5	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	13.9	10.2	11.9	13.1	4.8
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	262			789	706	
Approach Delay, s/veh	14.2			10.9	8.0	
Approach LOS	B			B	A	
Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	8.1				13.2	11.8
Change Period (Y+Rc), s	3.5				3.5	3.5
Max Green Setting (Gmax), s	20.0				15.0	14.0
Max Q Clear Time (g_c+I1), s	3.8				7.3	6.6
Green Ext Time (p_c), s	1.3				2.4	1.7
Intersection Summary						
HCM 6th Ctrl Delay			10.2			
HCM 6th LOS			B			
Notes						

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

Existing Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	470	60	360	50	100	60	350	610	40	30	520	290
Future Volume (veh/h)	470	60	360	50	100	60	350	610	40	30	520	290
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	557	0	84	54	109	38	380	663	17	33	565	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	718	0	317	216	161	56	440	1444	640	82	744	330
Arrive On Green	0.20	0.00	0.20	0.12	0.12	0.11	0.25	0.41	0.41	0.05	0.21	0.21
Sat Flow, veh/h	3563	0	1573	1781	1325	462	1781	3554	1575	1781	3554	1574
Grp Volume(v), veh/h	557	0	84	54	0	147	380	663	17	33	565	73
Grp Sat Flow(s), veh/h/ln	1781	0	1573	1781	0	1787	1781	1777	1575	1781	1777	1574
Q Serve(g_s), s	10.7	0.0	3.3	2.0	0.0	5.7	14.8	9.9	0.5	1.3	10.8	2.8
Cycle Q Clear(g_c), s	10.7	0.0	3.3	2.0	0.0	5.7	14.8	9.9	0.5	1.3	10.8	2.8
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	718	0	317	216	0	217	440	1444	640	82	744	330
V/C Ratio(X)	0.78	0.00	0.27	0.25	0.00	0.68	0.86	0.46	0.03	0.40	0.76	0.22
Avail Cap(c_a), veh/h	939	0	415	273	0	274	445	1444	640	280	854	378
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	0.0	24.4	28.8	0.0	30.6	26.1	15.7	12.9	33.6	26.9	23.7
Incr Delay (d2), s/veh	2.1	0.0	0.2	0.2	0.0	2.5	15.2	0.1	0.0	1.2	2.8	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	0.0
%ile BackOfQ(50%), veh/ln	4.6	0.0	1.2	0.8	0.0	2.6	7.7	3.6	0.2	0.6	4.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.5	0.0	24.6	29.1	0.0	33.2	41.3	15.8	12.9	34.8	29.7	23.9
LnGrp LOS	C	A	C	C	A	C	D	B	B	C	C	C
Approach Vol, veh/h	641			201			1060			671		
Approach Delay, s/veh	28.9			32.1			24.9			29.3		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	18.6			21.9			19.2			12.8		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	12.7			16.8			12.8			7.7		
Green Ext Time (p_c), s	0.5			0.0			0.7			0.1		

Intersection Summary

HCM 6th Ctrl Delay 27.6

HCM 6th LOS C

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection

Intersection Delay, s/veh 11

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	10	190	10	10	10	130	150	10	10	120	60
Future Vol, veh/h	50	10	190	10	10	10	130	150	10	10	120	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	11	207	11	11	11	141	163	11	11	130	65
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.7	8.9	12	10
HCM LOS	B	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	45%	20%	33%	5%
Vol Thru, %	52%	4%	33%	63%
Vol Right, %	3%	76%	33%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	290	250	30	190
LT Vol	130	50	10	10
Through Vol	150	10	10	120
RT Vol	10	190	10	60
Lane Flow Rate	315	272	33	207
Geometry Grp	1	1	1	1
Degree of Util (X)	0.438	0.363	0.051	0.287
Departure Headway (Hd)	5.001	4.814	5.582	5.004
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	709	736	644	723
Service Time	3.099	2.912	3.594	3.004
HCM Lane V/C Ratio	0.444	0.37	0.051	0.286
HCM Control Delay	12	10.7	8.9	10
HCM Lane LOS	B	B	A	A
HCM 95th-tile Q	2.2	1.7	0.2	1.2

HCM 6th TWSC
16: Riverside Dr & Verano Ave

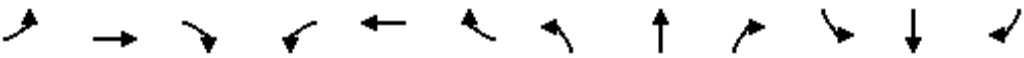
Existing Conditions PM

Intersection												
Int Delay, s/veh	31.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	290	110	70	350	130	20	80	20	70	50	30
Future Vol, veh/h	50	290	110	70	350	130	20	80	20	70	50	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	315	120	76	380	141	22	87	22	76	54	33
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	521	0	0	435	0	0	1129	1156	375	1141	1146	451
Stage 1	-	-	-	-	-	-	483	483	-	603	603	-
Stage 2	-	-	-	-	-	-	646	673	-	538	543	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1045	-	-	1125	-	-	181	197	671	178	199	608
Stage 1	-	-	-	-	-	-	565	553	-	486	488	-
Stage 2	-	-	-	-	-	-	460	454	-	527	520	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1045	-	-	1125	-	-	115	169	671	92	170	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	115	169	-	92	170	-
Stage 1	-	-	-	-	-	-	536	524	-	461	441	-
Stage 2	-	-	-	-	-	-	345	410	-	403	493	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			1.1			67.4			203.8		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	177	1045	-	-	1125	-	-	136				
HCM Lane V/C Ratio	0.737	0.052	-	-	0.068	-	-	1.199				
HCM Control Delay (s)	67.4	8.6	-	-	8.4	0	-	203.8				
HCM Lane LOS	F	A	-	-	A	A	-	F				
HCM 95th %tile Q(veh)	4.7	0.2	-	-	0.2	-	-	9.7				

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Existing Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (veh/h)	30	130	50	20	180	390	40	630	20	260	280	30
Future Volume (veh/h)	30	130	50	20	180	390	40	630	20	260	280	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	141	39	22	196	328	43	685	21	283	304	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	106	409	103	63	231	367	28	451	14	365	345	32
Arrive On Green	0.36	0.36	0.35	0.37	0.37	0.35	0.27	0.27	0.26	0.20	0.20	0.19
Sat Flow, veh/h	138	1127	284	34	630	999	107	1697	52	1781	1685	155
Grp Volume(v), veh/h	213	0	0	546	0	0	749	0	0	283	0	332
Grp Sat Flow(s),veh/h/ln	1549	0	0	1663	0	0	1856	0	0	1781	0	1840
Q Serve(g_s), s	0.0	0.0	0.0	9.6	0.0	0.0	19.6	0.0	0.0	11.1	0.0	12.9
Cycle Q Clear(g_c), s	6.3	0.0	0.0	22.8	0.0	0.0	19.6	0.0	0.0	11.1	0.0	12.9
Prop In Lane	0.15		0.18	0.04		0.60	0.06		0.03	1.00		0.08
Lane Grp Cap(c), veh/h	618	0	0	661	0	0	493	0	0	365	0	377
V/C Ratio(X)	0.34	0.00	0.00	0.83	0.00	0.00	1.52	0.00	0.00	0.78	0.00	0.88
Avail Cap(c_a), veh/h	618	0	0	729	0	0	493	0	0	365	0	377
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	0.0	22.4	0.0	0.0	27.1	0.0	0.0	27.7	0.0	28.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	6.4	0.0	0.0	243.8	0.0	0.0	9.2	0.0	20.2
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	2.4	0.0	0.0	9.2	0.0	0.0	41.7	0.0	0.0	5.4	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	0.0	28.8	0.0	0.0	270.9	0.0	0.0	37.0	0.0	48.7
LnGrp LOS	B	A	A	C	A	A	F	A	A	D	A	D
Approach Vol, veh/h		213			546			749			615	
Approach Delay, s/veh		17.2			28.8			270.9			43.3	
Approach LOS		B			C			F			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.6		31.1		19.1		31.1				
Change Period (Y+Rc), s		4.6		* 5.4		5.4		5.4				
Max Green Setting (Gmax), s		19.0		* 24		13.7		28.7				
Max Q Clear Time (g_c+I1), s		21.6		8.3		14.9		24.8				
Green Ext Time (p_c), s		0.0		0.4		0.0		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				117.2								
HCM 6th LOS				F								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

Existing Conditions PM



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	320	20	520	670	20	240
Future Volume (veh/h)	320	20	520	670	20	240
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	348	5	565	728	22	261
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	414	369	945	801	103	1181
Arrive On Green	0.23	0.23	0.51	0.51	0.06	0.63
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	348	5	565	728	22	261
Grp Sat Flow(s), veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	11.0	0.1	12.6	24.7	0.7	3.5
Cycle Q Clear(g_c), s	11.0	0.1	12.6	24.7	0.7	3.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	414	369	945	801	103	1181
V/C Ratio(X)	0.84	0.01	0.60	0.91	0.21	0.22
Avail Cap(c_a), veh/h	927	825	1025	868	430	1181
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	21.5	17.4	10.3	13.3	26.4	4.6
Incr Delay (d2), s/veh	1.8	0.0	0.5	12.2	0.4	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	4.5	0.1	4.0	9.1	0.3	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	23.3	17.4	10.8	25.5	26.8	4.7
LnGrp LOS	C	B	B	C	C	A
Approach Vol, veh/h	353		1293			283
Approach Delay, s/veh	23.2		19.0			6.4
Approach LOS	C		B			A
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.4	33.7		17.7		41.1
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	12.7	26.7		13.0		5.5
Green Ext Time (p_c), s	0.0	0.8		0.2		0.4

Intersection Summary

HCM 6th Ctrl Delay 18.0

HCM 6th LOS B

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

Existing Conditions PM

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	350	0	0	420	20	0	0	0	20	0	20
Future Vol, veh/h	20	350	0	0	420	20	0	0	0	20	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	380	0	0	457	22	0	0	0	22	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	479	0	0	380	0	0	903	903	380	892	892	468
Stage 1	-	-	-	-	-	-	424	424	-	468	468	-
Stage 2	-	-	-	-	-	-	479	479	-	424	424	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1083	-	-	1178	-	-	258	277	667	263	281	595
Stage 1	-	-	-	-	-	-	608	587	-	575	561	-
Stage 2	-	-	-	-	-	-	568	555	-	608	587	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1083	-	-	1178	-	-	245	271	667	259	275	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	245	271	-	259	275	-
Stage 1	-	-	-	-	-	-	596	575	-	564	561	-
Stage 2	-	-	-	-	-	-	547	555	-	596	575	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	0	16.3
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1083	-	-	1178	-	-	361
HCM Lane V/C Ratio	-	0.02	-	-	-	-	-	0.12
HCM Control Delay (s)	0	8.4	-	-	0	-	-	16.3
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.4

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

Existing Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	350	60	70	380	240	70	250	100	240	260	110
Future Volume (veh/h)	110	350	60	70	380	240	70	250	100	240	260	110
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		0.98	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	120	380	61	76	413	244	76	272	70	261	283	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	216	595	96	191	401	237	191	446	112	299	603	165
Arrive On Green	0.12	0.38	0.38	0.11	0.36	0.36	0.11	0.16	0.15	0.17	0.22	0.21
Sat Flow, veh/h	1781	1571	252	1781	1100	650	1781	2800	706	1781	2749	752
Grp Volume(v), veh/h	120	0	441	76	0	657	76	171	171	261	181	181
Grp Sat Flow(s),veh/h/ln	1781	0	1824	1781	0	1750	1781	1777	1729	1781	1777	1724
Q Serve(g_s), s	5.4	0.0	16.9	3.4	0.0	31.2	3.4	7.6	7.9	12.2	7.6	7.9
Cycle Q Clear(g_c), s	5.4	0.0	16.9	3.4	0.0	31.2	3.4	7.6	7.9	12.2	7.6	7.9
Prop In Lane	1.00		0.14	1.00		0.37	1.00		0.41	1.00		0.44
Lane Grp Cap(c), veh/h	216	0	691	191	0	639	191	283	275	299	390	378
V/C Ratio(X)	0.56	0.00	0.64	0.40	0.00	1.03	0.40	0.60	0.62	0.87	0.46	0.48
Avail Cap(c_a), veh/h	542	0	691	542	0	639	229	582	566	333	582	565
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	0.0	21.8	35.6	0.0	27.2	35.6	33.4	33.8	34.7	29.0	29.3
Incr Delay (d2), s/veh	2.2	0.0	2.0	1.3	0.0	43.2	1.3	2.1	2.3	20.3	0.9	0.9
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	2.4	0.0	6.9	1.5	0.0	19.5	1.5	3.3	3.3	6.8	3.2	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.6	0.0	23.8	36.9	0.0	70.4	36.9	35.5	36.1	55.0	29.9	30.3
LnGrp LOS	D	A	C	D	A	F	D	D	D	E	C	C
Approach Vol, veh/h		561			733			418			623	
Approach Delay, s/veh		26.7			66.9			36.0			40.5	
Approach LOS		C			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.2	22.7	14.4	35.2	18.3	17.6	13.2	36.4				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	5.4	9.9	7.4	33.2	14.2	9.9	5.4	18.9				
Green Ext Time (p_c), s	0.1	1.9	0.3	0.0	0.1	1.6	0.1	2.0				
Intersection Summary												
HCM 6th Ctrl Delay			44.7									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

ATTACHMENT C-2

EXISTING PLUS PROGRAM CONDITIONS OUTPUTS



HCM 6th AWSC
1: Geyserville Ave & Canyon Road

Existing plus Project Conditions AM

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	10	178	10	10	10	118	20	10	10	20	20
Future Vol, veh/h	40	10	178	10	10	10	118	20	10	10	20	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	193	11	11	11	128	22	11	11	22	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	7.8	9	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	80%	18%	33%	20%
Vol Thru, %	14%	4%	33%	40%
Vol Right, %	7%	78%	33%	40%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	148	228	30	50
LT Vol	118	40	10	10
Through Vol	20	10	10	20
RT Vol	10	178	10	20
Lane Flow Rate	161	248	33	54
Geometry Grp	1	1	1	1
Degree of Util (X)	0.211	0.279	0.041	0.068
Departure Headway (Hd)	4.715	4.059	4.58	4.529
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	763	887	782	790
Service Time	2.74	2.075	2.607	2.559
HCM Lane V/C Ratio	0.211	0.28	0.042	0.068
HCM Control Delay	9	8.6	7.8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	1.1	0.1	0.2

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

Existing plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	300	0	0	310	98	10	22	20	154	0	40
Future Volume (veh/h)	55	300	0	0	310	98	10	22	20	154	0	40
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No				No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	326	0	0	337	44	11	24	5	167	0	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	501	965	0	0	549	461	499	323	67	483	0	338
Arrive On Green	0.09	0.52	0.00	0.00	0.29	0.29	0.22	0.22	0.22	0.22	0.00	0.22
Sat Flow, veh/h	1781	1870	0	0	1870	1572	1390	1498	312	1366	0	1568
Grp Volume(v), veh/h	60	326	0	0	337	44	11	0	29	167	0	9
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1572	1390	0	1810	1366	0	1568
Q Serve(g_s), s	0.7	3.6	0.0	0.0	5.4	0.7	0.2	0.0	0.4	3.9	0.0	0.2
Cycle Q Clear(g_c), s	0.7	3.6	0.0	0.0	5.4	0.7	0.4	0.0	0.4	4.3	0.0	0.2
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	501	965	0	0	549	461	499	0	390	483	0	338
V/C Ratio(X)	0.12	0.34	0.00	0.00	0.61	0.10	0.02	0.00	0.07	0.35	0.00	0.03
Avail Cap(c_a), veh/h	700	1709	0	0	2243	1884	914	0	930	890	0	806
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	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.5	5.0	0.0	0.0	10.7	9.0	11.0	0.0	11.0	12.7	0.0	10.8
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	1.1	0.1	0.0	0.0	0.1	0.4	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	0.2	0.9	0.0	0.0	1.9	0.2	0.1	0.0	0.2	1.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.7	5.2	0.0	0.0	11.8	9.1	11.0	0.0	11.0	13.1	0.0	10.9
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h	386				381			40			176	
Approach Delay, s/veh	5.4				11.5			11.0			13.0	
Approach LOS	A				B			B			B	
Timer - Assigned Phs	2			4	5	6		8				
Phs Duration (G+Y+Rc), s	22.8			12.3	7.8	15.0		12.3				
Change Period (Y+Rc), s	* 4.7			* 4.7	* 4.7	* 4.7		* 4.7				
Max Green Setting (Gmax), s	* 32			* 18	* 7	* 42		* 18				
Max Q Clear Time (g_c+I1), s	5.6			6.3	2.7	7.4		2.4				
Green Ext Time (p_c), s	2.1			0.4	0.0	2.5		0.1				

Intersection Summary

HCM 6th Ctrl Delay 9.3

HCM 6th LOS A

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

Existing plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↖	↖	↖		↖	↖			↕	
Traffic Volume (veh/h)	0	335	139	20	290	10	108	30	70	10	20	10
Future Volume (veh/h)	0	335	139	20	290	10	108	30	70	10	20	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	364	97	22	315	10	117	33	16	11	22	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	578	486	432	896	28	529	270	131	206	305	23
Arrive On Green	0.00	0.31	0.31	0.05	0.50	0.50	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	0	1870	1572	1781	1802	57	1373	1190	577	294	1346	99
Grp Volume(v), veh/h	0	364	97	22	0	325	117	0	49	35	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1572	1781	0	1860	1373	0	1767	1740	0	0
Q Serve(g_s), s	0.0	5.7	1.5	0.2	0.0	3.6	1.8	0.0	0.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.7	1.5	0.2	0.0	3.6	2.3	0.0	0.8	0.5	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.03	1.00		0.33	0.31		0.06
Lane Grp Cap(c), veh/h	0	578	486	432	0	924	529	0	400	533	0	0
V/C Ratio(X)	0.00	0.63	0.20	0.05	0.00	0.35	0.22	0.00	0.12	0.07	0.00	0.00
Avail Cap(c_a), veh/h	0	1320	1110	815	0	1313	1429	0	1559	645	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	10.1	8.7	6.7	0.0	5.2	11.0	0.0	10.5	10.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.2	0.0	0.0	0.2	0.2	0.0	0.1	0.1	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	0.0	1.9	0.4	0.1	0.0	0.9	0.6	0.0	0.2	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	11.2	8.9	6.8	0.0	5.4	11.2	0.0	10.6	10.4	0.0	0.0
LnGrp LOS	A	B	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	461		347			166			35			
Approach Delay, s/veh	10.7		5.5			11.0			10.4			
Approach LOS	B		A			B			B			
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	6.4	15.2	12.4		21.6		12.4					
Change Period (Y+Rc), s	4.7	* 4.7	* 4.7		* 4.7		* 4.7					
Max Green Setting (Gmax), s	24	* 24	* 10		* 24		* 30					
Max Q Clear Time (g_c+I), s	12.2	7.7	2.5		5.6		4.3					
Green Ext Time (p_c), s	0.0	2.4	0.0		1.9		0.6					

Intersection Summary

HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Old Redwood Hwy & Fulton Rd

Existing plus Project Conditions AM

Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	132	30	30	144	656	308
Future Vol, veh/h	132	30	30	144	656	308
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	90	70	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	33	33	157	713	335
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	936	713	1048	0	-	0
Stage 1	713	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	294	432	664	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	279	432	664	-	-	-
Mov Cap-2 Maneuver	279	-	-	-	-	-
Stage 1	462	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	27.7	1.8		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	664	-	279	432	-	-
HCM Lane V/C Ratio	0.049	-	0.514	0.075	-	-
HCM Control Delay (s)	10.7	-	30.8	14	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.7	0.2	-	-

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Existing plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	271	160	182	493	20	570	141	121	30	222	206
Future Volume (veh/h)	61	271	160	182	493	20	570	141	121	30	222	206
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	295	38	198	536	21	620	153	35	33	241	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	376	315	229	497	19	495	520	437	22	162	135
Arrive On Green	0.05	0.20	0.20	0.13	0.28	0.28	0.28	0.28	0.28	0.19	0.19	0.19
Sat Flow, veh/h	1781	1870	1565	1781	1787	70	1781	1870	1571	120	876	730
Grp Volume(v), veh/h	66	295	38	198	0	557	620	153	35	475	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1565	1781	0	1857	1781	1870	1571	1726	0	0
Q Serve(g_s), s	4.0	16.1	2.1	11.8	0.0	30.0	30.0	6.9	1.8	20.0	0.0	0.0
Cycle Q Clear(g_c), s	4.0	16.1	2.1	11.8	0.0	30.0	30.0	6.9	1.8	20.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		1.00	0.07		0.42
Lane Grp Cap(c), veh/h	85	376	315	229	0	516	495	520	437	320	0	0
V/C Ratio(X)	0.77	0.78	0.12	0.87	0.00	1.08	1.25	0.29	0.08	1.48	0.00	0.00
Avail Cap(c_a), veh/h	330	520	435	330	0	516	495	520	437	320	0	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(l)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	50.8	40.9	35.3	46.1	0.0	38.9	38.9	30.6	28.7	43.9	0.0	0.0
Incr Delay (d2), s/veh	5.5	3.4	0.1	11.2	0.0	62.4	129.0	0.1	0.0	234.0	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	1.8	7.5	0.8	5.8	0.0	22.0	30.2	3.0	0.7	29.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	44.3	35.3	57.3	0.0	101.4	168.0	30.7	28.8	278.0	0.0	0.0
LnGrp LOS	E	D	D	E	A	F	F	C	C	F	A	A
Approach Vol, veh/h		399			755			808			475	
Approach Delay, s/veh		45.4			89.8			135.9			278.0	
Approach LOS		D			F			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.3	27.7		25.1	11.0	36.0		35.8				
Change Period (Y+Rc), s	5.4	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	20.0	30.0		20.0	20.0	30.0		30.0				
Max Q Clear Time (g_c+I1), s	13.8	18.1		22.0	6.0	32.0		32.0				
Green Ext Time (p_c), s	0.1	0.8		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 134.5

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

Existing plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	120	282	30	241	30	294	154	10	30	666	60
Future Volume (veh/h)	30	120	282	30	241	30	294	154	10	30	666	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	130	57	33	262	28	320	167	6	33	724	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	369	309	45	312	33	354	971	819	45	647	544
Arrive On Green	0.03	0.20	0.20	0.03	0.19	0.19	0.20	0.52	0.52	0.03	0.35	0.35
Sat Flow, veh/h	1781	1870	1565	1781	1659	177	1781	1870	1577	1781	1870	1574
Grp Volume(v), veh/h	33	130	57	33	0	290	320	167	6	33	724	24
Grp Sat Flow(s),veh/h/ln	1781	1870	1565	1781	0	1837	1781	1870	1577	1781	1870	1574
Q Serve(g_s), s	1.6	5.2	2.6	1.6	0.0	13.2	15.2	4.1	0.2	1.6	30.0	0.9
Cycle Q Clear(g_c), s	1.6	5.2	2.6	1.6	0.0	13.2	15.2	4.1	0.2	1.6	30.0	0.9
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	45	369	309	45	0	345	354	971	819	45	647	544
V/C Ratio(X)	0.73	0.35	0.18	0.73	0.00	0.84	0.90	0.17	0.01	0.73	1.12	0.04
Avail Cap(c_a), veh/h	246	862	721	246	0	550	410	971	819	205	647	544
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.0	30.0	29.0	42.0	0.0	34.0	33.9	11.0	10.1	42.0	28.4	18.9
Incr Delay (d2), s/veh	8.2	0.2	0.1	8.2	0.0	3.4	19.4	0.0	0.0	8.2	73.1	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	0.8	2.3	1.0	0.8	0.0	6.1	8.2	1.6	0.1	0.8	25.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.2	30.3	29.1	50.2	0.0	37.3	53.4	11.0	10.1	50.2	101.5	18.9
LnGrp LOS	D	C	C	D	A	D	D	B	B	D	F	B
Approach Vol, veh/h	220			323			493			781		
Approach Delay, s/veh	33.0			38.7			38.5			96.8		
Approach LOS	C			D			D			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	22.5	22.4	35.1	7.6	21.7	7.3	50.2				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+I), s	13.6	7.2	17.2	32.0	3.6	15.2	3.6	6.1				
Green Ext Time (p_c), s	0.0	0.2	0.1	0.0	0.0	0.5	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay 62.9

HCM 6th LOS E

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection												
Int Delay, s/veh	46.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	10	20	142	10	10	10	347	80	20	858	20
Future Vol, veh/h	40	10	20	142	10	10	10	347	80	20	858	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	22	154	11	11	11	377	87	22	933	22
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1442	1474	944	1404	1398	377	955	0	0	464	0	0
Stage 1	988	988	-	399	399	-	-	-	-	-	-	-
Stage 2	454	486	-	1005	999	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	110	127	318	~ 117	141	670	720	-	-	1097	-	-
Stage 1	297	325	-	627	602	-	-	-	-	-	-	-
Stage 2	586	551	-	291	321	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	97	120	318	~ 97	133	670	720	-	-	1097	-	-
Mov Cap-2 Maneuver	97	120	-	~ 97	133	-	-	-	-	-	-	-
Stage 1	293	311	-	618	593	-	-	-	-	-	-	-
Stage 2	557	543	-	250	307	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	70.8		\$ 420.7		0.2		0.2					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	720	-	-	125 104	1097	-	-					
HCM Lane V/C Ratio	0.015	-	-	0.609 1.693	0.02	-	-					
HCM Control Delay (s)	10.1	-	-	70.8\$ 420.7	8.3	0	-					
HCM Lane LOS	B	-	-	F F	A	A	-					
HCM 95th %tile Q(veh)	0	-	-	3.1 13.8	0.1	-	-					
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

Existing plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	10	20	179	10	47	10	351	124	154	796	10
Future Volume (veh/h)	20	10	20	179	10	47	10	351	124	154	796	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	11	5	195	11	12	11	382	53	167	865	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	67	17	388	14	323	20	734	618	212	935	789
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.01	0.39	0.39	0.12	0.50	0.50
Sat Flow, veh/h	225	323	83	1233	70	1566	1781	1870	1575	1781	1870	1577
Grp Volume(v), veh/h	38	0	0	206	0	12	11	382	53	167	865	6
Grp Sat Flow(s),veh/h/ln	632	0	0	1303	0	1566	1781	1870	1575	1781	1870	1577
Q Serve(g_s), s	0.2	0.0	0.0	0.0	0.0	0.3	0.3	8.2	1.1	4.8	22.6	0.1
Cycle Q Clear(g_c), s	8.2	0.0	0.0	8.1	0.0	0.3	0.3	8.2	1.1	4.8	22.6	0.1
Prop In Lane	0.58		0.13	0.95		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	239	0	0	403	0	323	20	734	618	212	935	789
V/C Ratio(X)	0.16	0.00	0.00	0.51	0.00	0.04	0.55	0.52	0.09	0.79	0.92	0.01
Avail Cap(c_a), veh/h	272	0	0	782	0	746	407	1069	901	407	1069	902
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(l)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	0.0	0.0	19.7	0.0	16.6	25.8	12.2	10.0	22.5	12.2	6.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.0	8.3	0.2	0.0	2.5	11.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.2	0.0	0.1	0.2	2.8	0.3	1.9	9.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.4	0.0	0.0	20.1	0.0	16.7	34.1	12.4	10.0	24.9	23.7	6.6
LnGrp LOS	B	A	A	C	A	B	C	B	B	C	C	A
Approach Vol, veh/h	38			218			446			1038		
Approach Delay, s/veh	17.4			19.9			12.6			23.8		
Approach LOS	B			B			B			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	15.4		5.7	31.3		15.4		11.3	25.7			
Change Period (Y+Rc), s	4.6		5.1	5.1		4.6		5.1	5.1			
Max Green Setting (Gmax), s	12.0		12.0	30.0		25.0		12.0	30.0			
Max Q Clear Time (g_c+I1), s	10.2		2.3	24.6		10.1		6.8	10.2			
Green Ext Time (p_c), s	0.0		0.0	1.7		0.7		0.1	1.1			
Intersection Summary												
HCM 6th Ctrl Delay	20.3											
HCM 6th LOS	C											

Notes

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

Intersection

Int Delay, s/veh 15

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Vol, veh/h	65	255	145	156	342	23
Future Vol, veh/h	65	255	145	156	342	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	277	158	170	372	25

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	158	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1422	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1422	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

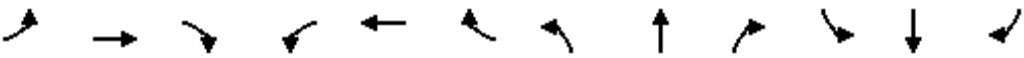
Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	39
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1422	-	-	-	450	887
HCM Lane V/C Ratio	0.05	-	-	-	0.826	0.028
HCM Control Delay (s)	7.7	0	-	-	41	9.2
HCM Lane LOS	A	A	-	-	E	A
HCM 95th %tile Q(veh)	0.2	-	-	-	7.9	0.1

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

Existing plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Volume (veh/h)	30	51	144	90	41	10	73	290	110	11	375	20
Future Volume (veh/h)	30	51	144	90	41	10	73	290	110	11	375	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	55	37	98	45	9	79	315	113	12	408	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	283	347	288	116	18	284	558	200	66	533	27
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.16	0.43	0.43	0.04	0.30	0.30
Sat Flow, veh/h	455	1279	1567	767	524	81	1781	1312	471	1781	1762	91
Grp Volume(v), veh/h	88	0	37	152	0	0	79	0	428	12	0	429
Grp Sat Flow(s),veh/h/ln	1734	0	1567	1372	0	0	1781	0	1782	1781	0	1853
Q Serve(g_s), s	0.0	0.0	0.9	3.3	0.0	0.0	2.0	0.0	9.1	0.3	0.0	10.5
Cycle Q Clear(g_c), s	1.9	0.0	0.9	5.2	0.0	0.0	2.0	0.0	9.1	0.3	0.0	10.5
Prop In Lane	0.37		1.00	0.64		0.06	1.00		0.26	1.00		0.05
Lane Grp Cap(c), veh/h	482	0	347	422	0	0	284	0	758	66	0	560
V/C Ratio(X)	0.18	0.00	0.11	0.36	0.00	0.00	0.28	0.00	0.57	0.18	0.00	0.77
Avail Cap(c_a), veh/h	1744	0	1561	562	0	0	568	0	1776	1775	0	923
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(l)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.0	0.0	15.6	17.3	0.0	0.0	18.5	0.0	10.9	23.4	0.0	15.9
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.0	0.5	0.0	0.7	1.3	0.0	2.2
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	0.7	0.0	0.3	1.4	0.0	0.0	0.7	0.0	2.6	0.1	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.1	0.0	15.7	17.8	0.0	0.0	19.1	0.0	11.6	24.8	0.0	18.1
LnGrp LOS	B	A	B	B	A	A	B	A	B	C	A	B
Approach Vol, veh/h		125			152			507			441	
Approach Delay, s/veh		16.0			17.8			12.7			18.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.7	21.0		16.5	6.5	27.1		16.5				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	4.0	12.5		7.2	2.3	11.1		3.9				
Green Ext Time (p_c), s	0.1	1.9		0.4	0.0	2.7		0.6				

Intersection Summary

HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection												
Int Delay, s/veh	185.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	459	10	10	435	329	10	10	10	315	10	72
Future Vol, veh/h	52	459	10	10	435	329	10	10	10	315	10	72
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	499	11	11	473	358	11	11	11	342	11	78
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	831	0	0	510	0	0	1338	1472	505	1304	1298	652
Stage 1	-	-	-	-	-	-	619	619	-	674	674	-
Stage 2	-	-	-	-	-	-	719	853	-	630	624	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	801	-	-	1055	-	-	130	127	567	~ 137	162	468
Stage 1	-	-	-	-	-	-	476	480	-	444	454	-
Stage 2	-	-	-	-	-	-	420	376	-	470	478	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	801	-	-	1055	-	-	96	117	567	~ 117	149	468
Mov Cap-2 Maneuver	-	-	-	-	-	-	96	117	-	~ 117	149	-
Stage 1	-	-	-	-	-	-	442	446	-	412	449	-
Stage 2	-	-	-	-	-	-	338	372	-	418	444	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0.1			36.9			\$ 801.9		
HCM LOS							E			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	145	801	-	-	1055	-	-	118	468			
HCM Lane V/C Ratio	0.225	0.071	-	-	0.01	-	-	2.994	0.167			
HCM Control Delay (s)	36.9	9.8	-	-	8.4	-	-	\$ 976.4	14.2			
HCM Lane LOS	E	A	-	-	A	-	-	F	B			
HCM 95th %tile Q(veh)	0.8	0.2	-	-	0	-	-	33.4	0.6			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

Existing plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	430	354	350	247	0	527	0	177	0	0	0
Future Volume (veh/h)	0	430	354	350	247	0	527	0	177	0	0	0
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	467	210	380	268	0	573	0	128	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	509	431	463	486	0	608	0	1082	0	3	0
Arrive On Green	0.00	0.27	0.27	0.26	0.26	0.00	0.34	0.00	0.34	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	467	210	380	268	0	573	0	128	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	17.6	8.1	14.6	9.0	0.0	22.7	0.0	2.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	17.6	8.1	14.6	9.0	0.0	22.7	0.0	2.0	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	509	431	463	486	0	608	0	1082	0	3	0
V/C Ratio(X)	0.00	0.92	0.49	0.82	0.55	0.00	0.94	0.00	0.12	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	515	436	735	772	0	613	0	1091	0	206	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(l)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	25.7	22.2	25.3	23.2	0.0	23.2	0.0	16.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	21.4	0.9	4.1	1.0	0.0	23.0	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.0	10.2	2.9	6.2	3.8	0.0	12.7	0.0	0.7	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	47.1	23.0	29.4	24.2	0.0	46.3	0.0	16.5	0.0	0.0	0.0
LnGrp LOS	A	D	C	C	C	A	D	A	B	A	A	A
Approach Vol, veh/h		677			648			701			0	
Approach Delay, s/veh		39.6			27.2			40.8			0.0	
Approach LOS		D			C			D				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		0.0		23.0		27.8		21.9				
Change Period (Y+Rc), s		3.0		3.2		3.0		3.0				
Max Green Setting (Gmax), s		8.0		20.0		25.0		30.0				
Max Q Clear Time (g_c+I1), s		0.0		19.6		24.7		16.6				
Green Ext Time (p_c), s		0.0		0.2		0.1		2.3				

Intersection Summary

HCM 6th Ctrl Delay	36.1
HCM 6th LOS	D

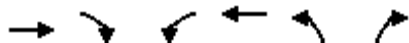
Notes

User approved pedestrian interval to be less than phase max green.
 User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

Existing plus Project Conditions AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	216	250	444	296	237	487
Future Volume (veh/h)	216	250	444	296	237	487
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	235	57	483	322	258	295
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	549	245	1026	539	413	1450
Arrive On Green	0.15	0.15	0.29	0.29	0.23	0.23
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	235	57	483	322	258	295
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	1.9	1.0	3.6	4.8	4.2	1.8
Cycle Q Clear(g_c), s	1.9	1.0	3.6	4.8	4.2	1.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	549	245	1026	539	413	1450
V/C Ratio(X)	0.43	0.23	0.47	0.60	0.63	0.20
Avail Cap(c_a), veh/h	2206	984	1659	871	774	2016
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	12.3	11.9	9.4	9.9	11.1	4.2
Incr Delay (d2), s/veh	0.5	0.5	0.3	1.1	1.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.3	1.0	1.5	1.4	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.9	12.4	9.8	10.9	12.7	4.2
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	292			805	553	
Approach Delay, s/veh	12.8			10.2	8.2	
Approach LOS	B			B	A	
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	8.5		12.8		11.0	
Change Period (Y+Rc), s	3.5		3.5		3.5	
Max Green Setting (Gmax), s	20.0		15.0		14.0	
Max Q Clear Time (g_c+I1), s	3.9		6.8		6.2	
Green Ext Time (p_c), s	1.4		2.5		1.3	
Intersection Summary						
HCM 6th Ctrl Delay			10.0			
HCM 6th LOS			A			

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

Existing plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	100	273	20	30	30	369	671	40	50	335	341
Future Volume (veh/h)	330	100	273	20	30	30	369	671	40	50	335	341
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	234	284	61	22	33	1	401	729	18	54	364	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	349	367	308	73	74	2	451	1290	571	71	551	243
Arrive On Green	0.20	0.20	0.20	0.04	0.04	0.04	0.25	0.36	0.36	0.04	0.16	0.16
Sat Flow, veh/h	1781	1870	1573	1781	1806	55	1781	3554	1574	1781	3554	1570
Grp Volume(v), veh/h	234	284	61	22	0	34	401	729	18	54	364	80
Grp Sat Flow(s), veh/h/ln	1781	1870	1573	1781	0	1861	1781	1777	1574	1781	1777	1570
Q Serve(g_s), s	7.1	8.4	1.9	0.7	0.0	1.0	12.7	9.6	0.4	1.8	5.6	2.6
Cycle Q Clear(g_c), s	7.1	8.4	1.9	0.7	0.0	1.0	12.7	9.6	0.4	1.8	5.6	2.6
Prop In Lane	1.00		1.00	1.00		0.03	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	349	367	308	73	0	76	451	1290	571	71	551	243
V/C Ratio(X)	0.67	0.77	0.20	0.30	0.00	0.45	0.89	0.57	0.03	0.76	0.66	0.33
Avail Cap(c_a), veh/h	550	577	485	305	0	319	519	1462	648	305	975	431
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.7	22.2	19.6	27.2	0.0	27.3	21.0	14.9	12.0	27.7	23.2	21.9
Incr Delay (d2), s/veh	0.8	1.3	0.1	0.9	0.0	1.5	14.5	0.1	0.0	6.0	0.5	0.3
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	2.8	3.5	0.6	0.3	0.0	0.5	6.5	3.3	0.1	0.8	2.1	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	23.6	19.7	28.0	0.0	28.8	35.5	15.0	12.0	33.7	23.7	22.2
LnGrp LOS	C	C	B	C	A	C	D	B	B	C	C	C
Approach Vol, veh/h	579			56			1148			498		
Approach Delay, s/veh	22.7			28.5			22.1			24.5		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	16.5			19.9			14.4			7.5		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	10.4			14.7			7.6			3.0		
Green Ext Time (p_c), s	0.8			0.1			0.8			0.0		

Intersection Summary

HCM 6th Ctrl Delay 23.0

HCM 6th LOS C

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection

Intersection Delay, s/veh 11.4

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	40	10	241	10	10	10	122	112	10	10	191	40
Future Vol, veh/h	40	10	241	10	10	10	122	112	10	10	191	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	262	11	11	11	133	122	11	11	208	43
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	9.1	11.7	11.3
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	14%	33%	4%
Vol Thru, %	46%	3%	33%	79%
Vol Right, %	4%	83%	33%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	244	291	30	241
LT Vol	122	40	10	10
Through Vol	112	10	10	191
RT Vol	10	241	10	40
Lane Flow Rate	265	316	33	262
Geometry Grp	1	1	1	1
Degree of Util (X)	0.391	0.433	0.052	0.375
Departure Headway (Hd)	5.31	4.927	5.718	5.158
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	676	737	625	697
Service Time	3.346	2.927	3.765	3.194
HCM Lane V/C Ratio	0.392	0.429	0.053	0.376
HCM Control Delay	11.7	11.6	9.1	11.3
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.9	2.2	0.2	1.7

HCM 6th TWSC
16: Riverside Dr & Verano Ave

Existing plus Project Conditions AM

Intersection												
Int Delay, s/veh	15.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	270	10	90	260	52	20	20	20	127	20	47
Future Vol, veh/h	42	270	10	90	260	52	20	20	20	127	20	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	293	11	98	283	57	22	22	22	138	22	51
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	340	0	0	304	0	0	935	927	299	921	904	312
Stage 1	-	-	-	-	-	-	391	391	-	508	508	-
Stage 2	-	-	-	-	-	-	544	536	-	413	396	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1219	-	-	1257	-	-	246	268	741	251	277	728
Stage 1	-	-	-	-	-	-	633	607	-	547	539	-
Stage 2	-	-	-	-	-	-	523	523	-	616	604	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1219	-	-	1257	-	-	192	233	741	204	241	728
Mov Cap-2 Maneuver	-	-	-	-	-	-	192	233	-	204	241	-
Stage 1	-	-	-	-	-	-	609	584	-	526	487	-
Stage 2	-	-	-	-	-	-	420	472	-	554	581	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			1.8			22			64.6		
HCM LOS							C			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	277	1219	-	-	1257	-	-	252				
HCM Lane V/C Ratio	0.235	0.037	-	-	0.078	-	-	0.837				
HCM Control Delay (s)	22	8.1	-	-	8.1	0	-	64.6				
HCM Lane LOS	C	A	-	-	A	A	-	F				
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.3	-	-	6.7				

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Existing plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	194	70	10	92	300	40	203	10	370	494	51
Future Volume (veh/h)	44	194	70	10	92	300	40	203	10	370	494	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	211	60	11	100	162	43	221	9	402	537	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	293	77	80	153	233	56	289	12	481	454	43
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.19	0.19	0.19	0.27	0.27	0.27
Sat Flow, veh/h	172	1257	331	28	658	1001	291	1493	61	1781	1680	160
Grp Volume(v), veh/h	319	0	0	273	0	0	273	0	0	402	0	588
Grp Sat Flow(s),veh/h/ln	1760	0	0	1686	0	0	1845	0	0	1781	0	1840
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	10.8	0.0	13.7
Cycle Q Clear(g_c), s	8.3	0.0	0.0	7.5	0.0	0.0	7.1	0.0	0.0	10.8	0.0	13.7
Prop In Lane	0.15		0.19	0.04		0.59	0.16		0.03	1.00		0.09
Lane Grp Cap(c), veh/h	492	0	0	467	0	0	357	0	0	481	0	497
V/C Ratio(X)	0.65	0.00	0.00	0.58	0.00	0.00	0.76	0.00	0.00	0.84	0.00	1.18
Avail Cap(c_a), veh/h	886	0	0	1011	0	0	691	0	0	481	0	497
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(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.1	0.0	0.0	17.8	0.0	0.0	19.4	0.0	0.0	17.5	0.0	18.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.0	0.0	2.6	0.0	0.0	11.5	0.0	101.8
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	3.1	0.0	0.0	2.5	0.0	0.0	3.0	0.0	0.0	5.3	0.0	18.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.7	0.0	0.0	18.3	0.0	0.0	21.9	0.0	0.0	29.0	0.0	120.3
LnGrp LOS	B	A	A	B	A	A	C	A	A	C	A	F
Approach Vol, veh/h		319			273			273			990	
Approach Delay, s/veh		18.7			18.3			21.9			83.2	
Approach LOS		B			B			C			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.4		17.2		19.1		17.2				
Change Period (Y+Rc), s		4.6		* 5.4		5.4		5.4				
Max Green Setting (Gmax), s		19.0		* 24		13.7		28.7				
Max Q Clear Time (g_c+I1), s		9.1		10.3		15.7		9.5				
Green Ext Time (p_c), s		0.9		0.6		0.0		0.5				

Intersection Summary

HCM 6th Ctrl Delay 53.5

HCM 6th LOS D

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

Existing plus Project Conditions AM



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	520	23	208	255	33	546
Future Volume (veh/h)	520	23	208	255	33	546
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	565	10	226	277	36	593
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	628	559	416	352	58	744
Arrive On Green	0.35	0.35	0.22	0.22	0.03	0.40
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	565	10	226	277	36	593
Grp Sat Flow(s), veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	13.0	0.2	4.6	7.1	0.9	12.1
Cycle Q Clear(g_c), s	13.0	0.2	4.6	7.1	0.9	12.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	628	559	416	352	58	744
V/C Ratio(X)	0.90	0.02	0.54	0.79	0.62	0.80
Avail Cap(c_a), veh/h	1234	1098	1296	1098	494	1296
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	13.3	9.1	14.9	15.9	20.7	11.5
Incr Delay (d2), s/veh	2.0	0.0	0.4	1.5	4.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.1	1.6	2.2	0.4	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.2	9.1	15.3	17.4	24.7	12.2
LnGrp LOS	B	A	B	B	C	B
Approach Vol, veh/h	575		503			629
Approach Delay, s/veh	15.1		16.4			13.0
Approach LOS	B		B			B
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.6	15.8		19.9		23.4
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	12.9	9.1		15.0		14.1
Green Ext Time (p_c), s	0.0	0.5		0.3		1.1

Intersection Summary

HCM 6th Ctrl Delay 14.7

HCM 6th LOS B

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

Existing plus Project Conditions AM

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	505	5	15	375	25	5	10	25	45	5	20
Future Vol, veh/h	20	505	5	15	375	25	5	10	25	45	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	549	5	16	408	27	5	11	27	49	5	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	435	0	0	554	0	0	1063	1063	552	1069	1052	422
Stage 1	-	-	-	-	-	-	596	596	-	454	454	-
Stage 2	-	-	-	-	-	-	467	467	-	615	598	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1125	-	-	1016	-	-	201	223	533	199	227	632
Stage 1	-	-	-	-	-	-	490	492	-	586	569	-
Stage 2	-	-	-	-	-	-	576	562	-	479	491	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1125	-	-	1016	-	-	185	215	533	177	219	632
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	215	-	177	219	-
Stage 1	-	-	-	-	-	-	480	482	-	574	560	-
Stage 2	-	-	-	-	-	-	542	553	-	436	481	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.3			17.5			28.7		
HCM LOS							C			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	332	1125	-	-	1016	-	-	227
HCM Lane V/C Ratio	0.131	0.019	-	-	0.016	-	-	0.335
HCM Control Delay (s)	17.5	8.3	-	-	8.6	-	-	28.7
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	1.4

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

Existing plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	350	81	71	250	270	73	358	123	200	232	80
Future Volume (veh/h)	300	350	81	71	250	270	73	358	123	200	232	80
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	326	380	81	77	272	261	79	389	104	217	252	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	362	618	132	172	268	257	173	499	132	249	641	145
Arrive On Green	0.20	0.41	0.41	0.10	0.31	0.31	0.10	0.18	0.18	0.14	0.22	0.22
Sat Flow, veh/h	1781	1493	318	1781	875	840	1781	2771	732	1781	2873	649
Grp Volume(v), veh/h	326	0	461	77	0	533	79	248	245	217	154	156
Grp Sat Flow(s),veh/h/ln	1781	0	1812	1781	0	1714	1781	1777	1726	1781	1777	1745
Q Serve(g_s), s	18.0	0.0	20.2	4.1	0.0	31.0	4.2	13.4	13.7	12.1	7.5	7.7
Cycle Q Clear(g_c), s	18.0	0.0	20.2	4.1	0.0	31.0	4.2	13.4	13.7	12.1	7.5	7.7
Prop In Lane	1.00		0.18	1.00		0.49	1.00		0.42	1.00		0.37
Lane Grp Cap(c), veh/h	362	0	749	172	0	526	173	320	311	249	396	389
V/C Ratio(X)	0.90	0.00	0.62	0.45	0.00	1.01	0.46	0.77	0.79	0.87	0.39	0.40
Avail Cap(c_a), veh/h	458	0	749	458	0	526	194	475	461	282	475	466
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.3	0.0	23.3	43.1	0.0	35.0	43.1	39.5	39.6	42.6	33.4	33.5
Incr Delay (d2), s/veh	17.7	0.0	1.5	1.8	0.0	42.7	1.9	4.6	5.5	22.4	0.6	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	9.3	0.0	8.3	1.9	0.0	18.5	1.9	6.0	6.0	6.8	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.0	0.0	24.8	45.0	0.0	77.8	45.0	44.1	45.1	65.0	34.0	34.2
LnGrp LOS	E	A	C	D	A	F	D	D	D	E	C	C
Approach Vol, veh/h		787			610			572			527	
Approach Delay, s/veh		38.1			73.6			44.7			46.8	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.8	27.5	24.5	35.2	18.1	23.2	13.7	46.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	6.2	9.7	20.0	33.0	14.1	15.7	6.1	22.2				
Green Ext Time (p_c), s	0.1	1.5	0.5	0.0	0.1	2.0	0.1	1.7				

Intersection Summary

HCM 6th Ctrl Delay 50.1

HCM 6th LOS D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th AWSC

1: Geyserville Ave & Canyon Road

Existing plus Project Conditions PM

Intersection	
Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	10	118	10	10	10	146	40	10	10	40	20
Future Vol, veh/h	40	10	118	10	10	10	146	40	10	10	40	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	11	128	11	11	11	159	43	11	11	43	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	7.9	9.4	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	74%	24%	33%	14%
Vol Thru, %	20%	6%	33%	57%
Vol Right, %	5%	70%	33%	29%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	196	168	30	70
LT Vol	146	40	10	10
Through Vol	40	10	10	40
RT Vol	10	118	10	20
Lane Flow Rate	213	183	33	76
Geometry Grp	1	1	1	1
Degree of Util (X)	0.273	0.217	0.043	0.096
Departure Headway (Hd)	4.619	4.283	4.694	4.521
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	778	838	762	791
Service Time	2.648	2.307	2.726	2.554
HCM Lane V/C Ratio	0.274	0.218	0.043	0.096
HCM Control Delay	9.4	8.5	7.9	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.1	0.8	0.1	0.3

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

Existing plus Project Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	360	0	0	430	234	10	36	20	117	0	72
Future Volume (veh/h)	64	360	0	0	430	234	10	36	20	117	0	72
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No				No		No				No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	391	0	0	467	119	11	39	5	127	0	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	475	1079	0	0	686	578	429	310	40	408	0	299
Arrive On Green	0.09	0.58	0.00	0.00	0.37	0.37	0.19	0.19	0.19	0.19	0.00	0.19
Sat Flow, veh/h	1781	1870	0	0	1870	1574	1379	1622	208	1346	0	1565
Grp Volume(v), veh/h	70	391	0	0	467	119	11	0	44	127	0	17
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1574	1379	0	1830	1346	0	1565
Q Serve(g_s), s	0.8	4.5	0.0	0.0	8.5	2.1	0.3	0.0	0.8	3.5	0.0	0.4
Cycle Q Clear(g_c), s	0.8	4.5	0.0	0.0	8.5	2.1	0.6	0.0	0.8	4.3	0.0	0.4
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	475	1079	0	0	686	578	429	0	350	408	0	299
V/C Ratio(X)	0.15	0.36	0.00	0.00	0.68	0.21	0.03	0.00	0.13	0.31	0.00	0.06
Avail Cap(c_a), veh/h	614	1476	0	0	3321	2795	777	0	812	748	0	695
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	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.6	4.6	0.0	0.0	10.8	8.8	13.7	0.0	13.6	15.4	0.0	13.4
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	1.2	0.2	0.0	0.0	0.2	0.4	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.1	0.0	0.0	3.0	0.6	0.1	0.0	0.3	1.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.7	4.8	0.0	0.0	12.0	9.0	13.7	0.0	13.7	15.8	0.0	13.5
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h	461				586		55		144			
Approach Delay, s/veh	5.1				11.4		13.7		15.5			
Approach LOS	A				B		B		B			
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	28.1		12.5		8.5		19.6		12.5			
Change Period (Y+Rc), s	* 4.7		* 4.7		* 4.7		* 4.7		* 4.7			
Max Green Setting (Gmax), s	* 32		* 18		* 7		* 72		* 18			
Max Q Clear Time (g_c+I1), s	6.5		6.3		2.8		10.5		2.8			
Green Ext Time (p_c), s	2.6		0.3		0.0		4.0		0.1			

Intersection Summary

HCM 6th Ctrl Delay 9.6

HCM 6th LOS A

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

Existing plus Project Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↗		↖	↗			↕	
Traffic Volume (veh/h)	0	360	137	60	465	20	169	10	30	20	20	30
Future Volume (veh/h)	0	360	137	60	465	20	169	10	30	20	20	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	391	94	65	505	20	184	11	8	22	22	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	575	484	504	972	38	488	218	158	234	200	55
Arrive On Green	0.00	0.31	0.31	0.12	0.54	0.54	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	0	1870	1572	1781	1786	71	1365	1007	732	478	924	255
Grp Volume(v), veh/h	0	391	94	65	0	525	184	0	19	52	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1572	1781	0	1857	1365	0	1739	1657	0	0
Q Serve(g_s), s	0.0	7.2	1.7	0.8	0.0	7.0	3.6	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	7.2	1.7	0.8	0.0	7.0	4.5	0.0	0.3	0.9	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.04	1.00		0.42	0.42		0.15
Lane Grp Cap(c), veh/h	0	575	484	504	0	1010	488	0	376	489	0	0
V/C Ratio(X)	0.00	0.68	0.19	0.13	0.00	0.52	0.38	0.00	0.05	0.11	0.00	0.00
Avail Cap(c_a), veh/h	0	1145	962	706	0	1137	1237	0	1330	551	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.9	10.0	6.8	0.0	5.7	13.7	0.0	12.2	12.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.4	0.2	0.1	0.0	0.4	0.5	0.0	0.1	0.1	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	0.0	2.6	0.5	0.2	0.0	1.8	1.3	0.0	0.1	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.3	10.2	6.9	0.0	6.1	14.2	0.0	12.2	12.5	0.0	0.0
LnGrp LOS	A	B	B	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	485		590				203		52			
Approach Delay, s/veh	12.7		6.2				14.0		12.5			
Approach LOS	B		A				B		B			
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	9.3	16.8	13.2		26.0		13.2					
Change Period (Y+Rc), s	4.7	* 4.7	* 4.7		* 4.7		* 4.7					
Max Green Setting (Gmax), s	24	* 24	* 10		* 24		* 30					
Max Q Clear Time (g_c+I), s	12.8	9.2	2.9		9.0		6.5					
Green Ext Time (p_c), s	0.1	2.5	0.1		3.2		0.6					

Intersection Summary

HCM 6th Ctrl Delay 10.0

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	53					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	282	50	40	554	445	225
Future Vol, veh/h	282	50	40	554	445	225
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	90	70	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	307	54	43	602	484	245
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1172	484	729	0	-	0
Stage 1	484	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 213	583	875	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 203	583	875	-	-	-
Mov Cap-2 Maneuver	~ 203	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	253.5	0.6		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	875	-	203	583	-	-
HCM Lane V/C Ratio	0.05	-	1.51	0.093	-	-
HCM Control Delay (s)	9.3	-	296.3	11.8	-	-
HCM Lane LOS	A	-	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	19	0.3	-	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Existing plus Project Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	630	490	122	314	30	430	272	152	40	222	103
Future Volume (veh/h)	161	630	490	122	314	30	430	272	152	40	222	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	175	685	290	133	341	30	467	296	41	43	241	101
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	204	497	417	161	409	36	473	497	417	35	196	82
Arrive On Green	0.11	0.27	0.27	0.09	0.24	0.24	0.27	0.27	0.27	0.18	0.18	0.18
Sat Flow, veh/h	1781	1870	1570	1781	1693	149	1781	1870	1570	198	1109	465
Grp Volume(v), veh/h	175	685	290	133	0	371	467	296	41	385	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1570	1781	0	1842	1781	1870	1570	1772	0	0
Q Serve(g_s), s	10.9	30.0	18.8	8.3	0.0	21.6	29.5	15.6	2.2	20.0	0.0	0.0
Cycle Q Clear(g_c), s	10.9	30.0	18.8	8.3	0.0	21.6	29.5	15.6	2.2	20.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		1.00	0.11		0.26
Lane Grp Cap(c), veh/h	204	497	417	161	0	445	473	497	417	314	0	0
V/C Ratio(X)	0.86	1.38	0.70	0.82	0.00	0.83	0.99	0.60	0.10	1.23	0.00	0.00
Avail Cap(c_a), veh/h	315	497	417	309	0	571	473	497	417	314	0	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.1	41.5	37.3	50.5	0.0	40.7	41.3	36.2	31.3	46.5	0.0	0.0
Incr Delay (d2), s/veh	8.4	182.7	4.2	4.0	0.0	6.7	37.8	1.4	0.0	127.0	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	5.2	38.4	7.4	3.8	0.0	10.3	17.3	7.0	0.8	19.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.5	224.1	41.5	54.5	0.0	47.3	79.0	37.5	31.3	173.4	0.0	0.0
LnGrp LOS	E	F	D	D	A	D	E	D	C	F	A	A
Approach Vol, veh/h	1150				504				804			
Approach Delay, s/veh	152.7				49.2				61.3			
Approach LOS	F				D				E			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.0	36.0		25.1	18.8	33.3		35.8				
Change Period (Y+Rc), s	5.8	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	19.6	30.0		20.0	20.0	35.0		30.0				
Max Q Clear Time (g_c+I1), s	10.3	32.0		22.0	12.9	23.6		31.5				
Green Ext Time (p_c), s	0.1	0.0		0.0	0.1	1.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 111.3

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

Existing plus Project Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	161	411	20	91	30	245	544	20	50	404	50
Future Volume (veh/h)	70	161	411	20	91	30	245	544	20	50	404	50
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	175	92	22	99	20	266	591	11	54	439	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	96	254	215	37	132	27	321	776	657	74	517	438
Arrive On Green	0.05	0.14	0.14	0.02	0.09	0.09	0.18	0.41	0.41	0.04	0.28	0.28
Sat Flow, veh/h	1781	1870	1585	1781	1510	305	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	76	175	92	22	0	119	266	591	11	54	439	54
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1815	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.2	4.7	2.8	0.6	0.0	3.3	7.5	14.1	0.2	1.6	11.6	1.3
Cycle Q Clear(g_c), s	2.2	4.7	2.8	0.6	0.0	3.3	7.5	14.1	0.2	1.6	11.6	1.3
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	96	254	215	37	0	159	321	776	657	74	517	438
V/C Ratio(X)	0.79	0.69	0.43	0.59	0.00	0.75	0.83	0.76	0.02	0.73	0.85	0.12
Avail Cap(c_a), veh/h	409	1433	1214	409	0	904	682	1075	911	341	1075	911
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	21.5	20.7	25.3	0.0	23.3	20.6	13.1	9.0	24.7	17.9	14.2
Incr Delay (d2), s/veh	5.4	1.2	0.5	5.4	0.0	2.6	2.1	1.3	0.0	5.0	1.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.9	0.9	0.3	0.0	1.5	2.9	4.9	0.1	0.7	4.5	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	22.7	21.2	30.8	0.0	25.9	22.8	14.3	9.0	29.7	19.4	14.2
LnGrp LOS	C	C	C	C	A	C	C	B	A	C	B	B
Approach Vol, veh/h	343			141			868			547		
Approach Delay, s/veh	23.9			26.6			16.8			19.9		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	12.5	14.5	19.5	8.2	10.0	7.3	26.7				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+12.6)	12.6	6.7	9.5	13.6	4.2	5.3	3.6	16.1				
Green Ext Time (p_c), s	0.0	0.3	0.1	0.8	0.0	0.2	0.0	1.1				

Intersection Summary

HCM 6th Ctrl Delay 19.7

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection												
Int Delay, s/veh	24.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↑	↗		↕	
Traffic Vol, veh/h	10	10	20	71	10	20	20	709	122	30	715	30
Future Vol, veh/h	10	10	20	71	10	20	20	709	122	30	715	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	11	22	77	11	22	22	771	133	33	777	33
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1758	1808	794	1691	1691	771	810	0	0	904	0	0
Stage 1	860	860	-	815	815	-	-	-	-	-	-	-
Stage 2	898	948	-	876	876	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	66	79	388	~ 74	93	400	816	-	-	752	-	-
Stage 1	351	373	-	371	391	-	-	-	-	-	-	-
Stage 2	334	339	-	344	367	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	52	71	388	~ 57	83	400	816	-	-	752	-	-
Mov Cap-2 Maneuver	52	71	-	~ 57	83	-	-	-	-	-	-	-
Stage 1	342	343	-	361	380	-	-	-	-	-	-	-
Stage 2	299	330	-	289	338	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	62.5		\$ 403.1		0.2		0.4					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	816	-	-	104	71	752	-	-				
HCM Lane V/C Ratio	0.027	-	-	0.418	1.546	0.043	-	-				
HCM Control Delay (s)	9.5	-	-	62.5	\$ 403.1	10	0	-				
HCM Lane LOS	A	-	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	1.8	9.3	0.1	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

Existing plus Project Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	10	10	159	10	128	30	694	176	95	651	10
Future Volume (veh/h)	10	10	10	159	10	128	30	694	176	95	651	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	11	2	173	11	41	33	754	118	103	708	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	135	109	13	363	15	317	52	837	705	132	922	777
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.03	0.45	0.45	0.07	0.49	0.49
Sat Flow, veh/h	186	539	66	1151	73	1565	1781	1870	1576	1781	1870	1577
Grp Volume(v), veh/h	24	0	0	184	0	41	33	754	118	103	708	6
Grp Sat Flow(s),veh/h/ln	791	0	0	1224	0	1565	1781	1870	1576	1781	1870	1577
Q Serve(g_s), s	0.1	0.0	0.0	0.0	0.0	1.2	1.0	20.0	2.4	3.1	16.6	0.1
Cycle Q Clear(g_c), s	8.2	0.0	0.0	8.1	0.0	1.2	1.0	20.0	2.4	3.1	16.6	0.1
Prop In Lane	0.46		0.08	0.94		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	258	0	0	378	0	317	52	837	705	132	922	777
V/C Ratio(X)	0.09	0.00	0.00	0.49	0.00	0.13	0.64	0.90	0.17	0.78	0.77	0.01
Avail Cap(c_a), veh/h	290	0	0	749	0	729	398	1045	880	398	1045	881
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	0.0	0.0	20.3	0.0	17.5	25.8	13.7	8.9	24.4	11.1	6.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.4	0.0	0.1	4.8	8.1	0.0	3.7	2.6	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	0.0	2.1	0.0	0.4	0.5	8.3	0.7	1.3	5.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	0.0	0.0	20.7	0.0	17.6	30.6	21.8	8.9	28.1	13.7	6.9
LnGrp LOS	B	A	A	C	A	B	C	C	A	C	B	A
Approach Vol, veh/h		24			225			905			817	
Approach Delay, s/veh		17.7			20.1			20.4			15.4	
Approach LOS		B			C			C			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.5	6.7	31.6		15.5	9.1	29.1				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		12.0	12.0	30.0		25.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s		10.2	3.0	18.6		10.1	5.1	22.0				
Green Ext Time (p_c), s		0.0	0.0	1.9		0.7	0.0	1.9				
Intersection Summary												
HCM 6th Ctrl Delay			18.3									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection

Int Delay, s/veh 5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↑	↗	↖	↗
Traffic Vol, veh/h	32	185	199	423	273	50
Future Vol, veh/h	32	185	199	423	273	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	201	216	460	297	54

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	216	0	0 487 216
Stage 1	-	-	- 216 -
Stage 2	-	-	- 271 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1354	-	- 540 824
Stage 1	-	-	- 820 -
Stage 2	-	-	- 775 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1354	-	- 524 824
Mov Cap-2 Maneuver	-	-	- 524 -
Stage 1	-	-	- 796 -
Stage 2	-	-	- 775 -

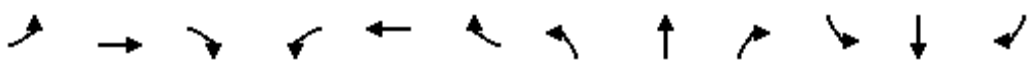
Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1354	-	-	-	524	824
HCM Lane V/C Ratio	0.026	-	-	-	0.566	0.066
HCM Control Delay (s)	7.7	0	-	-	20.5	9.7
HCM Lane LOS	A	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	-	-	-	3.5	0.2

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

Existing plus Project Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Volume (veh/h)	20	21	88	150	41	11	136	438	70	10	363	30
Future Volume (veh/h)	20	21	88	150	41	11	136	438	70	10	363	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	23	23	163	45	10	148	476	74	11	395	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	238	216	328	322	73	13	354	727	113	60	507	38
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.46	0.46	0.03	0.30	0.30
Sat Flow, veh/h	660	1030	1566	975	348	64	1781	1579	245	1781	1715	130
Grp Volume(v), veh/h	45	0	23	218	0	0	148	0	550	11	0	425
Grp Sat Flow(s),veh/h/ln	1690	0	1566	1387	0	0	1781	0	1825	1781	0	1846
Q Serve(g_s), s	0.0	0.0	0.6	7.0	0.0	0.0	3.9	0.0	12.5	0.3	0.0	11.3
Cycle Q Clear(g_c), s	1.0	0.0	0.6	8.1	0.0	0.0	3.9	0.0	12.5	0.3	0.0	11.3
Prop In Lane	0.49		1.00	0.75		0.05	1.00		0.13	1.00		0.07
Lane Grp Cap(c), veh/h	454	0	328	408	0	0	354	0	840	60	0	545
V/C Ratio(X)	0.10	0.00	0.07	0.53	0.00	0.00	0.42	0.00	0.65	0.18	0.00	0.78
Avail Cap(c_a), veh/h	1584	0	1458	535	0	0	531	0	1699	1658	0	859
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.2	0.0	17.0	20.1	0.0	0.0	18.8	0.0	11.2	25.2	0.0	17.3
Incr Delay (d2), s/veh	0.1	0.0	0.1	1.1	0.0	0.0	0.8	0.0	0.9	1.4	0.0	2.5
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	0.4	0.0	0.2	2.3	0.0	0.0	1.4	0.0	3.7	0.1	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	0.0	17.1	21.2	0.0	0.0	19.6	0.0	12.1	26.7	0.0	19.8
LnGrp LOS	B	A	B	C	A	A	B	A	B	C	A	B
Approach Vol, veh/h		68			218			698			436	
Approach Delay, s/veh		17.2			21.2			13.7			20.0	
Approach LOS		B			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.4	21.7		16.7	6.5	30.5		16.7				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	5.9	13.3		10.1	2.3	14.5		3.0				
Green Ext Time (p_c), s	0.2	1.8		0.5	0.0	3.6		0.3				

Intersection Summary

HCM 6th Ctrl Delay 16.9

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
11: Private Dwy/Moorland Ave & Todd Rd

Existing plus Project Conditions PM

Intersection												
Int Delay, s/veh	591.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	588	10	20	495	380	10	20	20	395	20	32
Future Vol, veh/h	52	588	10	20	495	380	10	20	20	395	20	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	639	11	22	538	413	11	22	22	429	22	35
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	951	0	0	650	0	0	1576	1754	645	1570	1553	745
Stage 1	-	-	-	-	-	-	759	759	-	789	789	-
Stage 2	-	-	-	-	-	-	817	995	-	781	764	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	722	-	-	936	-	-	89	85	472	~ 90	113	414
Stage 1	-	-	-	-	-	-	399	415	-	~ 384	402	-
Stage 2	-	-	-	-	-	-	370	323	-	~ 388	413	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	722	-	-	936	-	-	63	76	472	~ 62	102	414
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	76	-	~ 62	102	-
Stage 1	-	-	-	-	-	-	367	382	-	~ 354	392	-
Stage 2	-	-	-	-	-	-	313	315	-	~ 322	380	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.2			68.1			\$ 2692.6		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	108	722	-	-	936	-	-	63	414			
HCM Lane V/C Ratio	0.503	0.078	-	-	0.023	-	-	7.16	0.084			
HCM Control Delay (s)	68.1	10.4	-	-	8.9	-	-	\$ 2899.1	14.5			
HCM Lane LOS	F	B	-	-	A	-	-	F	B			
HCM 95th %tile Q(veh)	2.3	0.3	-	-	0.1	-	-	51.8	0.3			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

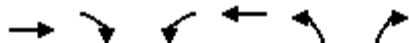
Existing plus Project Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	425	578	380	273	0	622	0	127	0	0	0
Future Volume (veh/h)	0	425	578	380	273	0	622	0	127	0	0	0
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	462	339	413	297	0	676	0	91	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	499	423	494	519	0	594	0	1057	0	2	0
Arrive On Green	0.00	0.27	0.27	0.28	0.28	0.00	0.33	0.00	0.33	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	462	339	413	297	0	676	0	91	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	18.0	15.0	16.4	10.2	0.0	25.0	0.0	1.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	18.0	15.0	16.4	10.2	0.0	25.0	0.0	1.5	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	499	423	494	519	0	594	0	1057	0	2	0
V/C Ratio(X)	0.00	0.93	0.80	0.84	0.57	0.00	1.14	0.00	0.09	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	499	423	713	748	0	594	0	1057	0	200	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	26.8	25.7	25.5	23.3	0.0	25.0	0.0	17.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	23.5	10.6	5.9	1.0	0.0	81.4	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.0	10.7	6.5	7.2	4.4	0.0	23.2	0.0	0.5	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	50.3	36.3	31.4	24.3	0.0	106.4	0.0	17.2	0.0	0.0	0.0
LnGrp LOS	A	D	D	C	C	A	F	A	B	A	A	A
Approach Vol, veh/h		801			710			767			0	
Approach Delay, s/veh		44.3			28.4			95.8			0.0	
Approach LOS		D			C			F				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		0.0		23.2		28.0		23.8				
Change Period (Y+Rc), s		3.0		3.2		3.0		3.0				
Max Green Setting (Gmax), s		8.0		20.0		25.0		30.0				
Max Q Clear Time (g_c+I1), s		0.0		20.0		27.0		18.4				
Green Ext Time (p_c), s		0.0		0.0		0.0		2.4				
Intersection Summary												
HCM 6th Ctrl Delay				56.7								
HCM 6th LOS				E								
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

Existing plus Project Conditions PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	245	315	414	388	285	723
Future Volume (veh/h)	245	315	414	388	285	723
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	266	74	487	370	310	486
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	577	257	1044	548	461	1539
Arrive On Green	0.16	0.16	0.29	0.29	0.26	0.26
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	266	74	487	370	310	486
Grp Sat Flow(s), veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	2.5	1.5	4.1	6.4	5.7	3.5
Cycle Q Clear(g_c), s	2.5	1.5	4.1	6.4	5.7	3.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	577	257	1044	548	461	1539
V/C Ratio(X)	0.46	0.29	0.47	0.68	0.67	0.32
Avail Cap(c_a), veh/h	1934	863	1454	764	679	1880
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	13.9	13.5	10.6	11.4	12.2	4.5
Incr Delay (d2), s/veh	0.6	0.6	0.3	1.5	1.7	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.9	0.5	1.3	2.2	2.0	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	14.5	14.1	11.0	12.9	13.9	4.6
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	340			857	796	
Approach Delay, s/veh	14.4			11.8	8.2	
Approach LOS	B			B	A	
Timer - Assigned Phs	2			6		8
Phs Duration (G+Y+Rc), s	9.5			14.3		13.0
Change Period (Y+Rc), s	3.5			3.5		3.5
Max Green Setting (Gmax), s	20.0			15.0		14.0
Max Q Clear Time (g_c+I1), s	4.5			8.4		7.7
Green Ext Time (p_c), s	1.7			2.4		1.8

Intersection Summary

HCM 6th Ctrl Delay	10.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

Existing plus Project Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	533	60	375	50	100	60	367	615	40	30	533	335
Future Volume (veh/h)	533	60	375	50	100	60	367	615	40	30	533	335
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	625	0	201	54	109	38	399	668	17	33	579	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	728	0	322	189	141	49	399	1373	608	47	684	303
Arrive On Green	0.20	0.00	0.20	0.11	0.11	0.11	0.22	0.39	0.39	0.03	0.19	0.19
Sat Flow, veh/h	3563	0	1573	1781	1325	462	1781	3554	1575	1781	3554	1573
Grp Volume(v), veh/h	625	0	201	54	0	147	399	668	17	33	579	84
Grp Sat Flow(s), veh/h/ln	1781	0	1573	1781	0	1787	1781	1777	1575	1781	1777	1573
Q Serve(g_s), s	12.8	0.0	8.8	2.1	0.0	6.1	17.0	10.8	0.5	1.4	11.9	3.5
Cycle Q Clear(g_c), s	12.8	0.0	8.8	2.1	0.0	6.1	17.0	10.8	0.5	1.4	11.9	3.5
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	728	0	322	189	0	190	399	1373	608	47	684	303
V/C Ratio(X)	0.86	0.00	0.63	0.29	0.00	0.78	1.00	0.49	0.03	0.70	0.85	0.28
Avail Cap(c_a), veh/h	845	0	373	235	0	236	399	1373	608	235	750	332
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(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	27.5	31.2	0.0	33.0	29.4	17.6	14.4	36.6	29.5	26.1
Incr Delay (d2), s/veh	7.0	0.0	1.4	0.3	0.0	9.2	44.9	0.1	0.0	6.8	7.6	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	0.0	0.0
%ile BackOfQ(50%), veh/ln	6.0	0.0	3.3	0.9	0.0	3.1	11.8	4.1	0.2	0.7	5.4	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	36.1	0.0	28.9	31.6	0.0	42.2	74.3	17.7	14.4	43.5	37.1	26.3
LnGrp LOS	D	A	C	C	A	D	E	B	B	D	D	C
Approach Vol, veh/h	826			201			1084			696		
Approach Delay, s/veh	34.4			39.4			38.5			36.1		
Approach LOS	C			D			D			D		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	20.6			22.1			20.0			13.1		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	14.8			19.0			13.9			8.1		
Green Ext Time (p_c), s	0.5			0.0			0.5			0.1		

Intersection Summary

HCM 6th Ctrl Delay 36.8

HCM 6th LOS D

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection

Intersection Delay, s/veh11.2

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	10	192	10	10	10	132	152	10	10	122	60
Future Vol, veh/h	50	10	192	10	10	10	132	152	10	10	122	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	11	209	11	11	11	143	165	11	11	133	65
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach RightNB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.9	9	12.3	10.1
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	45%	20%	33%	5%
Vol Thru, %	52%	4%	33%	64%
Vol Right, %	3%	76%	33%	31%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	294	252	30	192
LT Vol	132	50	10	10
Through Vol	152	10	10	122
RT Vol	10	192	10	60
Lane Flow Rate	320	274	33	209
Geometry Grp	1	1	1	1
Degree of Util (X)	0.454	0.375	0.051	0.291
Departure Headway (Hd)	5.111	4.93	5.609	5.019
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	706	731	638	716
Service Time	3.128	2.946	3.65	3.048
HCM Lane V/C Ratio	0.453	0.375	0.052	0.292
HCM Control Delay	12.3	10.9	9	10.1
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	2.4	1.7	0.2	1.2

HCM 6th TWSC
16: Riverside Dr & Verano Ave

Existing plus Project Conditions PM

Intersection												
Int Delay, s/veh	53.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	325	110	70	375	140	20	80	20	75	50	35
Future Vol, veh/h	55	325	110	70	375	140	20	80	20	75	50	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	353	120	76	408	152	22	87	22	82	54	38
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	560	0	0	473	0	0	1215	1245	413	1224	1229	484
Stage 1	-	-	-	-	-	-	533	533	-	636	636	-
Stage 2	-	-	-	-	-	-	682	712	-	588	593	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1011	-	-	1089	-	-	158	174	639	156	178	583
Stage 1	-	-	-	-	-	-	531	525	-	466	472	-
Stage 2	-	-	-	-	-	-	440	436	-	495	493	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1011	-	-	1089	-	-	94	147	639	~ 71	150	583
Mov Cap-2 Maneuver	-	-	-	-	-	-	94	147	-	~ 71	150	-
Stage 1	-	-	-	-	-	-	500	494	-	439	423	-
Stage 2	-	-	-	-	-	-	321	391	-	371	464	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			1			97.6			\$ 369.4		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	152	1011	-	-	1089	-	-	110				
HCM Lane V/C Ratio	0.858	0.059	-	-	0.07	-	-	1.581				
HCM Control Delay (s)	97.6	8.8	-	-	8.6	0		\$ 369.4				
HCM Lane LOS	F	A	-	-	A	A	-	F				
HCM 95th %tile Q(veh)	5.8	0.2	-	-	0.2	-	-	13				
Notes												
-: Volume exceeds capacity	\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon					

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Existing plus Project Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	131	50	20	185	390	40	635	20	260	286	34
Future Volume (veh/h)	31	131	50	20	185	390	40	635	20	260	286	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	142	39	22	201	331	43	690	20	283	311	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	104	391	97	61	227	354	27	433	13	327	308	30
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.25	0.25	0.25	0.18	0.18	0.18
Sat Flow, veh/h	135	1098	273	32	639	995	106	1701	49	1781	1677	162
Grp Volume(v), veh/h	215	0	0	554	0	0	753	0	0	283	0	341
Grp Sat Flow(s),veh/h/ln	1507	0	0	1665	0	0	1856	0	0	1781	0	1839
Q Serve(g_s), s	0.0	0.0	0.0	10.2	0.0	0.0	19.0	0.0	0.0	11.5	0.0	13.7
Cycle Q Clear(g_c), s	6.5	0.0	0.0	23.9	0.0	0.0	19.0	0.0	0.0	11.5	0.0	13.7
Prop In Lane	0.16		0.18	0.04		0.60	0.06		0.03	1.00		0.09
Lane Grp Cap(c), veh/h	592	0	0	642	0	0	472	0	0	327	0	337
V/C Ratio(X)	0.36	0.00	0.00	0.86	0.00	0.00	1.59	0.00	0.00	0.87	0.00	1.01
Avail Cap(c_a), veh/h	592	0	0	690	0	0	472	0	0	327	0	337
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.6	0.0	0.0	23.2	0.0	0.0	27.8	0.0	0.0	29.6	0.0	30.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	9.7	0.0	0.0	277.2	0.0	0.0	20.1	0.0	51.7
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	2.5	0.0	0.0	10.0	0.0	0.0	44.5	0.0	0.0	6.5	0.0	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	0.0	0.0	32.8	0.0	0.0	305.0	0.0	0.0	49.7	0.0	82.2
LnGrp LOS	B	A	A	C	A	A	F	A	A	D	A	F
Approach Vol, veh/h		215			554			753			624	
Approach Delay, s/veh		17.7			32.8			305.0			67.4	
Approach LOS		B			C			F			E	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.6		32.0		19.1		32.0				
Change Period (Y+Rc), s		4.6		* 5.4		5.4		5.4				
Max Green Setting (Gmax), s		19.0		* 24		13.7		28.7				
Max Q Clear Time (g_c+I1), s		21.0		8.5		15.7		25.9				
Green Ext Time (p_c), s		0.0		0.4		0.0		0.5				

Intersection Summary

HCM 6th Ctrl Delay 136.9

HCM 6th LOS F

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

Existing plus Project Conditions PM



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	333	22	535	682	22	250
Future Volume (veh/h)	333	22	535	682	22	250
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	362	6	582	741	24	272
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	410	365	893	757	39	1118
Arrive On Green	0.23	0.23	0.48	0.48	0.02	0.60
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	362	6	582	741	24	272
Grp Sat Flow(s), veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	12.3	0.2	14.8	28.8	0.8	4.3
Cycle Q Clear(g_c), s	12.3	0.2	14.8	28.8	0.8	4.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	410	365	893	757	39	1118
V/C Ratio(X)	0.88	0.02	0.65	0.98	0.62	0.24
Avail Cap(c_a), veh/h	850	757	893	757	340	1118
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	18.7	12.5	16.1	30.5	5.9
Incr Delay (d2), s/veh	2.5	0.0	1.3	27.4	5.8	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	5.2	0.1	5.2	13.8	0.4	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.9	18.7	13.8	43.6	36.3	6.0
LnGrp LOS	C	B	B	D	D	A
Approach Vol, veh/h	368		1323			296
Approach Delay, s/veh	25.8		30.5			8.4
Approach LOS	C		C			A
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.6	36.2		19.1		43.8
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	12.8	30.8		14.3		6.3
Green Ext Time (p_c), s	0.0	0.0		0.2		0.4

Intersection Summary

HCM 6th Ctrl Delay 26.3

HCM 6th LOS C

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

Existing plus Project Conditions PM

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	355	5	25	425	20	5	5	20	25	10	20
Future Vol, veh/h	20	355	5	25	425	20	5	5	20	25	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	386	5	27	462	22	5	5	22	27	11	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	484	0	0	391	0	0	977	971	389	973	962	473
Stage 1	-	-	-	-	-	-	433	433	-	527	527	-
Stage 2	-	-	-	-	-	-	544	538	-	446	435	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1079	-	-	1168	-	-	230	253	659	231	256	591
Stage 1	-	-	-	-	-	-	601	582	-	535	528	-
Stage 2	-	-	-	-	-	-	523	522	-	591	580	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1079	-	-	1168	-	-	207	242	659	212	245	591
Mov Cap-2 Maneuver	-	-	-	-	-	-	207	242	-	212	245	-
Stage 1	-	-	-	-	-	-	589	570	-	524	516	-
Stage 2	-	-	-	-	-	-	482	510	-	555	568	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.4			14.8			20.9		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	399	1079	-	-	1168	-	-	286
HCM Lane V/C Ratio	0.082	0.02	-	-	0.023	-	-	0.209
HCM Control Delay (s)	14.8	8.4	-	-	8.2	-	-	20.9
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.8

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

Existing plus Project Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	350	63	73	380	240	72	255	102	240	270	110
Future Volume (veh/h)	110	350	63	73	380	240	72	255	102	240	270	110
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		0.98	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	120	380	64	79	413	244	78	277	71	261	293	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	582	98	194	398	235	193	420	105	298	576	156
Arrive On Green	0.12	0.37	0.37	0.11	0.36	0.36	0.11	0.15	0.15	0.17	0.21	0.21
Sat Flow, veh/h	1781	1559	263	1781	1100	650	1781	2802	704	1781	2755	747
Grp Volume(v), veh/h	120	0	444	79	0	657	78	174	174	261	187	187
Grp Sat Flow(s),veh/h/ln	1781	0	1822	1781	0	1750	1781	1777	1730	1781	1777	1725
Q Serve(g_s), s	5.4	0.0	17.3	3.5	0.0	31.0	3.5	7.9	8.2	12.3	8.0	8.3
Cycle Q Clear(g_c), s	5.4	0.0	17.3	3.5	0.0	31.0	3.5	7.9	8.2	12.3	8.0	8.3
Prop In Lane	1.00		0.14	1.00		0.37	1.00		0.41	1.00		0.43
Lane Grp Cap(c), veh/h	215	0	680	194	0	632	193	266	259	298	372	361
V/C Ratio(X)	0.56	0.00	0.65	0.41	0.00	1.04	0.40	0.65	0.67	0.87	0.50	0.52
Avail Cap(c_a), veh/h	540	0	680	540	0	632	228	559	544	332	559	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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	22.3	35.7	0.0	27.4	35.7	34.4	34.5	34.8	30.0	30.1
Incr Delay (d2), s/veh	2.2	0.0	2.2	1.4	0.0	46.3	1.4	2.7	3.0	20.5	1.1	1.2
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	2.4	0.0	7.1	1.6	0.0	19.9	1.5	3.4	3.5	6.8	3.4	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.8	0.0	24.5	37.0	0.0	73.7	37.0	37.1	37.5	55.3	31.0	31.3
LnGrp LOS	D	A	C	D	A	F	D	D	D	E	C	C
Approach Vol, veh/h	564		736				426		635			
Approach Delay, s/veh	27.3		69.7				37.2		41.1			
Approach LOS	C		E				D		D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.3	22.9	14.4	35.2	18.4	17.9	13.3	36.2				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	5.5	10.3	7.4	33.0	14.3	10.2	5.5	19.3				
Green Ext Time (p_c), s	0.1	1.9	0.3	0.0	0.1	1.6	0.2	1.9				
Intersection Summary												
HCM 6th Ctrl Delay			46.0									
HCM 6th LOS			D									
Notes												

ATTACHMENT C-3

CUMULATIVE (YEAR 2040) CONDITIONS OUPUTS



HCM 6th AWSC
1: Geyserville Ave & Canyon Road

Cumulative Conditions AM

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	20	210	20	20	20	110	30	20	20	30	30
Future Vol, veh/h	50	20	210	20	20	20	110	30	20	20	30	30
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	21	221	21	21	21	116	32	21	21	32	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	8.2	9.4	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	69%	18%	33%	25%
Vol Thru, %	19%	7%	33%	38%
Vol Right, %	12%	75%	33%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	280	60	80
LT Vol	110	50	20	20
Through Vol	30	20	20	30
RT Vol	20	210	20	30
Lane Flow Rate	168	295	63	84
Geometry Grp	1	1	1	1
Degree of Util (X)	0.229	0.345	0.083	0.111
Departure Headway (Hd)	4.887	4.217	4.748	4.764
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	733	852	752	749
Service Time	2.933	2.249	2.795	2.816
HCM Lane V/C Ratio	0.229	0.346	0.084	0.112
HCM Control Delay	9.4	9.5	8.2	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	1.5	0.3	0.4

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

Cumulative Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	520	0	0	540	140	20	40	40	160	0	40
Future Volume (veh/h)	90	520	0	0	540	140	20	40	40	160	0	40
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	95	547	0	0	568	80	21	42	7	168	0	7
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	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	451	1136	0	0	754	635	418	304	51	383	0	305
Arrive On Green	0.11	0.61	0.00	0.00	0.40	0.40	0.20	0.20	0.20	0.20	0.00	0.20
Sat Flow, veh/h	1781	1870	0	0	1870	1575	1391	1560	260	1341	0	1565
Grp Volume(v), veh/h	95	547	0	0	568	80	21	0	49	168	0	7
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1575	1391	0	1820	1341	0	1565
Q Serve(g_s), s	1.2	7.7	0.0	0.0	12.4	1.5	0.6	0.0	1.1	5.6	0.0	0.2
Cycle Q Clear(g_c), s	1.2	7.7	0.0	0.0	12.4	1.5	0.8	0.0	1.1	6.7	0.0	0.2
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	451	1136	0	0	754	635	418	0	355	383	0	305
V/C Ratio(X)	0.21	0.48	0.00	0.00	0.75	0.13	0.05	0.00	0.14	0.44	0.00	0.02
Avail Cap(c_a), veh/h	525	1258	0	0	1651	1390	672	0	688	629	0	592
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	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	5.2	0.0	0.0	12.2	8.9	15.8	0.0	15.8	18.6	0.0	15.5
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.0	1.5	0.1	0.0	0.0	0.2	0.8	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	0.4	2.0	0.0	0.0	4.6	0.5	0.2	0.0	0.4	1.7	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.8	5.5	0.0	0.0	13.7	9.0	15.8	0.0	16.0	19.4	0.0	15.5
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h	642				648		70				175	
Approach Delay, s/veh	5.8				13.1		16.0				19.2	
Approach LOS	A				B		B				B	
Timer - Assigned Phs	2		4		5	6	8					
Phs Duration (G+Y+Rc), s	33.6		14.0		9.7	23.9	14.0					
Change Period (Y+Rc), s	* 4.7		* 4.7		* 4.7	* 4.7	* 4.7					
Max Green Setting (Gmax), s	* 32		* 18		* 7	* 42	* 18					
Max Q Clear Time (g_c+I1), s	9.7		8.7		3.2	14.4	3.1					
Green Ext Time (p_c), s	3.9		0.3		0.1	4.6	0.2					

Intersection Summary

HCM 6th Ctrl Delay 10.9

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

Cumulative Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↖	↖	↖		↖	↖			↕	
Traffic Volume (veh/h)	0	510	210	40	490	20	170	50	120	20	40	20
Future Volume (veh/h)	0	510	210	40	490	20	170	50	120	20	40	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	537	163	42	516	19	179	53	27	21	42	4
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	708	596	412	1025	38	461	243	124	175	272	21
Arrive On Green	0.00	0.38	0.38	0.08	0.57	0.57	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	0	1870	1575	1781	1792	66	1346	1168	595	307	1312	103
Grp Volume(v), veh/h	0	537	163	42	0	535	179	0	80	67	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1575	1781	0	1858	1346	0	1763	1722	0	0
Q Serve(g_s), s	0.0	10.7	3.1	0.5	0.0	7.4	3.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	10.7	3.1	0.5	0.0	7.4	4.7	0.0	1.6	1.3	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.04	1.00		0.34	0.31		0.06
Lane Grp Cap(c), veh/h	0	708	596	412	0	1062	461	0	366	468	0	0
V/C Ratio(X)	0.00	0.76	0.27	0.10	0.00	0.50	0.39	0.00	0.22	0.14	0.00	0.00
Avail Cap(c_a), veh/h	0	1054	887	641	0	1062	1129	0	1242	513	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.5	9.2	7.3	0.0	5.5	15.1	0.0	14.0	13.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.8	0.2	0.1	0.0	0.4	0.5	0.0	0.3	0.1	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	0.0	3.9	0.9	0.1	0.0	1.9	1.4	0.0	0.6	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.3	9.4	7.4	0.0	5.9	15.7	0.0	14.3	14.0	0.0	0.0
LnGrp LOS	A	B	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	700		577			259			67			
Approach Delay, s/veh	12.4		6.0			15.2			14.0			
Approach LOS	B		A			B			B			
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	20.8	13.5		29.1		13.5						
Change Period (Y+Rc), s	* 4.7	* 4.7		* 4.7		* 4.7						
Max Green Setting (Gmax), s	* 24	* 10		* 24		* 30						
Max Q Clear Time (g_c+I), s	12.7	3.3		9.4		6.7						
Green Ext Time (p_c), s	0.0	3.3	0.1		3.2		1.0					

Intersection Summary

HCM 6th Ctrl Delay 10.6

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Old Redwood Hwy & Fulton Rd

Cumulative Conditions AM

Intersection						
Int Delay, s/veh	12.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	180	40	40	190	860	400
Future Vol, veh/h	180	40	40	190	860	400
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	90	70	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	189	42	42	200	905	421
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1189	905	1326	0	-	0
Stage 1	905	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	208	335	521	-	-	-
Stage 1	395	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	191	335	521	-	-	-
Mov Cap-2 Maneuver	191	-	-	-	-	-
Stage 1	363	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	96.3	2.2		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	521	-	191	335	-	-
HCM Lane V/C Ratio	0.081	-	0.992	0.126	-	-
HCM Control Delay (s)	12.5	-	113.8	17.3	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile O(veh)	0.3	-	8.3	0.4	-	-

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Cumulative Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	340	210	230	610	30	720	180	160	40	280	260
Future Volume (veh/h)	80	340	210	230	610	30	720	180	160	40	280	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	358	41	242	642	31	758	189	35	42	295	249
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	107	406	340	270	540	26	467	490	411	22	152	128
Arrive On Green	0.06	0.22	0.22	0.15	0.31	0.31	0.26	0.26	0.26	0.17	0.17	0.17
Sat Flow, veh/h	1781	1870	1567	1781	1769	85	1781	1870	1570	124	868	733
Grp Volume(v), veh/h	84	358	41	242	0	673	758	189	35	586	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1567	1781	0	1854	1781	1870	1570	1725	0	0
Q Serve(g_s), s	5.3	21.2	2.4	15.3	0.0	35.0	30.0	9.5	1.9	20.0	0.0	0.0
Cycle Q Clear(g_c), s	5.3	21.2	2.4	15.3	0.0	35.0	30.0	9.5	1.9	20.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00	0.07		0.42
Lane Grp Cap(c), veh/h	107	406	340	270	0	566	467	490	411	301	0	0
V/C Ratio(X)	0.79	0.88	0.12	0.90	0.00	1.19	1.62	0.39	0.09	1.95	0.00	0.00
Avail Cap(c_a), veh/h	311	490	410	311	0	566	467	490	411	301	0	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.1	43.4	36.0	47.7	0.0	39.8	42.3	34.7	31.9	47.3	0.0	0.0
Incr Delay (d2), s/veh	4.7	13.3	0.1	22.8	0.0	101.9	290.8	0.2	0.0	437.6	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	2.5	10.9	0.9	8.3	0.0	31.3	50.3	4.2	0.7	45.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	56.7	36.1	70.5	0.0	141.6	333.1	34.9	31.9	484.8	0.0	0.0
LnGrp LOS	E	E	D	E	A	F	F	C	C	F	A	A
Approach Vol, veh/h		483			915			982			586	
Approach Delay, s/veh		55.2			122.8			264.9			484.8	
Approach LOS		E			F			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.8	30.9		25.1	12.7	41.0		35.8				
Change Period (Y+Rc), s	5.4	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	20.0	30.0		20.0	20.0	30.0		30.0				
Max Q Clear Time (g_c+I1), s	17.3	23.2		22.0	7.3	37.0		32.0				
Green Ext Time (p_c), s	0.1	0.7		0.0	0.1	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 230.4

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

Cumulative Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	160	360	40	310	40	360	200	20	40	850	80
Future Volume (veh/h)	40	160	360	40	310	40	360	200	20	40	850	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	168	66	42	326	37	379	211	9	42	895	25
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	53	430	361	53	365	41	376	930	784	53	591	497
Arrive On Green	0.03	0.23	0.23	0.03	0.22	0.22	0.21	0.50	0.50	0.03	0.32	0.32
Sat Flow, veh/h	1781	1870	1568	1781	1648	187	1781	1870	1577	1781	1870	1573
Grp Volume(v), veh/h	42	168	66	42	0	363	379	211	9	42	895	25
Grp Sat Flow(s),veh/h/ln	1781	1870	1568	1781	0	1835	1781	1870	1577	1781	1870	1573
Q Serve(g_s), s	2.2	7.2	3.2	2.2	0.0	18.2	20.0	6.1	0.3	2.2	30.0	1.0
Cycle Q Clear(g_c), s	2.2	7.2	3.2	2.2	0.0	18.2	20.0	6.1	0.3	2.2	30.0	1.0
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	53	430	361	53	0	407	376	930	784	53	591	497
V/C Ratio(X)	0.79	0.39	0.18	0.79	0.00	0.89	1.01	0.23	0.01	0.79	1.51	0.05
Avail Cap(c_a), veh/h	225	789	661	225	0	503	376	930	784	188	591	497
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	30.9	29.4	45.7	0.0	35.8	37.4	13.5	12.1	45.7	32.4	22.5
Incr Delay (d2), s/veh	9.3	0.2	0.1	9.2	0.0	13.9	48.8	0.0	0.0	9.3	239.6	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	1.1	3.2	1.2	1.1	0.0	9.6	13.5	2.4	0.1	1.1	52.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.0	31.1	29.4	54.9	0.0	49.7	86.2	13.6	12.1	55.0	272.0	22.5
LnGrp LOS	E	C	C	D	A	D	F	B	B	E	F	C
Approach Vol, veh/h	276			405			599			962		
Approach Delay, s/veh	34.3			50.2			59.5			256.0		
Approach LOS	C			D			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	27.2	25.1	35.1	8.2	26.4	7.9	52.3				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+14.2), s	14.2	9.2	22.0	32.0	4.2	20.2	4.2	8.1				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.0	0.0	0.5	0.0	0.4				

Intersection Summary

HCM 6th Ctrl Delay	139.1
HCM 6th LOS	F

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC

7: Old Redwood Hwy & Creekside Apts/Faught Rd

Cumulative Conditions AM

Intersection												
Int Delay, s/veh	246.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	20	30	180	20	20	20	420	110	30	1100	30
Future Vol, veh/h	60	20	30	180	20	20	20	420	110	30	1100	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	21	32	189	21	21	21	442	116	32	1158	32
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1801	1838	1174	1749	1738	442	1190	0	0	558	0	0
Stage 1	1238	1238	-	484	484	-	-	-	-	-	-	-
Stage 2	563	600	-	1265	1254	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 62	76	234	~ 67	87	615	587	-	-	1013	-	-
Stage 1	215	248	-	564	552	-	-	-	-	-	-	-
Stage 2	511	490	-	208	243	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 43	66	234	~ 40	76	615	587	-	-	1013	-	-
Mov Cap-2 Maneuver	~ 43	66	-	~ 40	76	-	-	-	-	-	-	-
Stage 1	207	225	-	544	532	-	-	-	-	-	-	-
Stage 2	457	472	-	~ 148	220	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s\$	583.8		\$ 1991.6		0.4		0.2					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	587	-	-	60	46	1013	-	-				
HCM Lane V/C Ratio	0.036	-	-	1.93	5.034	0.031	-	-				
HCM Control Delay (s)	11.4	-	-	\$ 583.8	\$ 1991.6	8.7	0	-				
HCM Lane LOS	B	-	-	F	F	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	10.9	26.5	0.1	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

Cumulative Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	20	30	180	20	40	20	410	150	240	950	20
Future Volume (veh/h)	30	20	30	180	20	40	20	410	150	240	950	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	21	6	189	21	7	21	432	52	253	1000	10
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	134	73	13	356	27	342	35	674	567	302	954	805
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.02	0.36	0.36	0.17	0.51	0.51
Sat Flow, veh/h	183	335	59	1097	122	1567	1781	1870	1574	1781	1870	1577
Grp Volume(v), veh/h	59	0	0	210	0	7	21	432	52	253	1000	10
Grp Sat Flow(s),veh/h/ln	576	0	0	1219	0	1567	1781	1870	1574	1781	1870	1577
Q Serve(g_s), s	0.3	0.0	0.0	0.0	0.0	0.2	0.7	11.3	1.3	8.1	30.0	0.2
Cycle Q Clear(g_c), s	10.4	0.0	0.0	10.0	0.0	0.2	0.7	11.3	1.3	8.1	30.0	0.2
Prop In Lane	0.54		0.10	0.90		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	220	0	0	382	0	342	35	674	567	302	954	805
V/C Ratio(X)	0.27	0.00	0.00	0.55	0.00	0.02	0.60	0.64	0.09	0.84	1.05	0.01
Avail Cap(c_a), veh/h	220	0	0	675	0	666	364	954	803	364	954	805
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	0.0	0.0	21.9	0.0	18.0	28.6	15.6	12.4	23.6	14.4	7.1
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	5.9	0.4	0.0	11.7	42.4	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	2.6	0.0	0.1	0.3	4.2	0.4	4.1	20.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.4	0.0	0.0	22.3	0.0	18.1	34.4	16.0	12.5	35.3	56.8	7.1
LnGrp LOS	B	A	A	C	A	B	C	B	B	D	F	A
Approach Vol, veh/h		59			217			505			1263	
Approach Delay, s/veh		19.4			22.2			16.4			52.1	
Approach LOS		B			C			B			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		17.4	6.3	35.1		17.4	15.1	26.3				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		12.0	12.0	30.0		25.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s		12.4	2.7	32.0		12.0	10.1	13.3				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.7	0.1	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			39.2									
HCM 6th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	100.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Vol, veh/h	100	340	220	210	470	40
Future Vol, veh/h	100	340	220	210	470	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	105	358	232	221	495	42
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	232	0	-	0	800	232
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	568	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1336	-	-	-	~ 354	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	567	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1336	-	-	-	~ 319	807
Mov Cap-2 Maneuver	-	-	-	-	~ 319	-
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	567	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.8	0		270.5		
HCM LOS				F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1336	-	-	-	319	807
HCM Lane V/C Ratio	0.079	-	-	-	1.551	0.052
HCM Control Delay (s)	7.9	0	-	-	292.7	9.7
HCM Lane LOS	A	A	-	-	F	A
HCM 95th %tile Q(veh)	0.3	-	-	-	28.5	0.2
Notes						
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

Cumulative Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	80	170	140	70	20	110	450	170	20	510	40
Future Volume (veh/h)	50	80	170	140	70	20	110	450	170	20	510	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	84	30	147	74	19	116	474	174	21	537	40
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	192	271	371	243	107	22	292	594	218	104	603	45
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.16	0.46	0.46	0.06	0.35	0.35
Sat Flow, veh/h	482	1146	1568	644	452	94	1781	1303	478	1781	1718	128
Grp Volume(v), veh/h	137	0	30	240	0	0	116	0	648	21	0	577
Grp Sat Flow(s),veh/h/ln	1628	0	1568	1190	0	0	1781	0	1781	1781	0	1846
Q Serve(g_s), s	0.0	0.0	1.0	8.9	0.0	0.0	3.7	0.0	19.9	0.7	0.0	18.9
Cycle Q Clear(g_c), s	4.0	0.0	1.0	12.9	0.0	0.0	3.7	0.0	19.9	0.7	0.0	18.9
Prop In Lane	0.39		1.00	0.61		0.08	1.00		0.27	1.00		0.07
Lane Grp Cap(c), veh/h	463	0	371	372	0	0	292	0	813	104	0	648
V/C Ratio(X)	0.30	0.00	0.08	0.64	0.00	0.00	0.40	0.00	0.80	0.20	0.00	0.89
Avail Cap(c_a), veh/h	1335	0	1227	392	0	0	446	0	1394	1394	0	722
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	0.0	19.0	24.4	0.0	0.0	23.9	0.0	14.8	28.7	0.0	19.6
Incr Delay (d2), s/veh	0.4	0.0	0.1	3.4	0.0	0.0	0.9	0.0	1.8	0.9	0.0	12.4
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	1.6	0.0	0.3	3.5	0.0	0.0	1.5	0.0	6.6	0.3	0.0	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	0.0	19.1	27.8	0.0	0.0	24.8	0.0	16.7	29.6	0.0	32.0
LnGrp LOS	C	A	B	C	A	A	C	A	B	C	A	C
Approach Vol, veh/h		167			240			764			598	
Approach Delay, s/veh		20.2			27.8			17.9			31.9	
Approach LOS		C			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.2	28.2		20.5	8.4	35.0		20.5				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	5.7	20.9		14.9	2.7	21.9		6.0				
Green Ext Time (p_c), s	0.2	1.3		0.1	0.0	4.4		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			24.2									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th TWSC
11: Private Dwy/Moorland Ave & Todd Rd

Cumulative Conditions AM

Intersection												
Int Delay, s/veh	302.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	450	20	20	510	390	20	20	20	330	20	90
Future Vol, veh/h	70	450	20	20	510	390	20	20	20	330	20	90
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	74	474	21	21	537	411	21	21	21	347	21	95
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	948	0	0	495	0	0	1476	1623	485	1439	1428	743
Stage 1	-	-	-	-	-	-	633	633	-	785	785	-
Stage 2	-	-	-	-	-	-	843	990	-	654	643	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	724	-	-	1069	-	-	104	103	582	~ 111	135	415
Stage 1	-	-	-	-	-	-	468	473	-	386	404	-
Stage 2	-	-	-	-	-	-	358	324	-	456	468	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	724	-	-	1069	-	-	63	91	582	~ 80	119	415
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	91	-	~ 80	119	-
Stage 1	-	-	-	-	-	-	420	425	-	~ 347	396	-
Stage 2	-	-	-	-	-	-	256	318	-	375	420	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.2			81.2			\$ 1335.9		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	105	724	-	-	1069	-	-	82	415			
HCM Lane V/C Ratio	0.602	0.102	-	-	0.02	-	-	4.493	0.228			
HCM Control Delay (s)	81.2	10.5	-	-	8.4	-	-	\$ 1675.3	16.2			
HCM Lane LOS	F	B	-	-	A	-	-	F	C			
HCM 95th %tile Q(veh)	2.9	0.3	-	-	0.1	-	-	39.3	0.9			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

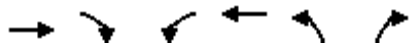
Cumulative Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	390	410	400	330	0	590	0	140	0	0	0
Future Volume (veh/h)	0	390	410	400	330	0	590	0	140	0	0	0
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	411	195	421	347	0	621	0	94	0	0	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	0	467	395	509	534	0	606	0	1078	0	3	0
Arrive On Green	0.00	0.25	0.25	0.29	0.29	0.00	0.34	0.00	0.34	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	411	195	421	347	0	621	0	94	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	15.5	7.7	16.3	12.0	0.0	25.0	0.0	1.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	15.5	7.7	16.3	12.0	0.0	25.0	0.0	1.5	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	467	395	509	534	0	606	0	1078	0	3	0
V/C Ratio(X)	0.00	0.88	0.49	0.83	0.65	0.00	1.03	0.00	0.09	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	509	431	727	763	0	606	0	1078	0	203	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	26.5	23.6	24.6	23.0	0.0	24.3	0.0	16.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	15.5	1.0	5.4	1.3	0.0	43.2	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.4	2.8	7.1	5.1	0.0	17.0	0.0	0.5	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	42.0	24.6	30.0	24.4	0.0	67.5	0.0	16.5	0.0	0.0	0.0
LnGrp LOS	A	D	C	C	C	A	F	A	B	A	A	A
Approach Vol, veh/h	606		768			715			0			
Approach Delay, s/veh	36.4		27.5			60.8			0.0			
Approach LOS	D		C			E						
Timer - Assigned Phs	2		4			6			8			
Phs Duration (G+Y+Rc), s	0.0		21.5			28.0			24.0			
Change Period (Y+Rc), s	3.0		3.2			3.0			3.0			
Max Green Setting (Gmax), s	8.0		20.0			25.0			30.0			
Max Q Clear Time (g_c+I1), s	0.0		17.5			27.0			18.3			
Green Ext Time (p_c), s	0.0		0.8			0.0			2.7			
Intersection Summary												
HCM 6th Ctrl Delay	41.5											
HCM 6th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

Cumulative Conditions AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	210	270	390	290	250	520
Future Volume (veh/h)	210	270	390	290	250	520
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	48	411	305	263	292
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	524	234	992	521	422	1438
Arrive On Green	0.15	0.15	0.28	0.28	0.24	0.24
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	221	48	411	305	263	292
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	1.8	0.8	2.9	4.4	4.1	1.8
Cycle Q Clear(g_c), s	1.8	0.8	2.9	4.4	4.1	1.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	524	234	992	521	422	1438
V/C Ratio(X)	0.42	0.21	0.41	0.59	0.62	0.20
Avail Cap(c_a), veh/h	2281	1017	1715	900	800	2030
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	12.1	11.7	9.2	9.7	10.6	4.1
Incr Delay (d2), s/veh	0.5	0.4	0.3	1.0	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.3	0.8	1.4	1.3	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.6	12.1	9.4	10.7	12.1	4.2
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	269			716	555	
Approach Delay, s/veh	12.5			10.0	7.9	
Approach LOS	B			A	A	
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	8.1		12.2		10.9	
Change Period (Y+Rc), s	3.5		3.5		3.5	
Max Green Setting (Gmax), s	20.0		15.0		14.0	
Max Q Clear Time (g_c+I1), s	3.8		6.4		6.1	
Green Ext Time (p_c), s	1.3		2.3		1.3	

Intersection Summary

HCM 6th Ctrl Delay	9.7
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

Cumulative Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	340	120	270	30	40	40	370	710	50	60	350	270
Future Volume (veh/h)	340	120	270	30	40	40	370	710	50	60	350	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	242	288	47	32	42	1	389	747	19	63	368	49
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	352	370	311	86	87	2	439	1251	554	79	552	244
Arrive On Green	0.20	0.20	0.20	0.05	0.05	0.05	0.25	0.35	0.35	0.04	0.16	0.16
Sat Flow, veh/h	1781	1870	1573	1781	1819	43	1781	3554	1574	1781	3554	1570
Grp Volume(v), veh/h	242	288	47	32	0	43	389	747	19	63	368	49
Grp Sat Flow(s), veh/h/ln	1781	1870	1573	1781	0	1863	1781	1777	1574	1781	1777	1570
Q Serve(g_s), s	7.4	8.6	1.5	1.0	0.0	1.3	12.4	10.1	0.5	2.1	5.7	1.6
Cycle Q Clear(g_c), s	7.4	8.6	1.5	1.0	0.0	1.3	12.4	10.1	0.5	2.1	5.7	1.6
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	352	370	311	86	0	90	439	1251	554	79	552	244
V/C Ratio(X)	0.69	0.78	0.15	0.37	0.00	0.48	0.89	0.60	0.03	0.79	0.67	0.20
Avail Cap(c_a), veh/h	546	573	482	303	0	317	516	1453	643	303	968	428
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	22.3	19.5	27.1	0.0	27.2	21.3	15.6	12.5	27.8	23.4	21.6
Incr Delay (d2), s/veh	0.9	1.4	0.1	1.0	0.0	1.5	13.8	0.2	0.0	6.5	0.5	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	0.0
%ile BackOfQ(50%),veh/ln	2.9	3.6	0.5	0.4	0.0	0.6	6.3	3.6	0.1	0.9	2.2	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	23.8	19.6	28.1	0.0	28.7	35.1	15.8	12.5	34.3	23.9	21.8
LnGrp LOS	C	C	B	C	A	C	D	B	B	C	C	C
Approach Vol, veh/h	577			75			1155			480		
Approach Delay, s/veh	23.0			28.4			22.3			25.0		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	16.7			19.6			14.5			7.9		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	10.6			14.4			7.7			3.3		
Green Ext Time (p_c), s	0.8			0.1			0.8			0.0		

Intersection Summary

HCM 6th Ctrl Delay 23.2

HCM 6th LOS C

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection

Intersection Delay, s/veh13.6

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	50	20	270	20	20	20	140	130	20	20	220	50
Future Vol, veh/h	50	20	270	20	20	20	140	130	20	20	220	50
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	21	284	21	21	21	147	137	21	21	232	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach RightNB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.1	10	13.9	13.5
HCM LOS	B	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	48%	15%	33%	7%
Vol Thru, %	45%	6%	33%	76%
Vol Right, %	7%	79%	33%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	290	340	60	290
LT Vol	140	50	20	20
Through Vol	130	20	20	220
RT Vol	20	270	20	50
Lane Flow Rate	305	358	63	305
Geometry Grp	1	1	1	1
Degree of Util (X)	0.481	0.525	0.109	0.47
Departure Headway (Hd)	5.678	5.285	6.185	5.544
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	632	680	575	647
Service Time	3.741	3.347	4.275	3.607
HCM Lane V/C Ratio	0.483	0.526	0.11	0.471
HCM Control Delay	13.9	14.1	10	13.5
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	2.6	3.1	0.4	2.5

HCM 6th TWSC
16: Riverside Dr & Verano Ave

Cumulative Conditions AM

Intersection												
Int Delay, s/veh	26.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	290	20	100	250	60	30	30	30	140	30	50
Future Vol, veh/h	50	290	20	100	250	60	30	30	30	140	30	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	305	21	105	263	63	32	32	32	147	32	53
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	326	0	0	326	0	0	969	958	316	959	937	295
Stage 1	-	-	-	-	-	-	422	422	-	505	505	-
Stage 2	-	-	-	-	-	-	547	536	-	454	432	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1234	-	-	1234	-	-	233	257	724	237	265	744
Stage 1	-	-	-	-	-	-	609	588	-	549	540	-
Stage 2	-	-	-	-	-	-	521	523	-	586	582	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1234	-	-	1234	-	-	173	220	724	180	227	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	173	220	-	180	227	-
Stage 1	-	-	-	-	-	-	583	563	-	525	483	-
Stage 2	-	-	-	-	-	-	405	468	-	506	557	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			2			27.1			113.9		
HCM LOS							D			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	256	1234	-	-	1234	-	-	225				
HCM Lane V/C Ratio	0.37	0.043	-	-	0.085	-	-	1.029				
HCM Control Delay (s)	27.1	8	-	-	8.2	0	-	113.9				
HCM Lane LOS	D	A	-	-	A	A	-	F				
HCM 95th %tile O(veh)	1.6	0.1	-	-	0.3	-	-	9.7				

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Cumulative Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	260	100	20	130	410	60	280	20	510	650	70
Future Volume (veh/h)	60	260	100	20	130	410	60	280	20	510	650	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	274	89	21	137	285	63	295	18	537	684	69
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	113	335	101	71	171	330	74	346	21	386	361	36
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.24	0.24	0.24	0.22	0.22	0.22
Sat Flow, veh/h	160	1114	336	39	569	1097	308	1443	88	1781	1669	168
Grp Volume(v), veh/h	426	0	0	443	0	0	376	0	0	537	0	753
Grp Sat Flow(s),veh/h/ln	1610	0	0	1705	0	0	1839	0	0	1781	0	1838
Q Serve(g_s), s	0.5	0.0	0.0	0.0	0.0	0.0	12.4	0.0	0.0	13.7	0.0	13.7
Cycle Q Clear(g_c), s	15.9	0.0	0.0	15.4	0.0	0.0	12.4	0.0	0.0	13.7	0.0	13.7
Prop In Lane	0.15		0.21	0.05		0.64	0.17		0.05	1.00		0.09
Lane Grp Cap(c), veh/h	549	0	0	572	0	0	441	0	0	386	0	398
V/C Ratio(X)	0.78	0.00	0.00	0.77	0.00	0.00	0.85	0.00	0.00	1.39	0.00	1.89
Avail Cap(c_a), veh/h	674	0	0	818	0	0	552	0	0	386	0	398
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.7	0.0	0.0	21.0	0.0	0.0	23.0	0.0	0.0	24.8	0.0	24.8
Incr Delay (d2), s/veh	3.5	0.0	0.0	1.7	0.0	0.0	9.6	0.0	0.0	192.1	0.0	411.4
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	5.8	0.0	0.0	5.6	0.0	0.0	6.2	0.0	0.0	25.8	0.0	50.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	0.0	0.0	22.7	0.0	0.0	32.6	0.0	0.0	216.9	0.0	436.2
LnGrp LOS	C	A	A	C	A	A	C	A	A	F	A	F
Approach Vol, veh/h		426			443			376			1290	
Approach Delay, s/veh		24.3			22.7			32.6			344.9	
Approach LOS		C			C			C			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		19.8		24.4		19.1		24.4				
Change Period (Y+Rc), s		4.6		* 5.4		5.4		5.4				
Max Green Setting (Gmax), s		19.0		* 24		13.7		28.7				
Max Q Clear Time (g_c+I1), s		14.4		17.9		15.7		17.4				
Green Ext Time (p_c), s		0.8		0.6		0.0		0.8				

Intersection Summary

HCM 6th Ctrl Delay 188.4

HCM 6th LOS F

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

Cumulative Conditions AM



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	650	30	270	330	40	680
Future Volume (veh/h)	650	30	270	330	40	680
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	684	12	284	347	42	716
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	726	646	518	439	60	773
Arrive On Green	0.41	0.41	0.28	0.28	0.03	0.41
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	684	12	284	347	42	716
Grp Sat Flow(s),veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	22.2	0.3	7.8	12.2	1.4	21.9
Cycle Q Clear(g_c), s	22.2	0.3	7.8	12.2	1.4	21.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	726	646	518	439	60	773
V/C Ratio(X)	0.94	0.02	0.55	0.79	0.70	0.93
Avail Cap(c_a), veh/h	888	790	932	790	355	932
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	17.2	10.7	18.6	20.2	28.8	16.8
Incr Delay (d2), s/veh	14.9	0.0	0.3	1.2	5.5	12.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	0.1	3.0	4.0	0.6	10.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.1	10.7	18.9	21.4	34.3	29.0
LnGrp LOS	C	B	B	C	C	C
Approach Vol, veh/h	696		631			758
Approach Delay, s/veh	31.7		20.3			29.3
Approach LOS	C		C			C
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	22.9		29.1		31.1
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	13.4	14.2		24.2		23.9
Green Ext Time (p_c), s	0.0	0.6		0.3		1.0

Intersection Summary

HCM 6th Ctrl Delay 27.4

HCM 6th LOS C

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

Cumulative Conditions AM

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	570	0	0	420	30	0	0	0	50	0	30
Future Vol, veh/h	30	570	0	0	420	30	0	0	0	50	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	600	0	0	442	32	0	0	0	53	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	474	0	0	600	0	0	1138	1138	600	1122	1122	458
Stage 1	-	-	-	-	-	-	664	664	-	458	458	-
Stage 2	-	-	-	-	-	-	474	474	-	664	664	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1088	-	-	977	-	-	179	201	501	183	206	603
Stage 1	-	-	-	-	-	-	450	458	-	583	567	-
Stage 2	-	-	-	-	-	-	571	558	-	450	458	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1088	-	-	977	-	-	166	195	501	179	200	603
Mov Cap-2 Maneuver	-	-	-	-	-	-	166	195	-	179	200	-
Stage 1	-	-	-	-	-	-	437	445	-	566	567	-
Stage 2	-	-	-	-	-	-	541	558	-	437	445	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0			0			27.5		
HCM LOS							A			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1088	-	-	977	-	-	243
HCM Lane V/C Ratio	-	0.029	-	-	-	-	-	0.347
HCM Control Delay (s)	0	8.4	-	-	0	-	-	27.5
HCM Lane LOS	A	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	1.5

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

Cumulative Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	340	390	90	80	280	300	80	390	140	230	260	90
Future Volume (veh/h)	340	390	90	80	280	300	80	390	140	230	260	90
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		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	358	411	89	84	295	282	84	411	113	242	274	63
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	389	615	133	168	253	242	168	506	138	265	686	155
Arrive On Green	0.22	0.41	0.41	0.09	0.29	0.29	0.09	0.18	0.18	0.15	0.24	0.24
Sat Flow, veh/h	1781	1489	322	1781	877	838	1781	2752	748	1781	2873	649
Grp Volume(v), veh/h	358	0	500	84	0	577	84	264	260	242	168	169
Grp Sat Flow(s),veh/h/ln	1781	0	1811	1781	0	1714	1781	1777	1723	1781	1777	1745
Q Serve(g_s), s	21.1	0.0	24.1	4.8	0.0	31.0	4.8	15.3	15.6	14.4	8.5	8.8
Cycle Q Clear(g_c), s	21.1	0.0	24.1	4.8	0.0	31.0	4.8	15.3	15.6	14.4	8.5	8.8
Prop In Lane	1.00		0.18	1.00		0.49	1.00		0.43	1.00		0.37
Lane Grp Cap(c), veh/h	389	0	748	168	0	495	168	327	317	265	425	417
V/C Ratio(X)	0.92	0.00	0.67	0.50	0.00	1.17	0.50	0.81	0.82	0.91	0.39	0.41
Avail Cap(c_a), veh/h	431	0	748	431	0	495	182	447	433	265	447	439
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.1	0.0	25.6	46.3	0.0	38.2	46.3	42.0	42.1	45.0	34.3	34.5
Incr Delay (d2), s/veh	23.7	0.0	2.3	2.3	0.0	94.9	2.3	7.6	8.8	33.0	0.6	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	11.4	0.0	10.1	2.2	0.0	25.5	2.2	7.1	7.1	8.7	3.7	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.8	0.0	27.9	48.6	0.0	133.1	48.6	49.6	50.9	78.1	34.9	35.1
LnGrp LOS	E	A	C	D	A	F	D	D	D	E	C	D
Approach Vol, veh/h		858			661			608			579	
Approach Delay, s/veh		43.3			122.4			50.0			53.0	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.1	30.7	27.4	35.2	20.0	24.8	14.1	48.5				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	6.8	10.8	23.1	33.0	16.4	17.6	6.8	26.1				
Green Ext Time (p_c), s	0.1	1.7	0.3	0.0	0.0	2.0	0.2	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			66.2									
HCM 6th LOS			E									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th AWSC
1: Geyserville Ave & Canyon Road

Cumulative Conditions PM

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	20	120	20	20	20	170	50	20	20	50	30
Future Vol, veh/h	50	20	120	20	20	20	170	50	20	20	50	30
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	21	126	21	21	21	179	53	21	21	53	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.1	8.4	10.2	8.5
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	71%	26%	33%	20%
Vol Thru, %	21%	11%	33%	50%
Vol Right, %	8%	63%	33%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	190	60	100
LT Vol	170	50	20	20
Through Vol	50	20	20	50
RT Vol	20	120	20	30
Lane Flow Rate	253	200	63	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.334	0.252	0.086	0.138
Departure Headway (Hd)	4.763	4.544	4.906	4.718
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	753	788	726	756
Service Time	2.812	2.591	2.966	2.775
HCM Lane V/C Ratio	0.336	0.254	0.087	0.139
HCM Control Delay	10.2	9.1	8.4	8.5
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.5	1	0.3	0.5

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

Cumulative Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	540	0	0	650	260	20	50	30	120	0	90
Future Volume (veh/h)	80	540	0	0	650	260	20	50	30	120	0	90
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No				No				No		No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	568	0	0	684	183	21	53	12	126	0	14
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	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	407	1221	0	0	882	744	361	252	57	320	0	268
Arrive On Green	0.09	0.65	0.00	0.00	0.47	0.47	0.17	0.17	0.17	0.17	0.00	0.17
Sat Flow, veh/h	1781	1870	0	0	1870	1577	1380	1471	333	1320	0	1562
Grp Volume(v), veh/h	84	568	0	0	684	183	21	0	65	126	0	14
Grp Sat Flow(s), veh/h/ln	1781	1870	0	0	1870	1577	1380	0	1805	1320	0	1562
Q Serve(g_s), s	1.1	8.1	0.0	0.0	16.3	3.7	0.7	0.0	1.7	4.9	0.0	0.4
Cycle Q Clear(g_c), s	1.1	8.1	0.0	0.0	16.3	3.7	1.1	0.0	1.7	6.5	0.0	0.4
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	407	1221	0	0	882	744	361	0	309	320	0	268
V/C Ratio(X)	0.21	0.47	0.00	0.00	0.78	0.25	0.06	0.00	0.21	0.39	0.00	0.05
Avail Cap(c_a), veh/h	474	1221	0	0	2517	2122	589	0	607	538	0	525
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(l)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	4.6	0.0	0.0	11.8	8.4	19.0	0.0	19.1	21.9	0.0	18.5
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.0	1.5	0.2	0.1	0.0	0.3	0.8	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.1	0.0	0.0	6.0	1.1	0.2	0.0	0.7	1.5	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	4.9	0.0	0.0	13.3	8.6	19.1	0.0	19.4	22.6	0.0	18.6
LnGrp LOS	A	A	A	A	B	A	B	A	B	C	A	B
Approach Vol, veh/h	652				867		86		140			
Approach Delay, s/veh	5.3				12.3		19.3		22.2			
Approach LOS	A				B		B		C			
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	39.6		13.9		9.7		29.9		13.9			
Change Period (Y+Rc), s	* 4.7		* 4.7		* 4.7		* 4.7		* 4.7			
Max Green Setting (Gmax), s	* 32		* 18		* 7		* 72		* 18			
Max Q Clear Time (g_c+I1), s	10.1		8.5		3.1		18.3		3.7			
Green Ext Time (p_c), s	4.1		0.3		0.1		7.0		0.3			

Intersection Summary

HCM 6th Ctrl Delay 10.8

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

Cumulative Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↖	↖	↖		↖	↖			↕	
Traffic Volume (veh/h)	0	500	190	90	630	30	230	20	50	30	30	50
Future Volume (veh/h)	0	500	190	90	630	30	230	20	50	30	30	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	526	141	95	663	30	242	21	13	32	32	13
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	667	561	469	1044	47	456	234	145	212	189	60
Arrive On Green	0.00	0.36	0.36	0.13	0.59	0.59	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	0	1870	1574	1781	1775	80	1348	1081	669	491	872	277
Grp Volume(v), veh/h	0	526	141	95	0	693	242	0	34	77	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1574	1781	0	1855	1348	0	1750	1640	0	0
Q Serve(g_s), s	0.0	12.1	3.1	1.3	0.0	11.8	6.0	0.0	0.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	12.1	3.1	1.3	0.0	11.8	7.6	0.0	0.7	1.7	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.04	1.00		0.38	0.42		0.17
Lane Grp Cap(c), veh/h	0	667	561	469	0	1092	456	0	379	461	0	0
V/C Ratio(X)	0.00	0.79	0.25	0.20	0.00	0.63	0.53	0.00	0.09	0.17	0.00	0.00
Avail Cap(c_a), veh/h	0	931	784	562	0	1092	1003	0	1089	461	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	13.9	11.0	7.9	0.0	6.5	17.6	0.0	15.1	15.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	3.1	0.2	0.2	0.0	1.2	1.0	0.0	0.1	0.2	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	0.0	4.9	1.0	0.4	0.0	3.5	2.4	0.0	0.3	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.0	11.2	8.1	0.0	7.7	18.6	0.0	15.2	15.6	0.0	0.0
LnGrp LOS	A	B	B	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	667		788				276		77			
Approach Delay, s/veh	15.8		7.8				18.1		15.6			
Approach LOS	B		A				B		B			
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	12.1	21.9	15.1		33.1		15.1					
Change Period (Y+Rc), s	4.7	* 4.7	* 4.7		* 4.7		* 4.7					
Max Green Setting (Gmax), s	24	* 24	* 10		* 24		* 30					
Max Q Clear Time (g_c+I), s	14.1	14.1	3.7		13.8		9.6					
Green Ext Time (p_c), s	0.1	2.9	0.1		3.6		0.9					

Intersection Summary

HCM 6th Ctrl Delay 12.6

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Old Redwood Hwy & Fulton Rd

Cumulative Conditions PM

Intersection						
Int Delay, s/veh	267.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	400	80	60	800	640	320
Future Vol, veh/h	400	80	60	800	640	320
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	90	70	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	421	84	63	842	674	337
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1642	674	1011	0	-	0
Stage 1	674	-	-	-	-	-
Stage 2	968	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 110	455	686	-	-	-
Stage 1	506	-	-	-	-	-
Stage 2	~ 368	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 100	455	686	-	-	-
Mov Cap-2 Maneuver	~ 100	-	-	-	-	-
Stage 1	459	-	-	-	-	-
Stage 2	~ 368	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	1278.7		0.8		0	
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	686	-	100	455	-	-
HCM Lane V/C Ratio	0.092	-	4.211	0.185	-	-
HCM Control Delay (s)	10.8	\$	1531.5	14.7	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0.3	-	43.7	0.7	-	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Cumulative Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	880	700	170	440	50	610	390	220	60	320	150
Future Volume (veh/h)	220	880	700	170	440	50	610	390	220	60	320	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	232	926	482	179	463	50	642	411	47	63	337	146
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	257	575	483	205	461	50	424	446	374	32	174	75
Arrive On Green	0.14	0.31	0.31	0.12	0.28	0.28	0.24	0.24	0.24	0.16	0.16	0.16
Sat Flow, veh/h	1781	1870	1572	1781	1657	179	1781	1870	1568	204	1092	473
Grp Volume(v), veh/h	232	926	482	179	0	513	642	411	47	546	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1572	1781	0	1836	1781	1870	1568	1770	0	0
Q Serve(g_s), s	16.1	38.7	38.6	12.4	0.0	35.0	30.0	27.0	3.0	20.0	0.0	0.0
Cycle Q Clear(g_c), s	16.1	38.7	38.6	12.4	0.0	35.0	30.0	27.0	3.0	20.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	0.12		0.27
Lane Grp Cap(c), veh/h	257	575	483	205	0	511	424	446	374	281	0	0
V/C Ratio(X)	0.90	1.61	1.00	0.87	0.00	1.00	1.51	0.92	0.13	1.94	0.00	0.00
Avail Cap(c_a), veh/h	283	575	483	277	0	511	424	446	374	281	0	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.0	43.6	43.6	54.8	0.0	45.4	47.9	46.8	37.6	52.9	0.0	0.0
Incr Delay (d2), s/veh	26.7	283.3	40.4	16.1	0.0	41.0	242.5	24.2	0.1	436.7	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	8.9	62.4	19.8	6.4	0.0	21.3	41.4	15.2	1.1	42.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.7	326.9	84.0	70.9	0.0	86.5	290.4	71.0	37.7	489.7	0.0	0.0
LnGrp LOS	E	F	F	E	A	F	F	E	D	F	A	A
Approach Vol, veh/h		1640			692			1100			546	
Approach Delay, s/veh		220.5			82.5			197.6			489.7	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.3	44.7		25.1	24.0	41.0		35.8				
Change Period (Y+Rc), s	5.8	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	19.6	30.0		20.0	20.0	35.0		30.0				
Max Q Clear Time (g_c+I1), s	14.4	40.7		22.0	18.1	37.0		32.0				
Green Ext Time (p_c), s	0.1	0.0		0.0	0.1	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			227.1									
HCM 6th LOS			F									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

Cumulative Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	230	560	30	130	50	340	750	30	70	560	70
Future Volume (veh/h)	100	230	560	30	130	50	340	750	30	70	560	70
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	105	242	212	32	137	38	358	789	14	74	589	21
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	133	336	285	45	170	47	392	938	795	95	626	530
Arrive On Green	0.07	0.18	0.18	0.03	0.12	0.12	0.22	0.50	0.50	0.05	0.33	0.33
Sat Flow, veh/h	1781	1870	1585	1781	1409	391	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	105	242	212	32	0	175	358	789	14	74	589	21
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1800	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.9	10.2	10.6	1.5	0.0	8.0	16.5	30.6	0.4	3.4	25.7	0.8
Cycle Q Clear(g_c), s	4.9	10.2	10.6	1.5	0.0	8.0	16.5	30.6	0.4	3.4	25.7	0.8
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	336	285	45	0	217	392	938	795	95	626	530
V/C Ratio(X)	0.79	0.72	0.74	0.72	0.00	0.81	0.91	0.84	0.02	0.78	0.94	0.04
Avail Cap(c_a), veh/h	254	890	754	254	0	557	424	938	795	212	668	566
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	32.5	32.6	40.7	0.0	36.0	32.0	18.1	10.5	39.3	27.2	18.9
Incr Delay (d2), s/veh	3.8	1.1	1.5	7.7	0.0	2.7	21.9	6.6	0.0	5.1	20.4	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	4.5	4.0	0.8	0.0	3.6	9.1	13.4	0.1	1.6	14.2	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.1	33.6	34.1	48.4	0.0	38.7	53.8	24.7	10.5	44.3	47.6	18.9
LnGrp LOS	D	C	C	D	A	D	D	C	B	D	D	B
Approach Vol, veh/h	559			207			1161			684		
Approach Delay, s/veh	35.4			40.2			33.5			46.3		
Approach LOS	D			D			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.7	20.5	23.6	33.2	11.7	15.5	9.6	47.2				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+I), s	13.5	12.6	18.5	27.7	6.9	10.0	5.4	32.6				
Green Ext Time (p_c), s	0.0	0.5	0.0	0.4	0.0	0.3	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 37.8

HCM 6th LOS D

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC

7: Old Redwood Hwy & Creekside Apts/Faught Rd

Cumulative Conditions PM

Intersection												
Int Delay, s/veh	687.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↑	↗		↕	
Traffic Vol, veh/h	20	20	30	100	20	60	30	920	170	50	990	50
Future Vol, veh/h	20	20	30	100	20	60	30	920	170	50	990	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	21	32	105	21	63	32	968	179	53	1042	53
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	2339	2386	1069	2233	2233	968	1095	0	0	1147	0	0
Stage 1	1175	1175	-	1032	1032	-	-	-	-	-	-	-
Stage 2	1164	1211	-	1201	1201	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	26	34	269	~ 30	43	308	637	-	-	609	-	-
Stage 1	233	265	-	281	310	-	-	-	-	-	-	-
Stage 2	237	255	-	226	258	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 8	25	269	~ 6	32	308	637	-	-	609	-	-
Mov Cap-2 Maneuver	~ 8	25	-	~ 6	32	-	-	-	-	-	-	-
Stage 1	221	205	-	267	295	-	-	-	-	-	-	-
Stage 2	166	242	-	139	200	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, \$	1508.6		\$ 8805			0.3			0.5			
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	637	-	-	21	10	609	-	-				
HCM Lane V/C Ratio	0.05	-	-	3.509	18.947	0.086	-	-				
HCM Control Delay (s)	10.9	-	-	\$ 1508.6	\$ 8805	11.5	0	-				
HCM Lane LOS	B	-	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0.2	-	-	9.5	25.2	0.3	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

Cumulative Conditions PM

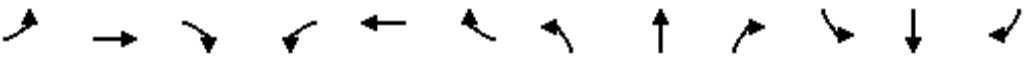
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	20	20	190	20	150	40	890	190	100	920	20
Future Volume (veh/h)	20	20	20	190	20	150	40	890	190	100	920	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	21	4	200	21	62	42	937	132	105	968	10
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	108	89	11	345	26	411	57	830	699	135	911	768
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.03	0.44	0.44	0.08	0.49	0.49
Sat Flow, veh/h	115	340	43	932	98	1570	1781	1870	1576	1781	1870	1577
Grp Volume(v), veh/h	46	0	0	221	0	62	42	937	132	105	968	10
Grp Sat Flow(s),veh/h/ln	499	0	0	1030	0	1570	1781	1870	1576	1781	1870	1577
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	2.1	1.6	30.0	3.4	3.9	32.9	0.2
Cycle Q Clear(g_c), s	15.2	0.0	0.0	14.8	0.0	2.1	1.6	30.0	3.4	3.9	32.9	0.2
Prop In Lane	0.46		0.09	0.90		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	0	0	371	0	411	57	830	699	135	911	768
V/C Ratio(X)	0.22	0.00	0.00	0.60	0.00	0.15	0.73	1.13	0.19	0.78	1.06	0.01
Avail Cap(c_a), veh/h	208	0	0	524	0	580	316	830	699	316	911	768
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.1	0.0	0.0	23.9	0.0	19.2	32.4	18.8	11.4	30.7	17.3	9.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.1	6.4	73.2	0.0	3.6	47.9	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	0.5	0.0	0.0	3.3	0.0	0.7	0.8	27.8	1.1	1.7	23.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	0.0	0.0	24.5	0.0	19.2	38.9	92.0	11.5	34.3	65.2	9.0
LnGrp LOS	C	A	A	C	A	B	D	F	B	C	F	A
Approach Vol, veh/h		46			283			1111			1083	
Approach Delay, s/veh		20.3			23.3			80.4			61.7	
Approach LOS		C			C			F			E	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		22.3	7.3	38.0		22.3	10.2	35.1				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		12.0	12.0	30.0		25.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s		17.2	3.6	34.9		16.8	5.9	32.0				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			64.9									
HCM 6th LOS			E									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	18.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Vol, veh/h	50	270	270	610	380	80
Future Vol, veh/h	50	270	270	610	380	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	284	284	642	400	84
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	284	0	-	0	674	284
Stage 1	-	-	-	-	284	-
Stage 2	-	-	-	-	390	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1278	-	-	-	420	755
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	684	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1278	-	-	-	~ 399	755
Mov Cap-2 Maneuver	-	-	-	-	~ 399	-
Stage 1	-	-	-	-	727	-
Stage 2	-	-	-	-	684	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		66.6		
HCM LOS				F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1278	-	-	-	399	755
HCM Lane V/C Ratio	0.041	-	-	-	1.003	0.112
HCM Control Delay (s)	7.9	0	-	-	78.4	10.4
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	12.3	0.4
Notes						
-: Volume exceeds capacity	\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon	

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

Cumulative Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩		↩		↩	↩		↩	↩	
Traffic Volume (veh/h)	40	40	130	240	70	20	160	630	110	20	570	50
Future Volume (veh/h)	40	40	130	240	70	20	160	630	110	20	570	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	42	22	253	74	19	168	663	114	21	600	51
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	236	212	359	289	58	15	294	755	130	102	643	55
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.17	0.49	0.49	0.06	0.38	0.38
Sat Flow, veh/h	694	927	1568	871	255	65	1781	1554	267	1781	1699	144
Grp Volume(v), veh/h	84	0	22	346	0	0	168	0	777	21	0	651
Grp Sat Flow(s),veh/h/ln	1621	0	1568	1191	0	0	1781	0	1821	1781	0	1843
Q Serve(g_s), s	0.0	0.0	0.8	13.4	0.0	0.0	6.1	0.0	26.7	0.8	0.0	23.7
Cycle Q Clear(g_c), s	2.6	0.0	0.8	16.0	0.0	0.0	6.1	0.0	26.7	0.8	0.0	23.7
Prop In Lane	0.50		1.00	0.73		0.05	1.00		0.15	1.00		0.08
Lane Grp Cap(c), veh/h	448	0	359	362	0	0	294	0	885	102	0	698
V/C Ratio(X)	0.19	0.00	0.06	0.96	0.00	0.00	0.57	0.00	0.88	0.21	0.00	0.93
Avail Cap(c_a), veh/h	1195	0	1121	362	0	0	408	0	1302	1274	0	698
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.8	0.0	21.1	29.7	0.0	0.0	26.9	0.0	16.1	31.4	0.0	20.9
Incr Delay (d2), s/veh	0.2	0.0	0.1	35.9	0.0	0.0	1.7	0.0	4.9	1.0	0.0	19.5
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	1.1	0.0	0.3	9.2	0.0	0.0	2.5	0.0	9.9	0.3	0.0	12.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	0.0	21.1	65.6	0.0	0.0	28.6	0.0	21.0	32.4	0.0	40.4
LnGrp LOS	C	A	C	E	A	A	C	A	C	C	A	D
Approach Vol, veh/h		106			346			945			672	
Approach Delay, s/veh		21.8			65.6			22.4			40.1	
Approach LOS		C			E			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.2	32.3		21.4	8.7	39.8		21.4				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	8.1	25.7		18.0	2.8	28.7		4.6				
Green Ext Time (p_c), s	0.2	0.0		0.0	0.0	5.2		0.5				

Intersection Summary

HCM 6th Ctrl Delay 35.3

HCM 6th LOS D

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
11: Private Dwy/Moorland Ave & Todd Rd

Cumulative Conditions PM

Intersection												
Int Delay, s/veh	1721.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	680	20	30	550	450	20	30	30	470	30	40
Future Vol, veh/h	70	680	20	30	550	450	20	30	30	470	30	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	74	716	21	32	579	474	21	32	32	495	32	42
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1053	0	0	737	0	0	1792	1992	727	1787	1765	816
Stage 1	-	-	-	-	-	-	875	875	-	880	880	-
Stage 2	-	-	-	-	-	-	917	1117	-	907	885	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	661	-	-	869	-	-	63	61	424	~ 63	84	377
Stage 1	-	-	-	-	-	-	344	367	-	~ 342	365	-
Stage 2	-	-	-	-	-	-	326	283	-	~ 330	363	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	661	-	-	869	-	-	33	52	424	~ 27	72	377
Mov Cap-2 Maneuver	-	-	-	-	-	-	33	52	-	~ 27	72	-
Stage 1	-	-	-	-	-	-	305	326	-	~ 304	351	-
Stage 2	-	-	-	-	-	-	254	273	-	~ 245	322	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0.3			\$ 328.1			\$ 7663.9		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	64	661	-	-	869	-	-	28	377			
HCM Lane V/C Ratio	1.316	0.111	-	-	0.036	-	-	18.797	0.112			
HCM Control Delay (s)	\$ 328.1	11.1	-	-	9.3	-	-	\$ 8275.8	15.7			
HCM Lane LOS	F	B	-	-	A	-	-	F	C			
HCM 95th %tile Q(veh)	7	0.4	-	-	0.1	-	-	65.3	0.4			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s				+: Computation Not Defined				*: All major volume in platoon		

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

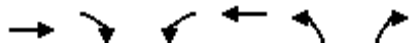
Cumulative Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱		↰	↱	↱		↰	↱
Traffic Volume (veh/h)	0	510	670	430	390	0	640	0	190	0	0	0
Future Volume (veh/h)	0	510	670	430	390	0	640	0	190	0	0	0
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	537	407	453	411	0	674	0	127	0	0	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	0	482	409	536	563	0	574	0	1022	0	2	0
Arrive On Green	0.00	0.26	0.26	0.30	0.30	0.00	0.32	0.00	0.32	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	537	407	453	411	0	674	0	127	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	20.0	19.9	18.5	15.3	0.0	25.0	0.0	2.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	20.0	19.9	18.5	15.3	0.0	25.0	0.0	2.2	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	482	409	536	563	0	574	0	1022	0	2	0
V/C Ratio(X)	0.00	1.11	1.00	0.84	0.73	0.00	1.17	0.00	0.12	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	482	409	689	724	0	574	0	1022	0	193	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	28.8	28.7	25.4	24.3	0.0	26.3	0.0	18.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	75.6	43.2	7.6	2.7	0.0	95.4	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	0.0	18.5	12.0	8.4	6.7	0.0	25.1	0.0	0.8	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	104.4	72.0	33.0	27.0	0.0	121.7	0.0	18.6	0.0	0.0	0.0
LnGrp LOS	A	F	E	C	C	A	F	A	B	A	A	A
Approach Vol, veh/h		944			864			801			0	
Approach Delay, s/veh		90.4			30.2			105.3			0.0	
Approach LOS		F			C			F				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		0.0		23.2		28.0		26.3				
Change Period (Y+Rc), s		3.0		3.2		3.0		3.0				
Max Green Setting (Gmax), s		8.0		20.0		25.0		30.0				
Max Q Clear Time (g_c+I1), s		0.0		22.0		27.0		20.5				
Green Ext Time (p_c), s		0.0		0.0		0.0		2.9				
Intersection Summary												
HCM 6th Ctrl Delay			75.0									
HCM 6th LOS			E									
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

Cumulative Conditions PM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	210	280	440	400	280	780
Future Volume (veh/h)	210	280	440	400	280	780
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	48	493	379	295	453
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	500	223	1084	569	454	1560
Arrive On Green	0.14	0.14	0.30	0.30	0.25	0.25
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	221	48	493	379	295	453
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	2.0	0.9	3.9	6.2	5.2	3.0
Cycle Q Clear(g_c), s	2.0	0.9	3.9	6.2	5.2	3.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	500	223	1084	569	454	1560
V/C Ratio(X)	0.44	0.22	0.45	0.67	0.65	0.29
Avail Cap(c_a), veh/h	2032	906	1528	802	713	1965
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	13.8	13.3	9.8	10.6	11.6	4.1
Incr Delay (d2), s/veh	0.6	0.5	0.3	1.4	1.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.3	1.2	2.1	1.7	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.4	13.8	10.1	12.0	13.2	4.2
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	269			872	748	
Approach Delay, s/veh	14.3			10.9	7.7	
Approach LOS	B			B	A	
Timer - Assigned Phs	2			6		8
Phs Duration (G+Y+Rc), s	8.4			14.1		12.4
Change Period (Y+Rc), s	3.5			3.5		3.5
Max Green Setting (Gmax), s	20.0			15.0		14.0
Max Q Clear Time (g_c+I1), s	4.0			8.2		7.2
Green Ext Time (p_c), s	1.3			2.5		1.8

Intersection Summary

HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

Cumulative Conditions PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	520	70	400	60	120	70	390	680	50	40	580	330
Future Volume (veh/h)	520	70	400	60	120	70	390	680	50	40	580	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	600	0	77	63	126	47	411	716	18	42	611	67
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	699	0	309	214	156	58	391	1358	602	55	701	310
Arrive On Green	0.20	0.00	0.20	0.12	0.12	0.12	0.22	0.38	0.38	0.03	0.20	0.20
Sat Flow, veh/h	3563	0	1573	1781	1299	484	1781	3554	1575	1781	3554	1573
Grp Volume(v), veh/h	600	0	77	63	0	173	411	716	18	42	611	67
Grp Sat Flow(s),veh/h/ln	1781	0	1573	1781	0	1783	1781	1777	1575	1781	1777	1573
Q Serve(g_s), s	12.6	0.0	3.2	2.5	0.0	7.3	17.0	12.1	0.6	1.8	12.9	2.8
Cycle Q Clear(g_c), s	12.6	0.0	3.2	2.5	0.0	7.3	17.0	12.1	0.6	1.8	12.9	2.8
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	699	0	309	214	0	214	391	1358	602	55	701	310
V/C Ratio(X)	0.86	0.00	0.25	0.29	0.00	0.81	1.05	0.53	0.03	0.77	0.87	0.22
Avail Cap(c_a), veh/h	827	0	365	230	0	230	391	1358	602	230	733	325
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	26.3	31.1	0.0	33.2	30.3	18.5	15.0	37.3	30.2	26.1
Incr Delay (d2), s/veh	7.0	0.0	0.2	0.3	0.0	16.2	59.9	0.2	0.0	8.1	10.2	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	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	1.2	1.1	0.0	4.1	13.4	4.6	0.2	0.9	6.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	0.0	26.5	31.4	0.0	49.4	90.2	18.7	15.0	45.4	40.4	26.2
LnGrp LOS	D	A	C	C	A	D	F	B	B	D	D	C
Approach Vol, veh/h	677			236			1145			720		
Approach Delay, s/veh	35.9			44.6			44.3			39.3		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	20.3			22.1			20.7			14.4		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	14.6			19.0			14.9			9.3		
Green Ext Time (p_c), s	0.4			0.0			0.3			0.0		

Intersection Summary

HCM 6th Ctrl Delay	41.0
HCM 6th LOS	D

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection

Intersection Delay, s/veh13.5

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	60	20	220	20	20	20	160	180	20	20	140	70
Future Vol, veh/h	60	20	220	20	20	20	160	180	20	20	140	70
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	21	232	21	21	21	168	189	21	21	147	74
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach RightNB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13	9.9	15.6	11.6
HCM LOS	B	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	20%	33%	9%
Vol Thru, %	50%	7%	33%	61%
Vol Right, %	6%	73%	33%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	360	300	60	230
LT Vol	160	60	20	20
Through Vol	180	20	20	140
RT Vol	20	220	20	70
Lane Flow Rate	379	316	63	242
Geometry Grp	1	1	1	1
Degree of Util (X)	0.573	0.467	0.107	0.366
Departure Headway (Hd)	5.445	5.322	6.089	5.447
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	659	673	585	659
Service Time	3.495	3.378	4.168	3.505
HCM Lane V/C Ratio	0.575	0.47	0.108	0.367
HCM Control Delay	15.6	13	9.9	11.6
HCM Lane LOS	C	B	A	B
HCM 95th-tile Q	3.6	2.5	0.4	1.7

HCM 6th TWSC
16: Riverside Dr & Verano Ave

Cumulative Conditions PM

Intersection												
Int Delay, s/veh	91.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	330	130	80	390	150	30	90	30	80	60	40
Future Vol, veh/h	60	330	130	80	390	150	30	90	30	80	60	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	347	137	84	411	158	32	95	32	84	63	42
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	569	0	0	484	0	0	1253	1279	416	1263	1268	490
Stage 1	-	-	-	-	-	-	542	542	-	658	658	-
Stage 2	-	-	-	-	-	-	711	737	-	605	610	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1003	-	-	1079	-	-	149	166	637	147	168	578
Stage 1	-	-	-	-	-	-	525	520	-	453	461	-
Stage 2	-	-	-	-	-	-	424	425	-	485	485	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1003	-	-	1079	-	-	78	137	637	~ 55	139	578
Mov Cap-2 Maneuver	-	-	-	-	-	-	78	137	-	~ 55	139	-
Stage 1	-	-	-	-	-	-	492	487	-	424	407	-
Stage 2	-	-	-	-	-	-	293	375	-	348	454	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			1.1			183.9			\$ 587.6		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	138	1003	-	-	1079	-	-	92				
HCM Lane V/C Ratio	1.144	0.063	-	-	0.078	-	-	2.059				
HCM Control Delay (s)	183.9	8.8	-	-	8.6	0	-	\$ 587.6				
HCM Lane LOS	F	A	-	-	A	A	-	F				
HCM 95th %tile Q(veh)	9	0.2	-	-	0.3	-	-	16.5				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s				+: Computation Not Defined				*: All major volume in platoon		

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Cumulative Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	190	80	30	260	560	60	910	30	380	410	50
Future Volume (veh/h)	50	190	80	30	260	560	60	910	30	380	410	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	200	67	32	274	492	63	958	30	400	432	47
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	102	351	106	63	223	381	28	418	13	318	295	32
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.25	0.25	0.25	0.18	0.18	0.18
Sat Flow, veh/h	127	940	283	37	597	1019	111	1691	53	1781	1655	180
Grp Volume(v), veh/h	320	0	0	798	0	0	1051	0	0	400	0	479
Grp Sat Flow(s),veh/h/ln	1350	0	0	1653	0	0	1855	0	0	1781	0	1835
Q Serve(g_s), s	0.0	0.0	0.0	16.1	0.0	0.0	19.0	0.0	0.0	13.7	0.0	13.7
Cycle Q Clear(g_c), s	11.3	0.0	0.0	28.7	0.0	0.0	19.0	0.0	0.0	13.7	0.0	13.7
Prop In Lane	0.17		0.21	0.04		0.62	0.06		0.03	1.00		0.10
Lane Grp Cap(c), veh/h	559	0	0	667	0	0	459	0	0	318	0	327
V/C Ratio(X)	0.57	0.00	0.00	1.20	0.00	0.00	2.29	0.00	0.00	1.26	0.00	1.46
Avail Cap(c_a), veh/h	559	0	0	667	0	0	459	0	0	318	0	327
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	0.0	25.0	0.0	0.0	28.9	0.0	0.0	31.6	0.0	31.6
Incr Delay (d2), s/veh	0.9	0.0	0.0	102.8	0.0	0.0	587.3	0.0	0.0	139.5	0.0	224.6
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	4.1	0.0	0.0	30.2	0.0	0.0	83.1	0.0	0.0	17.9	0.0	26.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.3	0.0	0.0	127.8	0.0	0.0	616.2	0.0	0.0	171.0	0.0	256.2
LnGrp LOS	B	A	A	F	A	A	F	A	A	F	A	F
Approach Vol, veh/h	320		798				1051		879			
Approach Delay, s/veh	19.3		127.8				616.2		217.4			
Approach LOS	B		F				F		F			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	23.6		34.1		19.1		34.1					
Change Period (Y+Rc), s	4.6		* 5.4		5.4		5.4					
Max Green Setting (Gmax), s	19.0		* 24		13.7		28.7					
Max Q Clear Time (g_c+H1), s	21.0		13.3		15.7		30.7					
Green Ext Time (p_c), s	0.0		0.7		0.0		0.0					
Intersection Summary												
HCM 6th Ctrl Delay			310.7									
HCM 6th LOS			F									
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

Cumulative Conditions PM



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	440	30	710	910	30	330
Future Volume (veh/h)	440	30	710	910	30	330
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	463	8	747	958	32	347
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	506	450	823	698	48	1043
Arrive On Green	0.28	0.28	0.44	0.44	0.03	0.56
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	463	8	747	958	32	347
Grp Sat Flow(s),veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	17.1	0.2	25.4	30.0	1.2	6.9
Cycle Q Clear(g_c), s	17.1	0.2	25.4	30.0	1.2	6.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	506	450	823	698	48	1043
V/C Ratio(X)	0.92	0.02	0.91	1.37	0.67	0.33
Avail Cap(c_a), veh/h	784	698	823	698	314	1043
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	23.6	17.6	17.8	19.1	32.9	8.2
Incr Delay (d2), s/veh	7.9	0.0	13.4	177.0	6.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.1	12.1	43.3	0.6	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.5	17.6	31.2	196.1	38.9	8.3
LnGrp LOS	C	B	C	F	D	A
Approach Vol, veh/h	471		1705			379
Approach Delay, s/veh	31.3		123.9			10.8
Approach LOS	C		F			B
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.0	36.2		23.9		44.2
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	13.2	32.0		19.1		8.9
Green Ext Time (p_c), s	0.0	0.0		0.2		0.6

Intersection Summary

HCM 6th Ctrl Delay 90.0

HCM 6th LOS F

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

Cumulative Conditions PM

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	420	0	0	510	30	0	0	0	30	0	30
Future Vol, veh/h	30	420	0	0	510	30	0	0	0	30	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	442	0	0	537	32	0	0	0	32	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	569	0	0	442	0	0	1075	1075	442	1059	1059	553
Stage 1	-	-	-	-	-	-	506	506	-	553	553	-
Stage 2	-	-	-	-	-	-	569	569	-	506	506	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1003	-	-	1118	-	-	197	220	615	202	224	533
Stage 1	-	-	-	-	-	-	549	540	-	517	514	-
Stage 2	-	-	-	-	-	-	507	506	-	549	540	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1003	-	-	1118	-	-	181	213	615	197	217	533
Mov Cap-2 Maneuver	-	-	-	-	-	-	181	213	-	197	217	-
Stage 1	-	-	-	-	-	-	531	523	-	500	514	-
Stage 2	-	-	-	-	-	-	477	506	-	531	523	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0			0			21		
HCM LOS							A			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1003	-	-	1118	-	-	288
HCM Lane V/C Ratio	-	0.031	-	-	-	-	-	0.219
HCM Control Delay (s)	0	8.7	-	-	0	-	-	21
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.8

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

Cumulative Conditions PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	390	70	80	420	270	80	280	120	270	290	130
Future Volume (veh/h)	130	390	70	80	420	270	80	280	120	270	290	130
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		0.98	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	137	411	69	84	442	265	84	295	81	284	305	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	565	95	193	383	230	193	431	116	318	613	178
Arrive On Green	0.12	0.36	0.36	0.11	0.35	0.35	0.11	0.16	0.16	0.18	0.23	0.23
Sat Flow, veh/h	1781	1560	262	1781	1093	656	1781	2757	742	1781	2711	785
Grp Volume(v), veh/h	137	0	480	84	0	707	84	188	188	284	198	197
Grp Sat Flow(s),veh/h/ln	1781	0	1822	1781	0	1749	1781	1777	1722	1781	1777	1719
Q Serve(g_s), s	6.5	0.0	20.2	3.9	0.0	31.0	3.9	8.8	9.1	13.8	8.6	8.9
Cycle Q Clear(g_c), s	6.5	0.0	20.2	3.9	0.0	31.0	3.9	8.8	9.1	13.8	8.6	8.9
Prop In Lane	1.00		0.14	1.00		0.37	1.00		0.43	1.00		0.46
Lane Grp Cap(c), veh/h	214	0	660	193	0	613	193	278	269	318	402	389
V/C Ratio(X)	0.64	0.00	0.73	0.43	0.00	1.15	0.43	0.68	0.70	0.89	0.49	0.51
Avail Cap(c_a), veh/h	524	0	660	524	0	613	222	542	526	322	542	525
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.1	0.0	24.4	36.9	0.0	28.7	36.9	35.2	35.3	35.5	29.8	29.9
Incr Delay (d2), s/veh	3.2	0.0	4.0	1.5	0.0	86.5	1.5	2.9	3.3	25.2	0.9	1.0
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	2.9	0.0	8.6	1.7	0.0	26.6	1.7	3.8	3.9	8.0	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	0.0	28.5	38.4	0.0	115.2	38.4	38.1	38.6	60.7	30.7	30.9
LnGrp LOS	D	A	C	D	A	F	D	D	D	E	C	C
Approach Vol, veh/h		617			791			460			679	
Approach Delay, s/veh		31.1			107.1			38.3			43.3	
Approach LOS		C			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	25.0	14.6	35.2	19.8	18.8	13.6	36.2				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	5.9	10.9	8.5	33.0	15.8	11.1	5.9	22.2				
Green Ext Time (p_c), s	0.1	2.0	0.3	0.0	0.0	1.7	0.2	1.8				

Intersection Summary

HCM 6th Ctrl Delay 59.3

HCM 6th LOS E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

ATTACHMENT C-4

CUMULATIVE WITH PROGRAM CONDITIONS OUPUTS



HCM 6th AWSC
1: Geyserville Ave & Canyon Road

Cumulative plus Project Conditions AM

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	20	218	20	20	20	138	30	20	20	30	30
Future Vol, veh/h	50	20	218	20	20	20	138	30	20	20	30	30
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	21	229	21	21	21	145	32	21	21	32	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB	WB		NB		SB						
Opposing Approach	WB	EB		SB		NB						
Opposing Lanes	1	1		1		1						
Conflicting Approach Left	SB	NB		EB		WB						
Conflicting Lanes Left	1	1		1		1						
Conflicting Approach Right	NB	SB		WB		EB						
Conflicting Lanes Right	1	1		1		1						
HCM Control Delay	9.8	8.4		9.8		8.5						
HCM LOS	A	A		A		A						

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	73%	17%	33%	25%
Vol Thru, %	16%	7%	33%	38%
Vol Right, %	11%	76%	33%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	188	288	60	80
LT Vol	138	50	20	20
Through Vol	30	20	20	30
RT Vol	20	218	20	30
Lane Flow Rate	198	303	63	84
Geometry Grp	1	1	1	1
Degree of Util (X)	0.271	0.361	0.085	0.113
Departure Headway (Hd)	4.936	4.292	4.845	4.834
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	724	837	735	736
Service Time	2.99	2.331	2.903	2.897
HCM Lane V/C Ratio	0.273	0.362	0.086	0.114
HCM Control Delay	9.8	9.8	8.4	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.1	1.7	0.3	0.4

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

Cumulative plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	520	0	0	540	158	20	42	40	224	0	60
Future Volume (veh/h)	95	520	0	0	540	158	20	42	40	224	0	60
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No				No				No		No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	547	0	0	568	87	21	44	9	236	0	15
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	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	415	1088	0	0	733	617	459	363	74	428	0	378
Arrive On Green	0.10	0.58	0.00	0.00	0.39	0.39	0.24	0.24	0.24	0.24	0.00	0.24
Sat Flow, veh/h	1781	1870	0	0	1870	1575	1384	1504	308	1339	0	1569
Grp Volume(v), veh/h	100	547	0	0	568	87	21	0	53	236	0	15
Grp Sat Flow(s), veh/h/ln	1781	1870	0	0	1870	1575	1384	0	1811	1339	0	1569
Q Serve(g_s), s	1.5	9.2	0.0	0.0	14.1	1.9	0.6	0.0	1.2	8.9	0.0	0.4
Cycle Q Clear(g_c), s	1.5	9.2	0.0	0.0	14.1	1.9	1.0	0.0	1.2	10.1	0.0	0.4
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	415	1088	0	0	733	617	459	0	437	428	0	378
V/C Ratio(X)	0.24	0.50	0.00	0.00	0.77	0.14	0.05	0.00	0.12	0.55	0.00	0.04
Avail Cap(c_a), veh/h	468	1126	0	0	1478	1245	594	0	613	558	0	531
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	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.0	6.6	0.0	0.0	14.1	10.4	15.8	0.0	15.8	19.7	0.0	15.4
Incr Delay (d2), s/veh	0.3	0.4	0.0	0.0	1.8	0.1	0.0	0.0	0.1	1.1	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	0.5	2.8	0.0	0.0	5.5	0.6	0.2	0.0	0.5	2.7	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.3	6.9	0.0	0.0	15.9	10.5	15.9	0.0	15.9	20.8	0.0	15.5
LnGrp LOS	A	A	A	A	B	B	B	A	B	C	A	B
Approach Vol, veh/h	647				655		74		251			
Approach Delay, s/veh	7.3				15.2		15.9		20.5			
Approach LOS	A				B		B		C			
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	35.6		17.5		10.1		25.5		17.5			
Change Period (Y+Rc), s	* 4.7		* 4.7		* 4.7		* 4.7		* 4.7			
Max Green Setting (Gmax), s	* 32		* 18		* 7		* 42		* 18			
Max Q Clear Time (g_c+I1), s	11.2		12.1		3.5		16.1		3.2			
Green Ext Time (p_c), s	3.8		0.4		0.1		4.6		0.2			

Intersection Summary

HCM 6th Ctrl Delay 12.9

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

Cumulative plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↖	↖	↖		↖	↖			↕	
Traffic Volume (veh/h)	0	545	239	40	500	20	178	50	120	20	40	20
Future Volume (veh/h)	0	545	239	40	500	20	178	50	120	20	40	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	574	194	42	526	19	187	53	26	21	42	4
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	737	621	399	1046	38	449	240	118	170	265	21
Arrive On Green	0.00	0.39	0.39	0.08	0.58	0.58	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	0	1870	1575	1781	1794	65	1345	1185	581	308	1312	103
Grp Volume(v), veh/h	0	574	194	42	0	545	187	0	79	67	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1575	1781	0	1858	1345	0	1766	1722	0	0
Q Serve(g_s), s	0.0	11.8	3.7	0.5	0.0	7.6	3.9	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	11.8	3.7	0.5	0.0	7.6	5.2	0.0	1.6	1.3	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.03	1.00		0.33	0.31		0.06
Lane Grp Cap(c), veh/h	0	737	621	399	0	1084	449	0	357	456	0	0
V/C Ratio(X)	0.00	0.78	0.31	0.11	0.00	0.50	0.42	0.00	0.22	0.15	0.00	0.00
Avail Cap(c_a), veh/h	0	1023	861	617	0	1084	1096	0	1207	498	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.6	9.2	7.4	0.0	5.4	15.9	0.0	14.6	14.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.6	0.3	0.1	0.0	0.4	0.6	0.0	0.3	0.1	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	0.0	4.4	1.1	0.1	0.0	2.0	1.6	0.0	0.6	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	14.2	9.5	7.6	0.0	5.8	16.5	0.0	14.9	14.6	0.0	0.0
LnGrp LOS	A	B	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	768		587			266			67			
Approach Delay, s/veh	13.0		5.9			16.0			14.6			
Approach LOS	B		A			B			B			
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	8.3	22.0	13.6		30.3		13.6					
Change Period (Y+Rc), s	4.7	* 4.7	* 4.7		* 4.7		* 4.7					
Max Green Setting (Gmax), s	24	* 24	* 10		* 24		* 30					
Max Q Clear Time (g_c+I), s	13.8	13.8	3.3		9.6		7.2					
Green Ext Time (p_c), s	0.0	3.4	0.1		3.3		1.0					

Intersection Summary

HCM 6th Ctrl Delay 11.1

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC

4: Old Redwood Hwy & Fulton Rd

Cumulative plus Project Conditions AM

Intersection						
Int Delay, s/veh	13.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	182	40	40	194	866	408
Future Vol, veh/h	182	40	40	194	866	408
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	90	70	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	192	42	42	204	912	429
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1200	912	1341	0	-	0
Stage 1	912	-	-	-	-	-
Stage 2	288	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	204	332	514	-	-	-
Stage 1	392	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 187	332	514	-	-	-
Mov Cap-2 Maneuver	~ 187	-	-	-	-	-
Stage 1	360	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	104.9		2.2		0	
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	514	-	187	332	-	-
HCM Lane V/C Ratio	0.082	-	1.024	0.127	-	-
HCM Control Delay (s)	12.6	-	124.1	17.4	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.3	-	8.8	0.4	-	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	341	210	232	623	30	720	181	161	40	282	266
Future Volume (veh/h)	81	341	210	232	623	30	720	181	161	40	282	266
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach	No				No				No			
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	85	359	41	244	656	31	758	191	35	42	297	255
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	108	407	341	272	542	26	466	489	410	21	150	129
Arrive On Green	0.06	0.22	0.22	0.15	0.31	0.31	0.26	0.26	0.26	0.17	0.17	0.17
Sat Flow, veh/h	1781	1870	1567	1781	1771	84	1781	1870	1570	122	862	740
Grp Volume(v), veh/h	85	359	41	244	0	687	758	191	35	594	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1567	1781	0	1854	1781	1870	1570	1724	0	0
Q Serve(g_s), s	5.4	21.3	2.4	15.4	0.0	35.1	30.0	9.6	1.9	20.0	0.0	0.0
Cycle Q Clear(g_c), s	5.4	21.3	2.4	15.4	0.0	35.1	30.0	9.6	1.9	20.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00	0.07		0.43
Lane Grp Cap(c), veh/h	108	407	341	272	0	567	466	489	410	300	0	0
V/C Ratio(X)	0.79	0.88	0.12	0.90	0.00	1.21	1.63	0.39	0.09	1.98	0.00	0.00
Avail Cap(c_a), veh/h	310	489	409	310	0	567	466	489	410	300	0	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.2	43.5	36.1	47.7	0.0	39.8	42.4	34.9	32.0	47.4	0.0	0.0
Incr Delay (d2), s/veh	4.7	13.5	0.1	23.3	0.0	110.5	292.4	0.2	0.0	451.9	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	2.5	11.0	0.9	8.5	0.0	32.8	50.4	4.3	0.7	46.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.9	57.0	36.1	71.1	0.0	150.4	334.8	35.1	32.1	499.3	0.0	0.0
LnGrp LOS	E	E	D	E	A	F	F	D	C	F	A	A
Approach Vol, veh/h	485				931				984			
Approach Delay, s/veh	55.4				129.6				265.8			
Approach LOS	E				F				F			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.9	31.0		25.1	12.8	41.1		35.8				
Change Period (Y+Rc), s	5.4	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	20.0	30.0		20.0	20.0	30.0		30.0				
Max Q Clear Time (g_c+I1), s	17.4	23.3		22.0	7.4	37.1		32.0				
Green Ext Time (p_c), s	0.1	0.7		0.0	0.1	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 235.7

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

Cumulative plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	160	362	40	311	40	374	204	20	40	856	80
Future Volume (veh/h)	40	160	362	40	311	40	374	204	20	40	856	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	168	66	42	327	37	394	215	9	42	901	25
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	53	431	361	53	366	41	375	929	784	53	591	497
Arrive On Green	0.03	0.23	0.23	0.03	0.22	0.22	0.21	0.50	0.50	0.03	0.32	0.32
Sat Flow, veh/h	1781	1870	1568	1781	1649	187	1781	1870	1577	1781	1870	1573
Grp Volume(v), veh/h	42	168	66	42	0	364	394	215	9	42	901	25
Grp Sat Flow(s),veh/h/ln	1781	1870	1568	1781	0	1835	1781	1870	1577	1781	1870	1573
Q Serve(g_s), s	2.2	7.2	3.2	2.2	0.0	18.3	20.0	6.2	0.3	2.2	30.0	1.0
Cycle Q Clear(g_c), s	2.2	7.2	3.2	2.2	0.0	18.3	20.0	6.2	0.3	2.2	30.0	1.0
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	53	431	361	53	0	408	375	929	784	53	591	497
V/C Ratio(X)	0.79	0.39	0.18	0.79	0.00	0.89	1.05	0.23	0.01	0.79	1.52	0.05
Avail Cap(c_a), veh/h	225	788	661	225	0	503	375	929	784	188	591	497
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	30.9	29.3	45.7	0.0	35.8	37.5	13.6	12.1	45.8	32.5	22.6
Incr Delay (d2), s/veh	9.3	0.2	0.1	9.2	0.0	14.0	60.1	0.0	0.0	9.3	244.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.2	1.2	1.1	0.0	9.7	14.7	2.5	0.1	1.1	53.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.1	31.1	29.4	54.9	0.0	49.8	97.6	13.6	12.1	55.1	276.9	22.6
LnGrp LOS	E	C	C	D	A	D	F	B	B	E	F	C
Approach Vol, veh/h	276			406			618			968		
Approach Delay, s/veh	34.3			50.3			67.1			260.7		
Approach LOS	C			D			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	27.3	25.1	35.1	8.2	26.5	7.9	52.3				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+14.2), s	14.2	9.2	22.0	32.0	4.2	20.3	4.2	8.2				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.0	0.0	0.5	0.0	0.4				

Intersection Summary

HCM 6th Ctrl Delay 142.8

HCM 6th LOS F

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC

7: Old Redwood Hwy & Creekside Apts/Faught Rd

Cumulative plus Project Conditions AM

Intersection												
Int Delay, s/veh	275											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↱	↰	↱		↕	
Traffic Vol, veh/h	60	20	30	182	20	20	20	437	110	30	1108	30
Future Vol, veh/h	60	20	30	182	20	20	20	437	110	30	1108	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	21	32	192	21	21	21	460	116	32	1166	32
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1827	1864	1182	1775	1764	460	1198	0	0	576	0	0
Stage 1	1246	1246	-	502	502	-	-	-	-	-	-	-
Stage 2	581	618	-	1273	1262	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 59	73	231	~ 64	84	601	583	-	-	997	-	-
Stage 1	213	246	-	552	542	-	-	-	-	-	-	-
Stage 2	499	481	-	205	241	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 40	64	231	~ 37	73	601	583	-	-	997	-	-
Mov Cap-2 Maneuver	~ 40	64	-	~ 37	73	-	-	-	-	-	-	-
Stage 1	205	222	-	532	522	-	-	-	-	-	-	-
Stage 2	445	464	-	~ 145	218	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s\$	634.3		\$ 2244.1			0.4			0.2			
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	583	-	-	57	42	997	-	-				
HCM Lane V/C Ratio	0.036	-	-	2.031	5.564	0.032	-	-				
HCM Control Delay (s)	11.4	-	-	\$ 634.3	\$ 2244.1	8.7	0	-				
HCM Lane LOS	B	-	-	F	F	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	11.2	27.2	0.1	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	20	30	209	20	57	20	411	154	244	956	20
Future Volume (veh/h)	30	20	30	209	20	57	20	411	154	244	956	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	21	7	220	21	13	21	433	51	257	1006	10
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	128	71	14	379	26	403	35	624	525	304	907	764
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.02	0.33	0.33	0.17	0.48	0.48
Sat Flow, veh/h	149	276	56	1043	100	1570	1781	1870	1573	1781	1870	1577
Grp Volume(v), veh/h	60	0	0	241	0	13	21	433	51	257	1006	10
Grp Sat Flow(s),veh/h/ln	481	0	0	1143	0	1570	1781	1870	1573	1781	1870	1577
Q Serve(g_s), s	0.5	0.0	0.0	0.0	0.0	0.4	0.7	12.4	1.4	8.7	30.0	0.2
Cycle Q Clear(g_c), s	13.4	0.0	0.0	13.0	0.0	0.4	0.7	12.4	1.4	8.7	30.0	0.2
Prop In Lane	0.53		0.12	0.91		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	213	0	0	405	0	403	35	624	525	304	907	764
V/C Ratio(X)	0.28	0.00	0.00	0.60	0.00	0.03	0.60	0.69	0.10	0.85	1.11	0.01
Avail Cap(c_a), veh/h	213	0	0	612	0	634	345	907	762	345	907	764
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	0.0	0.0	21.9	0.0	17.2	30.1	17.9	14.2	24.9	15.9	8.3
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.5	0.0	0.0	6.0	0.5	0.0	14.2	64.7	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	0.6	0.0	0.0	3.2	0.0	0.1	0.4	4.8	0.4	4.5	26.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	0.0	0.0	22.5	0.0	17.3	36.1	18.4	14.2	39.1	80.7	8.3
LnGrp LOS	B	A	A	C	A	B	D	B	B	D	F	A
Approach Vol, veh/h		60			254			505			1273	
Approach Delay, s/veh		19.0			22.2			18.7			71.7	
Approach LOS		B			C			B			E	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		20.5	6.3	35.1		20.5	15.7	25.7				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		12.0	12.0	30.0		25.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s		15.4	2.7	32.0		15.0	10.7	14.4				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.7	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			51.4									
HCM 6th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	143.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	105	375	225	236	512	43
Future Vol, veh/h	105	375	225	236	512	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	111	395	237	248	539	45
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	237	0	-	0	854	237
Stage 1	-	-	-	-	237	-
Stage 2	-	-	-	-	617	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1330	-	-	- ~	329	802
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	- ~	538	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1330	-	-	- ~	294	802
Mov Cap-2 Maneuver	-	-	-	- ~	294	-
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	- ~	538	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.7	0		\$ 385.8		
HCM LOS	F					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1330	-	-	-	294	802
HCM Lane V/C Ratio	0.083	-	-	-	1.833	0.056
HCM Control Delay (s)	8	0	-	-	\$ 417.4	9.8
HCM Lane LOS	A	A	-	-	F	A
HCM 95th %tile Q(veh)	0.3	-	-	-	36.2	0.2
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	81	204	140	71	20	113	450	170	21	555	40
Future Volume (veh/h)	50	81	204	140	71	20	113	450	170	21	555	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	85	34	147	75	19	119	474	174	22	584	40
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	188	270	371	237	106	22	286	605	222	107	630	43
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.16	0.46	0.46	0.06	0.36	0.36
Sat Flow, veh/h	478	1140	1568	636	447	93	1781	1303	478	1781	1730	118
Grp Volume(v), veh/h	138	0	34	241	0	0	119	0	648	22	0	624
Grp Sat Flow(s),veh/h/ln	1619	0	1568	1176	0	0	1781	0	1781	1781	0	1848
Q Serve(g_s), s	0.0	0.0	1.1	9.4	0.0	0.0	4.0	0.0	20.4	0.8	0.0	21.6
Cycle Q Clear(g_c), s	4.3	0.0	1.1	13.7	0.0	0.0	4.0	0.0	20.4	0.8	0.0	21.6
Prop In Lane	0.38		1.00	0.61		0.08	1.00		0.27	1.00		0.06
Lane Grp Cap(c), veh/h	458	0	371	365	0	0	286	0	827	107	0	673
V/C Ratio(X)	0.30	0.00	0.09	0.66	0.00	0.00	0.42	0.00	0.78	0.20	0.00	0.93
Avail Cap(c_a), veh/h	1281	0	1179	371	0	0	429	0	1339	1340	0	695
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	19.8	25.6	0.0	0.0	25.1	0.0	15.0	29.7	0.0	20.3
Incr Delay (d2), s/veh	0.4	0.0	0.1	4.2	0.0	0.0	1.0	0.0	1.7	0.9	0.0	18.4
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	1.7	0.0	0.4	3.8	0.0	0.0	1.6	0.0	6.8	0.3	0.0	11.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	0.0	19.9	29.8	0.0	0.0	26.1	0.0	16.7	30.7	0.0	38.7
LnGrp LOS	C	A	B	C	A	A	C	A	B	C	A	D
Approach Vol, veh/h		172			241			767			646	
Approach Delay, s/veh		21.0			29.8			18.1			38.4	
Approach LOS		C			C			B			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.4	30.0		21.1	8.7	36.7		21.1				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	6.0	23.6		15.7	2.8	22.4		6.3				
Green Ext Time (p_c), s	0.2	0.6		0.0	0.0	4.4		0.9				

Intersection Summary

HCM 6th Ctrl Delay 27.1

HCM 6th LOS C

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC

11: Private Dwy/Moorland Ave & Todd Rd

Cumulative plus Project Conditions AM

Intersection												
Int Delay, s/veh	544.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	549	20	20	535	409	20	20	20	385	20	92
Future Vol, veh/h	72	549	20	20	535	409	20	20	20	385	20	92
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	578	21	21	563	431	21	21	21	405	21	97
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	994	0	0	599	0	0	1621	1777	589	1583	1572	779
Stage 1	-	-	-	-	-	-	741	741	-	821	821	-
Stage 2	-	-	-	-	-	-	880	1036	-	762	751	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	696	-	-	978	-	-	83	82	508	~ 88	110	396
Stage 1	-	-	-	-	-	-	408	423	-	~ 369	389	-
Stage 2	-	-	-	-	-	-	342	309	-	~ 397	418	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	696	-	-	978	-	-	47	72	508	~ 59	96	396
Mov Cap-2 Maneuver	-	-	-	-	-	-	47	72	-	~ 59	96	-
Stage 1	-	-	-	-	-	-	364	377	-	~ 329	381	-
Stage 2	-	-	-	-	-	-	239	303	-	~ 320	372	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			0.2			134.2			\$ 2350.4		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	81	696	-	-	978	-	-	60	396			
HCM Lane V/C Ratio	0.78	0.109	-	-	0.022	-	-	7.105	0.245			
HCM Control Delay (s)	134.2	10.8	-	-	8.8	-	-	\$ 2880.5	17			
HCM Lane LOS	F	B	-	-	A	-	-	F	C			
HCM 95th %tile Q(veh)	3.9	0.4	-	-	0.1	-	-	49	0.9			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s				+: Computation Not Defined				*: All major volume in platoon		

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

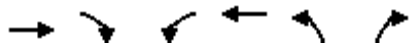
Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱		↰	↱	↱		↰	
Traffic Volume (veh/h)	0	530	424	420	337	0	627	0	207	0	0	0
Future Volume (veh/h)	0	530	424	420	337	0	627	0	207	0	0	0
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	558	265	442	355	0	660	0	139	0	0	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	0	488	413	523	549	0	580	0	1033	0	2	0
Arrive On Green	0.00	0.26	0.26	0.29	0.29	0.00	0.33	0.00	0.33	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	558	265	442	355	0	660	0	139	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	20.0	11.4	17.9	12.7	0.0	25.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	20.0	11.4	17.9	12.7	0.0	25.0	0.0	2.4	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	488	413	523	549	0	580	0	1033	0	2	0
V/C Ratio(X)	0.00	1.14	0.64	0.85	0.65	0.00	1.14	0.00	0.13	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	488	413	696	731	0	580	0	1033	0	195	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	28.4	25.2	25.5	23.6	0.0	25.9	0.0	18.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	86.9	3.3	7.3	1.3	0.0	81.3	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	0.0	20.1	4.4	8.1	5.4	0.0	23.0	0.0	0.8	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	115.3	28.5	32.7	24.9	0.0	107.1	0.0	18.3	0.0	0.0	0.0
LnGrp LOS	A	F	C	C	C	A	F	A	B	A	A	A
Approach Vol, veh/h		823			797			799			0	
Approach Delay, s/veh		87.3			29.2			91.7			0.0	
Approach LOS		F			C			F				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		0.0		23.2		28.0		25.5				
Change Period (Y+Rc), s		3.0		3.2		3.0		3.0				
Max Green Setting (Gmax), s		8.0		20.0		25.0		30.0				
Max Q Clear Time (g_c+I1), s		0.0		22.0		27.0		19.9				
Green Ext Time (p_c), s		0.0		0.0		0.0		2.6				
Intersection Summary												
HCM 6th Ctrl Delay			69.6									
HCM 6th LOS			E									
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

Cumulative plus Project Conditions AM



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	256	280	484	336	267	537
Future Volume (veh/h)	256	280	484	336	267	537
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	269	52	509	354	281	303
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	261	1050	551	423	1485
Arrive On Green	0.16	0.16	0.29	0.29	0.24	0.24
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	269	52	509	354	281	303
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	2.4	1.0	4.1	5.7	5.0	2.0
Cycle Q Clear(g_c), s	2.4	1.0	4.1	5.7	5.0	2.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	586	261	1050	551	423	1485
V/C Ratio(X)	0.46	0.20	0.48	0.64	0.66	0.20
Avail Cap(c_a), veh/h	2049	914	1540	809	719	1948
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	13.1	12.5	10.1	10.6	12.0	4.3
Incr Delay (d2), s/veh	0.6	0.4	0.3	1.3	1.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.3	1.2	1.9	1.7	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	12.9	10.4	11.9	13.8	4.3
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	321			863	584	
Approach Delay, s/veh	13.5			11.0	8.9	
Approach LOS	B			B	A	
Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	9.2				13.7	11.7
Change Period (Y+Rc), s	3.5				3.5	3.5
Max Green Setting (Gmax), s	20.0				15.0	14.0
Max Q Clear Time (g_c+I1), s	4.4				7.7	7.0
Green Ext Time (p_c), s	1.6				2.5	1.3
Intersection Summary						
HCM 6th Ctrl Delay		10.8				
HCM 6th LOS		B				
Notes						

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

Cumulative plus Project Conditions AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	370	120	303	30	40	40	409	741	50	60	375	371
Future Volume (veh/h)	370	120	303	30	40	40	409	741	50	60	375	371
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	258	310	56	32	42	1	431	780	19	63	395	70
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	365	383	322	82	84	2	473	1331	590	80	563	249
Arrive On Green	0.20	0.20	0.20	0.05	0.05	0.05	0.27	0.37	0.37	0.04	0.16	0.16
Sat Flow, veh/h	1781	1870	1573	1781	1819	43	1781	3554	1574	1781	3554	1570
Grp Volume(v), veh/h	258	310	56	32	0	43	431	780	19	63	395	70
Grp Sat Flow(s), veh/h/ln	1781	1870	1573	1781	0	1863	1781	1777	1574	1781	1777	1570
Q Serve(g_s), s	8.6	10.1	1.9	1.1	0.0	1.4	14.9	11.2	0.5	2.2	6.7	2.5
Cycle Q Clear(g_c), s	8.6	10.1	1.9	1.1	0.0	1.4	14.9	11.2	0.5	2.2	6.7	2.5
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	365	383	322	82	0	86	473	1331	590	80	563	249
V/C Ratio(X)	0.71	0.81	0.17	0.39	0.00	0.50	0.91	0.59	0.03	0.79	0.70	0.28
Avail Cap(c_a), veh/h	504	529	445	280	0	293	476	1339	593	280	893	395
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.6	24.1	20.9	29.5	0.0	29.7	22.6	16.0	12.6	30.1	25.4	23.6
Incr Delay (d2), s/veh	1.2	4.5	0.1	1.1	0.0	1.7	21.0	0.4	0.0	6.4	0.6	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	0.0	0.0
%ile BackOfQ(50%), veh/ln	8.5	4.6	0.6	0.5	0.0	0.7	8.4	4.1	0.2	1.0	2.6	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	24.8	28.7	21.0	30.6	0.0	31.3	43.7	16.4	12.6	36.5	26.0	23.8
LnGrp LOS	C	C	C	C	A	C	D	B	B	D	C	C
Approach Vol, veh/h	624			75			1230			528		
Approach Delay, s/veh	26.4			31.0			25.9			26.9		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	18.1			22.0			15.5			8.0		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	12.1			16.9			8.7			3.4		
Green Ext Time (p_c), s	0.7			0.0			0.8			0.0		

Intersection Summary

HCM 6th Ctrl Delay 26.4

HCM 6th LOS C

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection

Intersection Delay, s/veh13.7

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	20	271	20	20	20	142	132	20	20	221	50
Future Vol, veh/h	50	20	271	20	20	20	142	132	20	20	221	50
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	21	285	21	21	21	149	139	21	21	233	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach RightNB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.2	10.1	14.1	13.6
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	48%	15%	33%	7%
Vol Thru, %	45%	6%	33%	76%
Vol Right, %	7%	79%	33%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	294	341	60	291
LT Vol	142	50	20	20
Through Vol	132	20	20	221
RT Vol	20	271	20	50
Lane Flow Rate	309	359	63	306
Geometry Grp	1	1	1	1
Degree of Util (X)	0.489	0.528	0.109	0.473
Departure Headway (Hd)	5.687	5.3	6.208	5.558
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	631	675	572	646
Service Time	3.752	3.366	4.303	3.623
HCM Lane V/C Ratio	0.49	0.532	0.11	0.474
HCM Control Delay	14.1	14.2	10.1	13.6
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.7	3.1	0.4	2.5

HCM 6th TWSC
16: Riverside Dr & Verano Ave

Cumulative plus Project Conditions AM

Intersection												
Int Delay, s/veh	38.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	300	20	100	290	62	30	30	30	147	30	57
Future Vol, veh/h	52	300	20	100	290	62	30	30	30	147	30	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	55	316	21	105	305	65	32	32	32	155	32	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	370	0	0	337	0	0	1031	1017	327	1017	995	338
Stage 1	-	-	-	-	-	-	437	437	-	548	548	-
Stage 2	-	-	-	-	-	-	594	580	-	469	447	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1189	-	-	1222	-	-	211	238	714	216	245	704
Stage 1	-	-	-	-	-	-	598	579	-	521	517	-
Stage 2	-	-	-	-	-	-	491	500	-	575	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1189	-	-	1222	-	-	151	202	714	161	208	704
Mov Cap-2 Maneuver	-	-	-	-	-	-	151	202	-	161	208	-
Stage 1	-	-	-	-	-	-	570	552	-	497	461	-
Stage 2	-	-	-	-	-	-	373	446	-	494	547	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			1.8			31			173		
HCM LOS							D			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	231	1189	-	-	1222	-	-	206
HCM Lane V/C Ratio	0.41	0.046	-	-	0.086	-	-	1.196
HCM Control Delay (s)	31	8.2	-	-	8.2	0	-	173
HCM Lane LOS	D	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	1.9	0.1	-	-	0.3	-	-	12.5

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	↔
Traffic Volume (veh/h)	64	264	100	20	132	410	60	283	20	510	664	71
Future Volume (veh/h)	64	264	100	20	132	410	60	283	20	510	664	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	67	278	89	21	139	287	63	298	18	537	699	70
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	116	336	100	71	175	336	74	348	21	380	356	36
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.24	0.24	0.24	0.21	0.21	0.21
Sat Flow, veh/h	167	1096	326	39	572	1095	306	1446	87	1781	1671	167
Grp Volume(v), veh/h	434	0	0	447	0	0	379	0	0	537	0	769
Grp Sat Flow(s),veh/h/ln	1590	0	0	1706	0	0	1839	0	0	1781	0	1838
Q Serve(g_s), s	1.0	0.0	0.0	0.0	0.0	0.0	12.7	0.0	0.0	13.7	0.0	13.7
Cycle Q Clear(g_c), s	16.7	0.0	0.0	15.7	0.0	0.0	12.7	0.0	0.0	13.7	0.0	13.7
Prop In Lane	0.15		0.21	0.05		0.64	0.17		0.05	1.00		0.09
Lane Grp Cap(c), veh/h	552	0	0	581	0	0	442	0	0	380	0	392
V/C Ratio(X)	0.79	0.00	0.00	0.77	0.00	0.00	0.86	0.00	0.00	1.41	0.00	1.96
Avail Cap(c_a), veh/h	658	0	0	808	0	0	544	0	0	380	0	392
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	0.0	21.0	0.0	0.0	23.3	0.0	0.0	25.3	0.0	25.3
Incr Delay (d2), s/veh	4.3	0.0	0.0	1.8	0.0	0.0	10.3	0.0	0.0	201.0	0.0	441.8
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	6.1	0.0	0.0	5.8	0.0	0.0	6.5	0.0	0.0	26.5	0.0	53.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.2	0.0	0.0	22.8	0.0	0.0	33.6	0.0	0.0	226.2	0.0	467.1
LnGrp LOS	C	A	A	C	A	A	C	A	A	F	A	F
Approach Vol, veh/h		434			447			379			1306	
Approach Delay, s/veh		25.2			22.8			33.6			368.1	
Approach LOS		C			C			C			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		20.0		25.1		19.1		25.1				
Change Period (Y+Rc), s		4.6		* 5.4		5.4		5.4				
Max Green Setting (Gmax), s		19.0		* 24		13.7		28.7				
Max Q Clear Time (g_c+I1), s		14.7		18.7		15.7		17.7				
Green Ext Time (p_c), s		0.8		0.6		0.0		0.8				

Intersection Summary

HCM 6th Ctrl Delay 200.5

HCM 6th LOS F

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

Cumulative plus Project Conditions AM



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	680	33	278	335	43	706
Future Volume (veh/h)	680	33	278	335	43	706
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	716	13	293	353	45	743
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	750	667	550	466	60	784
Arrive On Green	0.42	0.42	0.29	0.29	0.03	0.42
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	716	13	293	353	45	743
Grp Sat Flow(s), veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	26.3	0.3	8.9	13.7	1.7	25.9
Cycle Q Clear(g_c), s	26.3	0.3	8.9	13.7	1.7	25.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	750	667	550	466	60	784
V/C Ratio(X)	0.96	0.02	0.53	0.76	0.75	0.95
Avail Cap(c_a), veh/h	790	703	830	703	316	830
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	19.0	11.4	20.0	21.7	32.4	18.9
Incr Delay (d2), s/veh	20.8	0.0	0.3	1.0	6.7	18.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.2	0.1	3.5	4.6	0.8	13.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.8	11.4	20.3	22.7	39.1	37.5
LnGrp LOS	D	B	C	C	D	D
Approach Vol, veh/h	729		646			788
Approach Delay, s/veh	39.2		21.6			37.6
Approach LOS	D		C			D
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.5	26.1		33.1		34.6
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	13.7	15.7		28.3		27.9
Green Ext Time (p_c), s	0.0	0.6		0.1		0.5

Intersection Summary

HCM 6th Ctrl Delay 33.4

HCM 6th LOS C

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

Cumulative plus Project Conditions AM

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	575	5	15	425	35	5	10	25	55	5	30
Future Vol, veh/h	30	575	5	15	425	35	5	10	25	55	5	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	605	5	16	447	37	5	11	26	58	5	32
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	484	0	0	610	0	0	1188	1188	608	1188	1172	466
Stage 1	-	-	-	-	-	-	672	672	-	498	498	-
Stage 2	-	-	-	-	-	-	516	516	-	690	674	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1079	-	-	969	-	-	165	188	496	165	192	597
Stage 1	-	-	-	-	-	-	445	454	-	554	544	-
Stage 2	-	-	-	-	-	-	542	534	-	435	454	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1079	-	-	969	-	-	148	179	496	144	183	597
Mov Cap-2 Maneuver	-	-	-	-	-	-	148	179	-	144	183	-
Stage 1	-	-	-	-	-	-	432	440	-	537	535	-
Stage 2	-	-	-	-	-	-	500	525	-	390	440	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.3			19.7			39.4		
HCM LOS							C			E		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	286	1079	-	-	969	-	-	196				
HCM Lane V/C Ratio	0.147	0.029	-	-	0.016	-	-	0.483				
HCM Control Delay (s)	19.7	8.4	-	-	8.8	-	-	39.4				
HCM Lane LOS	C	A	-	-	A	-	-	E				
HCM 95th %tile O(veh)	0.5	0.1	-	-	0.1	-	-	2.4				

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	340	390	91	81	280	300	83	398	143	230	262	90
Future Volume (veh/h)	340	390	91	81	280	300	83	398	143	230	262	90
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		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	358	411	90	85	295	282	87	419	117	242	276	64
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	389	611	134	167	252	241	168	512	141	264	690	157
Arrive On Green	0.22	0.41	0.41	0.09	0.29	0.29	0.09	0.19	0.19	0.15	0.24	0.24
Sat Flow, veh/h	1781	1485	325	1781	876	838	1781	2741	758	1781	2868	653
Grp Volume(v), veh/h	358	0	501	85	0	577	87	270	266	242	169	171
Grp Sat Flow(s),veh/h/ln	1781	0	1810	1781	0	1714	1781	1777	1722	1781	1777	1745
Q Serve(g_s), s	21.2	0.0	24.3	4.9	0.0	31.0	5.0	15.7	16.0	14.4	8.6	8.9
Cycle Q Clear(g_c), s	21.2	0.0	24.3	4.9	0.0	31.0	5.0	15.7	16.0	14.4	8.6	8.9
Prop In Lane	1.00		0.18	1.00		0.49	1.00		0.44	1.00		0.37
Lane Grp Cap(c), veh/h	389	0	745	167	0	493	168	332	321	264	427	420
V/C Ratio(X)	0.92	0.00	0.67	0.51	0.00	1.17	0.52	0.81	0.83	0.92	0.40	0.41
Avail Cap(c_a), veh/h	429	0	745	429	0	493	182	445	431	264	445	437
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.3	0.0	25.8	46.5	0.0	38.4	46.5	42.1	42.2	45.3	34.4	34.5
Incr Delay (d2), s/veh	23.9	0.0	2.4	2.4	0.0	96.9	2.4	8.3	9.5	34.0	0.6	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	11.5	0.0	10.2	2.2	0.0	25.7	2.3	7.4	7.4	8.8	3.7	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.2	0.0	28.2	48.9	0.0	135.3	48.9	50.4	51.7	79.2	35.0	35.1
LnGrp LOS	E	A	C	D	A	F	D	D	D	E	C	D
Approach Vol, veh/h		859			662			623			582	
Approach Delay, s/veh		43.6			124.2			50.8			53.4	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.2	31.0	27.5	35.2	20.0	25.1	14.1	48.6				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	7.0	10.9	23.2	33.0	16.4	18.0	6.9	26.3				
Green Ext Time (p_c), s	0.1	1.7	0.3	0.0	0.0	2.0	0.2	1.2				

Intersection Summary

HCM 6th Ctrl Delay 66.9

HCM 6th LOS E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th AWSC
1: Geyserville Ave & Canyon Road

08/02/2020

Intersection

Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	20	148	20	20	20	186	50	20	20	50	30
Future Vol, veh/h	50	20	148	20	20	20	186	50	20	20	50	30
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	21	156	21	21	21	196	53	21	21	53	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	8.6	10.7	8.7
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	73%	23%	33%	20%
Vol Thru, %	20%	9%	33%	50%
Vol Right, %	8%	68%	33%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	256	218	60	100
LT Vol	186	50	20	20
Through Vol	50	20	20	50
RT Vol	20	148	20	30
Lane Flow Rate	269	229	63	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.363	0.291	0.088	0.141
Departure Headway (Hd)	4.843	4.563	5	4.818
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	738	783	711	738
Service Time	2.903	2.619	3.073	2.889
HCM Lane V/C Ratio	0.364	0.292	0.089	0.142
HCM Control Delay	10.7	9.5	8.6	8.7
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.7	1.2	0.3	0.5

HCM 6th Signalized Intersection Summary

2: Armstrong Woods Rd & River Rd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	540	0	0	650	324	20	56	30	157	0	102
Future Volume (veh/h)	94	540	0	0	650	324	20	56	30	157	0	102
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		0.99	0.99		0.99	0.99		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
Work Zone On Approach	No				No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	568	0	0	684	224	21	59	15	165	0	19
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	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	388	1196	0	0	868	732	385	288	73	341	0	314
Arrive On Green	0.10	0.64	0.00	0.00	0.46	0.46	0.20	0.20	0.20	0.20	0.00	0.20
Sat Flow, veh/h	1781	1870	0	0	1870	1577	1377	1435	365	1312	0	1565
Grp Volume(v), veh/h	99	568	0	0	684	224	21	0	74	165	0	19
Grp Sat Flow(s), veh/h/ln	1781	1870	0	0	1870	1577	1377	0	1799	1312	0	1565
Q Serve(g_s), s	1.4	9.3	0.0	0.0	18.2	5.2	0.7	0.0	2.0	7.1	0.0	0.6
Cycle Q Clear(g_c), s	1.4	9.3	0.0	0.0	18.2	5.2	1.3	0.0	2.0	9.1	0.0	0.6
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	388	1196	0	0	868	732	385	0	361	341	0	314
V/C Ratio(X)	0.26	0.47	0.00	0.00	0.79	0.31	0.05	0.00	0.20	0.48	0.00	0.06
Avail Cap(c_a), veh/h	430	1196	0	0	2288	1929	530	0	550	479	0	479
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	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.3	5.5	0.0	0.0	13.3	9.8	19.6	0.0	19.6	23.4	0.0	19.0
Incr Delay (d2), s/veh	0.3	0.3	0.0	0.0	1.6	0.2	0.1	0.0	0.3	1.1	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.7	0.0	0.0	7.0	1.6	0.2	0.0	0.8	2.2	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	5.8	0.0	0.0	14.9	10.1	19.6	0.0	19.9	24.5	0.0	19.1
LnGrp LOS	A	A	A	A	B	B	B	A	B	C	A	B
Approach Vol, veh/h	667				908		95				184	
Approach Delay, s/veh	6.4				13.7		19.8				23.9	
Approach LOS	A				B		B				C	
Timer - Assigned Phs	2		4		5		6		8			
Phs Duration (G+Y+Rc), s	42.3		16.5		10.3		32.0		16.5			
Change Period (Y+Rc), s	* 4.7		* 4.7		* 4.7		* 4.7		* 4.7			
Max Green Setting (Gmax), s	* 32		* 18		* 7		* 72		* 18			
Max Q Clear Time (g_c+I1), s	11.3		11.1		3.4		20.2		4.0			
Green Ext Time (p_c), s	4.0		0.3		0.1		7.2		0.3			

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: Gravenstein Hwy/Old River Rd & River Rd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↖	↖	↖		↖	↖			↕	
Traffic Volume (veh/h)	0	520	207	90	665	30	259	20	50	30	30	50
Future Volume (veh/h)	0	520	207	90	665	30	259	20	50	30	30	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	0.99		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	547	157	95	700	30	273	21	14	32	32	14
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	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	671	564	441	1032	44	474	249	166	218	199	70
Arrive On Green	0.00	0.36	0.36	0.13	0.58	0.58	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	0	1870	1574	1781	1780	76	1348	1047	698	502	837	293
Grp Volume(v), veh/h	0	547	157	95	0	730	273	0	35	78	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1574	1781	0	1856	1348	0	1745	1632	0	0
Q Serve(g_s), s	0.0	13.6	3.7	1.4	0.0	14.0	7.5	0.0	0.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	13.6	3.7	1.4	0.0	14.0	9.3	0.0	0.8	1.8	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.04	1.00		0.40	0.41		0.18
Lane Grp Cap(c), veh/h	0	671	564	441	0	1076	474	0	414	486	0	0
V/C Ratio(X)	0.00	0.82	0.28	0.22	0.00	0.68	0.58	0.00	0.08	0.16	0.00	0.00
Avail Cap(c_a), veh/h	0	872	734	521	0	1076	940	0	1017	486	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	15.0	11.8	8.8	0.0	7.5	18.3	0.0	15.3	15.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.7	0.3	0.2	0.0	1.7	1.1	0.0	0.1	0.2	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	0.0	5.9	1.2	0.4	0.0	4.6	2.9	0.0	0.3	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	19.6	12.0	9.0	0.0	9.2	19.4	0.0	15.4	15.8	0.0	0.0
LnGrp LOS	A	B	B	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h	704		825			308			78			
Approach Delay, s/veh	17.9		9.2			18.9			15.8			
Approach LOS	B		A			B			B			
Timer - Assigned Phs	1	2	4		6		8					
Phs Duration (G+Y+Rc), s	1.4	23.2	16.9		34.5		16.9					
Change Period (Y+Rc), s	4.7	* 4.7	* 4.7		* 4.7		* 4.7					
Max Green Setting (Gmax), s	24	* 24	* 10		* 24		* 30					
Max Q Clear Time (g_c+I), s	13.4	15.6	3.8		16.0		11.3					
Green Ext Time (p_c), s	0.1	2.8	0.1		3.3		1.0					

Intersection Summary

HCM 6th Ctrl Delay 14.2

HCM 6th LOS B

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Old Redwood Hwy & Fulton Rd

08/02/2020

Intersection

Int Delay, s/veh 285.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	412	80	60	804	645	325
Future Vol, veh/h	412	80	60	804	645	325
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	90	70	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	434	84	63	846	679	342

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1651	679	1021
Stage 1	679	-	-
Stage 2	972	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	~ 109	452	680
Stage 1	504	-	-
Stage 2	~ 367	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 99	452	680
Mov Cap-2 Maneuver	~ 99	-	-
Stage 1	457	-	-
Stage 2	~ 367	-	-

Approach	EB	NB	SB
HCM Control Delay, \$	1349.3	0.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	680	-	99	452	-	-
HCM Lane V/C Ratio	0.093	-	4.381	0.186	-	-
HCM Control Delay (s)	10.8	\$	1608.4	14.8	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0.3	-	45.4	0.7	-	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

08/02/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	231	890	700	172	444	50	610	392	222	60	322	153
Future Volume (veh/h)	231	890	700	172	444	50	610	392	222	60	322	153
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	243	937	486	181	467	50	642	413	48	63	339	149
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	268	580	488	207	458	49	422	443	371	32	172	75
Arrive On Green	0.15	0.31	0.31	0.12	0.28	0.28	0.24	0.24	0.24	0.16	0.16	0.16
Sat Flow, veh/h	1781	1870	1572	1781	1659	178	1781	1870	1568	202	1088	478
Grp Volume(v), veh/h	243	937	486	181	0	517	642	413	48	551	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1572	1781	0	1836	1781	1870	1568	1769	0	0
Q Serve(g_s), s	17.0	39.3	39.1	12.7	0.0	35.0	30.0	27.4	3.1	20.0	0.0	0.0
Cycle Q Clear(g_c), s	17.0	39.3	39.1	12.7	0.0	35.0	30.0	27.4	3.1	20.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	0.11		0.27
Lane Grp Cap(c), veh/h	268	580	488	207	0	507	422	443	371	279	0	0
V/C Ratio(X)	0.91	1.62	1.00	0.87	0.00	1.02	1.52	0.93	0.13	1.97	0.00	0.00
Avail Cap(c_a), veh/h	281	580	488	275	0	507	422	443	371	279	0	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.0	43.7	43.7	55.1	0.0	45.9	48.4	47.4	38.1	53.4	0.0	0.0
Incr Delay (d2), s/veh	29.2	284.9	39.9	17.0	0.0	45.0	247.1	26.4	0.1	451.1	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	9.6	63.3	20.0	6.6	0.0	21.8	41.8	15.6	1.2	43.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.2	328.7	83.5	72.1	0.0	90.8	295.4	73.8	38.1	504.5	0.0	0.0
LnGrp LOS	F	F	F	E	A	F	F	E	D	F	A	A
Approach Vol, veh/h	1666				698				1103			
Approach Delay, s/veh	221.2				86.0				201.3			
Approach LOS	F				F				F			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.5	45.3		25.1	24.8	41.0		35.8				
Change Period (Y+Rc), s	5.8	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	19.6	30.0		20.0	20.0	35.0		30.0				
Max Q Clear Time (g_c+I1), s	14.7	41.3		22.0	19.0	37.0		32.0				
Green Ext Time (p_c), s	0.1	0.0		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 231.1

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

6: Old Redwood Hwy & Airport Blvd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	231	571	30	131	50	345	754	30	70	564	70
Future Volume (veh/h)	100	231	571	30	131	50	345	754	30	70	564	70
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
Work Zone On Approach	No		No				No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	105	243	227	32	138	38	363	794	14	74	594	21
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	133	337	285	44	170	47	397	945	801	95	628	533
Arrive On Green	0.07	0.18	0.18	0.02	0.12	0.12	0.22	0.51	0.51	0.05	0.34	0.34
Sat Flow, veh/h	1781	1870	1585	1781	1412	389	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	105	243	227	32	0	176	363	794	14	74	594	21
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1800	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.9	10.5	11.7	1.5	0.0	8.1	17.0	31.2	0.4	3.5	26.4	0.8
Cycle Q Clear(g_c), s	4.9	10.5	11.7	1.5	0.0	8.1	17.0	31.2	0.4	3.5	26.4	0.8
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	337	285	44	0	217	397	945	801	95	628	533
V/C Ratio(X)	0.79	0.72	0.80	0.72	0.00	0.81	0.92	0.84	0.02	0.78	0.95	0.04
Avail Cap(c_a), veh/h	250	876	742	250	0	548	417	945	801	209	657	557
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.8	33.0	33.5	41.3	0.0	36.6	32.4	18.2	10.5	39.9	27.6	19.1
Incr Delay (d2), s/veh	3.9	1.1	1.9	7.9	0.0	2.7	23.2	6.5	0.0	5.1	21.7	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	2.2	4.6	4.5	0.8	0.0	3.7	9.5	13.6	0.1	1.6	14.8	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.7	34.1	35.5	49.3	0.0	39.3	55.6	24.6	10.5	45.0	49.3	19.1
LnGrp LOS	D	C	D	D	A	D	E	C	B	D	D	B
Approach Vol, veh/h	575			208			1171			689		
Approach Delay, s/veh	36.2			40.9			34.1			47.9		
Approach LOS	D			D			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.7	20.8	24.1	33.8	11.8	15.7	9.7	48.3				
Change Period (Y+Rc), s	4.6	5.4	5.1	5.1	5.4	* 5.4	5.1	5.1				
Max Green Setting (Gmax), s	12.0	40.0	20.0	30.0	12.0	* 26	10.0	30.0				
Max Q Clear Time (g_c+I), s	13.5	13.7	19.0	28.4	6.9	10.1	5.5	33.2				
Green Ext Time (p_c), s	0.0	0.5	0.0	0.3	0.0	0.3	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	38.7
HCM 6th LOS	D

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
7: Old Redwood Hwy & Creekside Apts/Faught Rd

08/02/2020

Intersection												
Int Delay, s/veh	771											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	20	30	101	20	60	30	929	172	50	1005	50
Future Vol, veh/h	20	20	30	101	20	60	30	929	172	50	1005	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	270	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	21	32	106	21	63	32	978	181	53	1058	53
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2366	2414	1085	2259	2259	978	1111	0	0	1159	0	0
Stage 1	1191	1191	-	1042	1042	-	-	-	-	-	-	-
Stage 2	1175	1223	-	1217	1217	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	24	33	263	~ 29	41	304	629	-	-	603	-	-
Stage 1	229	261	-	277	307	-	-	-	-	-	-	-
Stage 2	233	252	-	221	253	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 7	24	263	~ 5	30	304	629	-	-	603	-	-
Mov Cap-2 Maneuver	~ 7	24	-	~ 5	30	-	-	-	-	-	-	-
Stage 1	217	200	-	263	291	-	-	-	-	-	-	-
Stage 2	163	239	-	133	194	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, \$	1824.6		\$ 9883.3		0.3		0.5					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	629	-	-	18	9	603	-	-				
HCM Lane V/C Ratio	0.05	-	-	4.094	21.17	0.087	-	-				
HCM Control Delay (s)	11	-	-	\$ 1824.6	\$ 9883.3	11.5	0	-				
HCM Lane LOS	B	-	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0.2	-	-	9.8	25.5	0.3	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

08/02/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	20	20	199	20	158	40	894	216	115	921	20
Future Volume (veh/h)	20	20	20	199	20	158	40	894	216	115	921	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	21	4	209	21	70	42	941	149	121	969	10
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	103	85	11	348	25	429	57	802	675	154	904	762
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.03	0.43	0.43	0.09	0.48	0.48
Sat Flow, veh/h	104	312	40	914	92	1571	1781	1870	1576	1781	1870	1577
Grp Volume(v), veh/h	46	0	0	230	0	70	42	941	149	121	969	10
Grp Sat Flow(s),veh/h/ln	455	0	0	1006	0	1571	1781	1870	1576	1781	1870	1577
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	2.4	1.6	30.0	4.2	4.7	33.8	0.2
Cycle Q Clear(g_c), s	16.7	0.0	0.0	16.3	0.0	2.4	1.6	30.0	4.2	4.7	33.8	0.2
Prop In Lane	0.46		0.09	0.91		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	199	0	0	373	0	429	57	802	675	154	904	762
V/C Ratio(X)	0.23	0.00	0.00	0.62	0.00	0.16	0.74	1.17	0.22	0.78	1.07	0.01
Avail Cap(c_a), veh/h	199	0	0	491	0	561	305	802	675	305	904	762
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	0.0	0.0	24.4	0.0	19.3	33.6	20.0	12.6	31.3	18.1	9.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.1	6.8	91.2	0.1	3.3	51.2	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	0.6	0.0	0.0	3.5	0.0	0.8	0.8	31.5	1.3	2.0	25.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	0.0	25.0	0.0	19.4	40.4	111.2	12.7	34.6	69.3	9.4
LnGrp LOS	C	A	A	C	A	B	D	F	B	C	F	A
Approach Vol, veh/h		46			300			1132			1100	
Approach Delay, s/veh		20.6			23.7			95.6			64.9	
Approach LOS		C			C			F			E	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		23.7	7.3	38.9		23.7	11.2	35.1				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		12.0	12.0	30.0		25.0	12.0	30.0				
Max Q Clear Time (g_c+I1), s		18.7	3.6	35.8		18.3	6.7	32.0				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			72.8									
HCM 6th LOS			E									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	31.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔	↔	↔	↔
Traffic Vol, veh/h	52	285	299	653	413	80
Future Vol, veh/h	52	285	299	653	413	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	150	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	55	300	315	687	435	84
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	315	0	-	0	725	315
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	410	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1245	-	-	-	~ 392	725
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	670	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1245	-	-	-	~ 371	725
Mov Cap-2 Maneuver	-	-	-	-	~ 371	-
Stage 1	-	-	-	-	701	-
Stage 2	-	-	-	-	670	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		114.6		
HCM LOS				F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1245	-	-	-	371	725
HCM Lane V/C Ratio	0.044	-	-	-	1.172	0.116
HCM Control Delay (s)	8	0	-	-	134.7	10.6
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	17.4	0.4
Notes						
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

HCM 6th Signalized Intersection Summary

10: Gravenstein Hwy & Graton Rd/Frei Rd

08/02/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	41	138	240	71	21	196	668	110	20	573	50
Future Volume (veh/h)	40	41	138	240	71	21	196	668	110	20	573	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	43	24	253	75	20	206	703	114	21	603	51
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	224	206	345	273	56	15	289	791	128	102	678	57
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.16	0.50	0.50	0.06	0.40	0.40
Sat Flow, veh/h	683	937	1567	853	253	67	1781	1569	254	1781	1700	144
Grp Volume(v), veh/h	85	0	24	348	0	0	206	0	817	21	0	654
Grp Sat Flow(s),veh/h/ln	1620	0	1567	1173	0	0	1781	0	1823	1781	0	1843
Q Serve(g_s), s	0.0	0.0	0.9	13.2	0.0	0.0	8.0	0.0	29.3	0.8	0.0	24.0
Cycle Q Clear(g_c), s	2.8	0.0	0.9	16.0	0.0	0.0	8.0	0.0	29.3	0.8	0.0	24.0
Prop In Lane	0.49		1.00	0.73		0.06	1.00		0.14	1.00		0.08
Lane Grp Cap(c), veh/h	431	0	345	344	0	0	289	0	919	102	0	735
V/C Ratio(X)	0.20	0.00	0.07	1.01	0.00	0.00	0.71	0.00	0.89	0.21	0.00	0.89
Avail Cap(c_a), veh/h	1150	0	1078	344	0	0	392	0	1254	1225	0	735
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.2	0.0	22.5	31.4	0.0	0.0	28.8	0.0	16.2	32.7	0.0	20.4
Incr Delay (d2), s/veh	0.2	0.0	0.1	51.8	0.0	0.0	3.8	0.0	6.3	1.0	0.0	13.0
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	1.2	0.0	0.3	10.7	0.0	0.0	3.4	0.0	11.2	0.4	0.0	11.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	22.5	83.2	0.0	0.0	32.6	0.0	22.5	33.7	0.0	33.3
LnGrp LOS	C	A	C	F	A	A	C	A	C	C	A	C
Approach Vol, veh/h		109			348			1023			675	
Approach Delay, s/veh		23.2			83.2			24.5			33.3	
Approach LOS		C			F			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.5	34.8		21.4	8.8	42.5		21.4				
Change Period (Y+Rc), s	* 4.7	5.8		5.4	* 4.7	5.8		5.4				
Max Green Setting (Gmax), s	* 16	25.0		16.0	* 50	50.0		50.0				
Max Q Clear Time (g_c+I1), s	10.0	26.0		18.0	2.8	31.3		4.8				
Green Ext Time (p_c), s	0.3	0.0		0.0	0.0	5.4		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			36.7									
HCM 6th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th TWSC
11: Private Dwy/Moorland Ave & Todd Rd

08/02/2020

Intersection

Int Delay, s/veh 3701.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	748	20	30	625	490	20	30	30	505	30	42
Future Vol, veh/h	72	748	20	30	625	490	20	30	30	505	30	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	70	-	-	-	-	-	-	-	60
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	787	21	32	658	516	21	32	32	532	32	44

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1174	0	0	808	0	0	1968	2188	798	1962	1940	916
Stage 1	-	-	-	-	-	-	950	950	-	980	980	-
Stage 2	-	-	-	-	-	-	1018	1238	-	982	960	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	595	-	-	817	-	-	47	46	386	~ 47	65	330
Stage 1	-	-	-	-	-	-	312	339	-	~ 301	328	-
Stage 2	-	-	-	-	-	-	286	248	-	~ 300	335	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	595	-	-	817	-	-	~ 19	39	386	~ 13	54	330
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 19	39	-	~ 13	54	-
Stage 1	-	-	-	-	-	-	272	296	-	~ 262	315	-
Stage 2	-	-	-	-	-	-	214	238	-	~ 215	292	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.3	\$ 675.3	\$ 16851.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	42	595	-	-	817	-	-	14	330
HCM Lane V/C Ratio	2.005	0.127	-	-	0.039	-	-	40.226	0.134
HCM Control Delay (s)	\$ 675.3	11.9	-	-	9.6	-	-	\$ 18173.5	17.6
HCM Lane LOS	F	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	8.8	0.4	-	-	0.1	-	-	71.6	0.5

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

08/02/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	585	698	460	413	0	732	0	197	0	0	0
Future Volume (veh/h)	0	585	698	460	413	0	732	0	197	0	0	0
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	616	462	484	435	0	771	0	132	0	0	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	0	473	401	561	589	0	563	0	1002	0	2	0
Arrive On Green	0.00	0.25	0.25	0.32	0.32	0.00	0.32	0.00	0.32	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	1781	0	3170	0	1870	0
Grp Volume(v), veh/h	0	616	462	484	435	0	771	0	132	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	20.0	20.0	20.2	16.4	0.0	25.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	20.0	20.0	20.2	16.4	0.0	25.0	0.0	2.4	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	473	401	561	589	0	563	0	1002	0	2	0
V/C Ratio(X)	0.00	1.30	1.15	0.86	0.74	0.00	1.37	0.00	0.13	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	473	401	675	709	0	563	0	1002	0	189	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	29.6	29.6	25.5	24.2	0.0	27.1	0.0	19.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	151.1	93.8	9.7	3.3	0.0	177.6	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	0.0	28.3	17.6	9.4	7.3	0.0	37.8	0.0	0.8	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	180.7	123.4	35.2	27.5	0.0	204.7	0.0	19.4	0.0	0.0	0.0
LnGrp LOS	A	F	F	D	C	A	F	A	B	A	A	A
Approach Vol, veh/h		1078			919			903			0	
Approach Delay, s/veh		156.1			31.5			177.6			0.0	
Approach LOS		F			C			F				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		0.0		23.2		28.0		27.9				
Change Period (Y+Rc), s		3.0		3.2		3.0		3.0				
Max Green Setting (Gmax), s		8.0		20.0		25.0		30.0				
Max Q Clear Time (g_c+I1), s		0.0		22.0		27.0		22.2				
Green Ext Time (p_c), s		0.0		0.0		0.0		2.7				

Intersection Summary

HCM 6th Ctrl Delay 123.3

HCM 6th LOS F

Notes

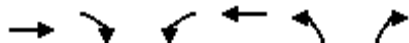
User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

13: Todd Rd Overpass & Todd Rd

08/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	265	345	474	428	315	803
Future Volume (veh/h)	265	345	474	428	315	803
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	279	67	530	408	332	542
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	578	258	1080	567	473	1586
Arrive On Green	0.16	0.16	0.30	0.30	0.27	0.27
Sat Flow, veh/h	3647	1585	3563	1870	1781	2790
Grp Volume(v), veh/h	279	67	530	408	332	542
Grp Sat Flow(s), veh/h/ln	1777	1585	1781	1870	1781	1395
Q Serve(g_s), s	2.8	1.4	4.8	7.6	6.6	4.1
Cycle Q Clear(g_c), s	2.8	1.4	4.8	7.6	6.6	4.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	578	258	1080	567	473	1586
V/C Ratio(X)	0.48	0.26	0.49	0.72	0.70	0.34
Avail Cap(c_a), veh/h	1820	812	1369	719	639	1846
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	14.9	14.3	11.1	12.1	13.0	4.5
Incr Delay (d2), s/veh	0.6	0.5	0.3	2.6	2.2	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	1.0	0.5	1.5	2.9	2.4	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.5	14.8	11.5	14.7	15.1	4.6
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	346			938	874	
Approach Delay, s/veh	15.4			12.9	8.6	
Approach LOS	B			B	A	
Timer - Assigned Phs	2			6		8
Phs Duration (G+Y+Rc), s	9.8			15.3		13.9
Change Period (Y+Rc), s	3.5			3.5		3.5
Max Green Setting (Gmax), s	20.0			15.0		14.0
Max Q Clear Time (g_c+I1), s	4.8			9.6		8.6
Green Ext Time (p_c), s	1.7			2.2		1.8

Intersection Summary

HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

14: Santa Rosa Ave & Todd Rd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	583	70	415	60	120	70	407	685	50	40	593	375
Future Volume (veh/h)	583	70	415	60	120	70	407	685	50	40	593	375
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	667	0	83	63	126	47	428	721	18	42	624	75
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	751	0	332	213	155	58	379	1337	593	54	702	311
Arrive On Green	0.21	0.00	0.21	0.12	0.12	0.12	0.21	0.38	0.38	0.03	0.20	0.20
Sat Flow, veh/h	3563	0	1574	1781	1299	484	1781	3554	1575	1781	3554	1573
Grp Volume(v), veh/h	667	0	83	63	0	173	428	721	18	42	624	75
Grp Sat Flow(s), veh/h/ln	1781	0	1574	1781	0	1783	1781	1777	1575	1781	1777	1573
Q Serve(g_s), s	14.5	0.0	3.5	2.6	0.0	7.6	17.0	12.7	0.6	1.9	13.6	3.2
Cycle Q Clear(g_c), s	14.5	0.0	3.5	2.6	0.0	7.6	17.0	12.7	0.6	1.9	13.6	3.2
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	751	0	332	213	0	213	379	1337	593	54	702	311
V/C Ratio(X)	0.89	0.00	0.25	0.30	0.00	0.81	1.13	0.54	0.03	0.78	0.89	0.24
Avail Cap(c_a), veh/h	803	0	355	223	0	223	379	1337	593	223	712	315
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	26.2	32.1	0.0	34.3	31.4	19.5	15.7	38.4	31.2	27.0
Incr Delay (d2), s/veh	10.7	0.0	0.1	0.3	0.0	17.7	86.0	0.2	0.0	8.5	12.6	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	0.0
%ile BackOfQ(50%), veh/ln	7.1	0.0	1.3	1.1	0.0	4.3	16.0	4.9	0.2	0.9	6.7	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.3	0.0	26.4	32.4	0.0	52.0	117.4	19.7	15.7	47.0	43.8	27.1
LnGrp LOS	D	A	C	C	A	D	F	B	B	D	D	C
Approach Vol, veh/h	750			236			1167			741		
Approach Delay, s/veh	39.7			46.8			55.5			42.3		
Approach LOS	D			D			E			D		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	21.9			22.1			21.2			14.6		
Change Period (Y+Rc), s	5.1			5.1			5.4			5.1		
Max Green Setting (Gmax), s	18.0			17.0			16.0			10.0		
Max Q Clear Time (g_c+I1), s	16.5			19.0			15.6			9.6		
Green Ext Time (p_c), s	0.3			0.0			0.1			0.0		

Intersection Summary

HCM 6th Ctrl Delay 47.3

HCM 6th LOS D

Notes

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

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th AWSC
15: Arnold Dr & Warm Springs Rd/Private Dwy

08/02/2020

Intersection

Intersection Delay, s/veh13.6

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	60	20	222	20	20	20	162	182	20	20	142	70
Future Vol, veh/h	60	20	222	20	20	20	162	182	20	20	142	70
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	21	234	21	21	21	171	192	21	21	149	74
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.1	9.9	15.9	11.8
HCM LOS	B	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	45%	20%	33%	9%
Vol Thru, %	50%	7%	33%	61%
Vol Right, %	5%	74%	33%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	364	302	60	232
LT Vol	162	60	20	20
Through Vol	182	20	20	142
RT Vol	20	222	20	70
Lane Flow Rate	383	318	63	244
Geometry Grp	1	1	1	1
Degree of Util (X)	0.581	0.472	0.107	0.371
Departure Headway (Hd)	5.46	5.341	6.121	5.468
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	659	671	582	654
Service Time	3.512	3.399	4.202	3.527
HCM Lane V/C Ratio	0.581	0.474	0.108	0.373
HCM Control Delay	15.9	13.1	9.9	11.8
HCM Lane LOS	C	B	A	B
HCM 95th-tile Q	3.7	2.5	0.4	1.7

Intersection												
Int Delay, s/veh	155.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	365	130	80	415	160	30	90	30	85	60	45
Future Vol, veh/h	65	365	130	80	415	160	30	90	30	85	60	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	384	137	84	437	168	32	95	32	89	63	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	605	0	0	521	0	0	1333	1362	453	1341	1346	521
Stage 1	-	-	-	-	-	-	589	589	-	689	689	-
Stage 2	-	-	-	-	-	-	744	773	-	652	657	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	973	-	-	1045	-	-	131	148	607	129	151	555
Stage 1	-	-	-	-	-	-	494	495	-	436	446	-
Stage 2	-	-	-	-	-	-	407	409	-	457	462	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	973	-	-	1045	-	-	62	120	607	~ 37	123	555
Mov Cap-2 Maneuver	-	-	-	-	-	-	62	120	-	~ 37	123	-
Stage 1	-	-	-	-	-	-	459	460	-	405	390	-
Stage 2	-	-	-	-	-	-	273	358	-	320	430	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	1.1	272.1	\$ 1048.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	117	973	-	-	1045	-	-	66
HCM Lane V/C Ratio	1.35	0.07	-	-	0.081	-	-	3.03
HCM Control Delay (s)	272.1	9	-	-	8.7	0		\$ 1048.4
HCM Lane LOS	F	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	10.7	0.2	-	-	0.3	-	-	20.4

Notes			
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (veh/h)	51	191	80	30	265	560	60	915	30	380	416	54
Future Volume (veh/h)	51	191	80	30	265	560	60	915	30	380	416	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	201	67	32	279	494	63	963	30	400	438	51
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	103	349	104	62	225	379	27	419	13	318	293	34
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.25	0.25	0.25	0.18	0.18	0.18
Sat Flow, veh/h	128	934	279	37	603	1015	111	1692	53	1781	1642	191
Grp Volume(v), veh/h	322	0	0	805	0	0	1056	0	0	400	0	489
Grp Sat Flow(s),veh/h/ln	1341	0	0	1654	0	0	1855	0	0	1781	0	1833
Q Serve(g_s), s	0.0	0.0	0.0	16.1	0.0	0.0	19.0	0.0	0.0	13.7	0.0	13.7
Cycle Q Clear(g_c), s	11.5	0.0	0.0	28.7	0.0	0.0	19.0	0.0	0.0	13.7	0.0	13.7
Prop In Lane	0.17		0.21	0.04		0.61	0.06		0.03	1.00		0.10
Lane Grp Cap(c), veh/h	556	0	0	667	0	0	459	0	0	318	0	327
V/C Ratio(X)	0.58	0.00	0.00	1.21	0.00	0.00	2.30	0.00	0.00	1.26	0.00	1.50
Avail Cap(c_a), veh/h	556	0	0	667	0	0	459	0	0	318	0	327
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	0.0	25.0	0.0	0.0	28.9	0.0	0.0	31.6	0.0	31.6
Incr Delay (d2), s/veh	1.0	0.0	0.0	106.8	0.0	0.0	592.1	0.0	0.0	139.5	0.0	238.6
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	4.2	0.0	0.0	31.0	0.0	0.0	83.7	0.0	0.0	17.9	0.0	27.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.4	0.0	0.0	131.9	0.0	0.0	621.0	0.0	0.0	171.0	0.0	270.1
LnGrp LOS	B	A	A	F	A	A	F	A	A	F	A	F
Approach Vol, veh/h		322			805			1056			889	
Approach Delay, s/veh		19.4			131.9			621.0			225.5	
Approach LOS		B			F			F			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.6		34.1		19.1		34.1				
Change Period (Y+Rc), s		4.6		* 5.4		5.4		5.4				
Max Green Setting (Gmax), s		19.0		* 24		13.7		28.7				
Max Q Clear Time (g_c+I1), s		21.0		13.5		15.7		30.7				
Green Ext Time (p_c), s		0.0		0.7		0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay	315.3
HCM 6th LOS	F

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

08/02/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	453	32	725	922	32	340
Future Volume (veh/h)	453	32	725	922	32	340
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	477	9	763	971	34	358
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	519	462	813	689	49	1033
Arrive On Green	0.29	0.29	0.43	0.43	0.03	0.55
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	477	9	763	971	34	358
Grp Sat Flow(s), veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	17.9	0.3	26.9	30.0	1.3	7.3
Cycle Q Clear(g_c), s	17.9	0.3	26.9	30.0	1.3	7.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	519	462	813	689	49	1033
V/C Ratio(X)	0.92	0.02	0.94	1.41	0.69	0.35
Avail Cap(c_a), veh/h	774	689	813	689	310	1033
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	23.7	17.4	18.6	19.5	33.3	8.6
Incr Delay (d2), s/veh	9.3	0.0	18.1	192.7	6.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.1	13.8	46.0	0.6	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.9	17.4	36.7	212.2	39.4	8.6
LnGrp LOS	C	B	D	F	D	A
Approach Vol, veh/h	486		1734			392
Approach Delay, s/veh	32.7		135.0			11.3
Approach LOS	C		F			B
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.1	36.2		24.7		44.3
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	12.0	30.0		30.0		30.0
Max Q Clear Time (g_c+I), s	13.3	32.0		19.9		9.3
Green Ext Time (p_c), s	0.0	0.0		0.2		0.6

Intersection Summary

HCM 6th Ctrl Delay 97.4
 HCM 6th LOS F

Notes

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

HCM 6th TWSC
19: Private Dwy/Paula Ln & Bodega Ave

08/02/2020

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	425	5	25	515	30	5	5	20	35	10	30
Future Vol, veh/h	30	425	5	25	515	30	5	5	20	35	10	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	90	-	-	90	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	447	5	26	542	32	5	5	21	37	11	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	574	0	0	452	0	0	1146	1140	450	1137	1126	558
Stage 1	-	-	-	-	-	-	514	514	-	610	610	-
Stage 2	-	-	-	-	-	-	632	626	-	527	516	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	999	-	-	1109	-	-	176	201	609	179	205	529
Stage 1	-	-	-	-	-	-	543	535	-	482	485	-
Stage 2	-	-	-	-	-	-	468	477	-	535	534	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	999	-	-	1109	-	-	152	190	609	162	194	529
Mov Cap-2 Maneuver	-	-	-	-	-	-	152	190	-	162	194	-
Stage 1	-	-	-	-	-	-	526	518	-	467	474	-
Stage 2	-	-	-	-	-	-	420	466	-	495	517	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.4			17.2			28.5		
HCM LOS							C			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	326	999	-	-	1109	-	-	231
HCM Lane V/C Ratio	0.097	0.032	-	-	0.024	-	-	0.342
HCM Control Delay (s)	17.2	8.7	-	-	8.3	-	-	28.5
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	1.4

HCM 6th Signalized Intersection Summary

20: Broadway & Leveroni Rd/Napa Rd

08/02/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	390	73	83	420	270	82	285	122	270	300	130
Future Volume (veh/h)	130	390	73	83	420	270	82	285	122	270	300	130
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		0.98	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	137	411	72	87	442	265	86	300	82	284	316	92
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	213	558	98	195	382	229	194	436	117	318	618	177
Arrive On Green	0.12	0.36	0.36	0.11	0.35	0.35	0.11	0.16	0.16	0.18	0.23	0.23
Sat Flow, veh/h	1781	1549	271	1781	1093	656	1781	2760	740	1781	2719	778
Grp Volume(v), veh/h	137	0	483	87	0	707	86	191	191	284	205	203
Grp Sat Flow(s),veh/h/ln	1781	0	1820	1781	0	1749	1781	1777	1723	1781	1777	1720
Q Serve(g_s), s	6.5	0.0	20.5	4.1	0.0	31.0	4.0	9.0	9.3	13.8	8.9	9.2
Cycle Q Clear(g_c), s	6.5	0.0	20.5	4.1	0.0	31.0	4.0	9.0	9.3	13.8	8.9	9.2
Prop In Lane	1.00		0.15	1.00		0.37	1.00		0.43	1.00		0.45
Lane Grp Cap(c), veh/h	213	0	655	195	0	612	194	281	272	318	404	391
V/C Ratio(X)	0.64	0.00	0.74	0.45	0.00	1.16	0.44	0.68	0.70	0.89	0.51	0.52
Avail Cap(c_a), veh/h	523	0	655	523	0	612	221	541	525	322	541	524
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.2	0.0	24.7	36.9	0.0	28.8	37.0	35.2	35.3	35.6	29.9	30.0
Incr Delay (d2), s/veh	3.2	0.0	4.4	1.6	0.0	87.6	1.6	2.9	3.3	25.4	1.0	1.1
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	2.9	0.0	8.8	1.8	0.0	26.8	1.7	3.9	3.9	8.0	3.8	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.4	0.0	29.1	38.5	0.0	116.4	38.5	38.1	38.6	61.0	30.9	31.1
LnGrp LOS	D	A	C	D	A	F	D	D	D	E	C	C
Approach Vol, veh/h		620			794			468			692	
Approach Delay, s/veh		31.6			107.8			38.4			43.3	
Approach LOS		C			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.7	25.1	14.6	35.2	19.8	19.0	13.7	36.1				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.2	4.0	5.0	4.0	* 4.2				
Max Green Setting (Gmax), s	11.0	27.0	26.0	* 31	16.0	27.0	26.0	* 31				
Max Q Clear Time (g_c+I1), s	6.0	11.2	8.5	33.0	15.8	11.3	6.1	22.5				
Green Ext Time (p_c), s	0.1	2.1	0.3	0.0	0.0	1.8	0.2	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			59.5									
HCM 6th LOS			E									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

ATTACHMENT C-5

MITIGATED CONDITIONS OUPUTS



HCM 6th Signalized Intersection Summary

4: Old Redwood Hwy & Fulton Rd

Cumulative plus Project Conditions AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	182	40	40	194	866	408
Future Volume (veh/h)	182	40	40	194	866	408
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	192	42	42	204	912	429
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	255	227	76	1306	1078	913
Arrive On Green	0.14	0.14	0.04	0.70	0.58	0.58
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	192	42	42	204	912	429
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	5.9	1.3	1.3	2.1	22.9	8.9
Cycle Q Clear(g_c), s	5.9	1.3	1.3	2.1	22.9	8.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	255	227	76	1306	1078	913
V/C Ratio(X)	0.75	0.18	0.55	0.16	0.85	0.47
Avail Cap(c_a), veh/h	565	503	157	1747	1434	1215
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	23.3	21.4	26.6	2.9	9.9	7.0
Incr Delay (d2), s/veh	4.5	0.4	6.1	0.1	3.7	0.4
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	1.3	0.6	0.4	6.7	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.8	21.8	32.8	3.0	13.7	7.4
LnGrp LOS	C	C	C	A	B	A
Approach Vol, veh/h	234			246	1341	
Approach Delay, s/veh	26.7			8.0	11.7	
Approach LOS	C			A	B	
Timer - Assigned Phs	2			4	5	6
Phs Duration (G+Y+Rc), s	44.1			12.6	6.9	37.2
Change Period (Y+Rc), s	4.5			4.5	4.5	4.5
Max Green Setting (Gmax), s	53.0			18.0	5.0	43.5
Max Q Clear Time (g_c+l1), s	4.1			7.9	3.3	24.9
Green Ext Time (p_c), s	1.2			0.5	0.0	7.8
Intersection Summary						
HCM 6th Ctrl Delay			13.1			
HCM 6th LOS			B			

HCM 6th Roundabout
4: Old Redwood Hwy & Fulton Rd

Cumulative plus Project Conditions AM

Intersection				
Intersection Delay, s/veh	9.7			
Intersection LOS	A			
Approach	EB	NB	SB	
Entry Lanes	1	1	2	
Conflicting Circle Lanes	1	1	1	
Adj Approach Flow, veh/h	234	246	1341	
Demand Flow Rate, veh/h	239	251	1368	
Vehicles Circulating, veh/h	930	196	43	
Vehicles Exiting, veh/h	481	973	404	
Ped Vol Crossing Leg, #/h	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	
Approach Delay, s/veh	14.6	5.3	9.7	
Approach LOS	B	A	A	
Lane	Left	Left	Left	Right
Designated Moves	LR	LT	LT	R
Assumed Moves	LR	LT	LT	R
RT Channelized				
Lane Util	1.000	1.000	0.680	0.320
Follow-Up Headway, s	2.609	2.609	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544
Entry Flow, veh/h	239	251	930	438
Cap Entry Lane, veh/h	534	1130	1366	1366
Entry HV Adj Factor	0.979	0.980	0.980	0.979
Flow Entry, veh/h	234	246	912	429
Cap Entry, veh/h	523	1107	1339	1338
V/C Ratio	0.447	0.222	0.681	0.321
Control Delay, s/veh	14.6	5.3	11.6	5.6
LOS	B	A	B	A
95th %tile Queue, veh	2	1	6	1

HCM 6th Signalized Intersection Summary

5: Fulton Rd & Airport Blvd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	341	210	232	623	30	720	181	161	40	282	266
Future Volume (veh/h)	81	341	210	232	623	30	720	181	161	40	282	266
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	85	359	41	244	656	31	758	191	35	42	297	255
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	69	421	353	140	465	22	514	540	454	33	231	199
Arrive On Green	0.04	0.22	0.22	0.08	0.26	0.26	0.29	0.29	0.29	0.27	0.27	0.27
Sat Flow, veh/h	1781	1870	1567	1781	1771	84	1781	1870	1571	122	863	741
Grp Volume(v), veh/h	85	359	41	244	0	687	758	191	35	594	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1567	1781	0	1854	1781	1870	1571	1726	0	0
Q Serve(g_s), s	6.2	29.5	3.3	12.6	0.0	42.0	46.2	12.9	2.6	42.9	0.0	0.0
Cycle Q Clear(g_c), s	6.2	29.5	3.3	12.6	0.0	42.0	46.2	12.9	2.6	42.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00	0.07		0.43
Lane Grp Cap(c), veh/h	69	421	353	140	0	487	514	540	454	463	0	0
V/C Ratio(X)	1.23	0.85	0.12	1.74	0.00	1.41	1.47	0.35	0.08	1.28	0.00	0.00
Avail Cap(c_a), veh/h	69	421	353	140	0	487	514	540	454	463	0	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	76.9	59.5	49.3	73.7	0.0	59.0	56.9	45.1	41.4	58.6	0.0	0.0
Incr Delay (d2), s/veh	183.1	14.8	0.1	360.6	0.0	197.0	223.5	0.1	0.0	143.3	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	6.3	15.5	1.3	19.8	0.0	46.1	52.2	6.0	1.0	37.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	260.0	74.3	49.4	434.3	0.0	256.0	280.4	45.2	41.4	201.8	0.0	0.0
LnGrp LOS	F	E	D	F	A	F	F	D	D	F	A	A
Approach Vol, veh/h		485			931			984			594	
Approach Delay, s/veh		104.7			302.7			226.3			201.8	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.0	42.0		48.0	12.0	48.0		52.0				
Change Period (Y+Rc), s	5.4	6.0		5.1	5.8	6.0		5.8				
Max Green Setting (Gmax), s	12.6	36.0		42.9	6.2	42.0		46.2				
Max Q Clear Time (g_c+I1), s	14.6	31.5		44.9	8.2	44.0		48.2				
Green Ext Time (p_c), s	0.0	0.6		0.0	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 225.5

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

7: Old Redwood Hwy & Creekside Apts/Faught Rd

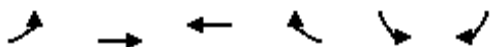
Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	20	30	182	20	20	20	437	110	30	1108	30
Future Volume (veh/h)	60	20	30	182	20	20	20	437	110	30	1108	30
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	21	32	192	21	21	21	460	116	32	1166	32
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	77	26	39	207	23	23	36	1147	972	47	1122	31
Arrive On Green	0.08	0.08	0.08	0.14	0.14	0.14	0.02	0.61	0.61	0.03	0.62	0.62
Sat Flow, veh/h	943	314	479	1452	159	159	1781	1870	1585	1781	1812	50
Grp Volume(v), veh/h	116	0	0	234	0	0	21	460	116	32	0	1198
Grp Sat Flow(s),veh/h/ln	1737	0	0	1769	0	0	1781	1870	1585	1781	0	1861
Q Serve(g_s), s	8.7	0.0	0.0	17.3	0.0	0.0	1.5	16.7	4.0	2.4	0.0	82.1
Cycle Q Clear(g_c), s	8.7	0.0	0.0	17.3	0.0	0.0	1.5	16.7	4.0	2.4	0.0	82.1
Prop In Lane	0.54		0.28	0.82		0.09	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	143	0	0	252	0	0	36	1147	972	47	0	1153
V/C Ratio(X)	0.81	0.00	0.00	0.93	0.00	0.00	0.58	0.40	0.12	0.69	0.00	1.04
Avail Cap(c_a), veh/h	255	0	0	252	0	0	155	1158	982	155	0	1153
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.8	0.0	0.0	56.2	0.0	0.0	64.4	13.1	10.7	64.0	0.0	25.2
Incr Delay (d2), s/veh	10.5	0.0	0.0	37.7	0.0	0.0	13.9	0.2	0.1	16.5	0.0	37.3
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	4.3	0.0	0.0	10.3	0.0	0.0	0.8	6.9	1.4	1.3	0.0	45.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	0.0	0.0	93.8	0.0	0.0	78.2	13.4	10.7	80.5	0.0	62.5
LnGrp LOS	E	A	A	F	A	A	E	B	B	F	A	F
Approach Vol, veh/h		116			234			597			1230	
Approach Delay, s/veh		70.4			93.8			15.1			63.0	
Approach LOS		E			F			B			E	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.4	8.0	85.8		23.4	7.2	86.6				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	11.5	82.1		18.9	11.5	82.1				
Max Q Clear Time (g_c+I1), s		10.7	4.4	18.7		19.3	3.5	84.1				
Green Ext Time (p_c), s		0.3	0.0	3.5		0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			53.6									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary

9: Pocket Canyon Hwy/Front St & Mirabel Rd

Cumulative plus Project Conditions AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰	↰	↰	↰
Traffic Volume (veh/h)	105	375	225	236	512	43
Future Volume (veh/h)	105	375	225	236	512	43
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
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	395	237	248	539	45
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	213	540	743	630	659	586
Arrive On Green	0.40	0.40	0.40	0.40	0.37	0.37
Sat Flow, veh/h	249	1359	1870	1585	1781	1585
Grp Volume(v), veh/h	506	0	237	248	539	45
Grp Sat Flow(s),veh/h/ln	1608	0	1870	1585	1781	1585
Q Serve(g_s), s	6.4	0.0	3.4	4.3	10.6	0.7
Cycle Q Clear(g_c), s	10.3	0.0	3.4	4.3	10.6	0.7
Prop In Lane	0.22			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	752	0	743	630	659	586
V/C Ratio(X)	0.67	0.00	0.32	0.39	0.82	0.08
Avail Cap(c_a), veh/h	1348	0	1477	1251	1406	1251
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	9.9	0.0	8.0	8.3	11.0	7.9
Incr Delay (d2), s/veh	1.1	0.0	0.2	0.4	2.6	0.1
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	0.0	1.1	1.2	2.9	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.9	0.0	8.3	8.7	13.6	8.0
LnGrp LOS	B	A	A	A	B	A
Approach Vol, veh/h		506	485		584	
Approach Delay, s/veh		10.9	8.5		13.2	
Approach LOS		B	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				19.9	18.8	19.9
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				30.5	30.5	30.5
Max Q Clear Time (g_c+I1), s				12.3	12.6	6.3
Green Ext Time (p_c), s				3.1	1.7	2.4
Intersection Summary						
HCM 6th Ctrl Delay			11.0			
HCM 6th LOS			B			

HCM 6th Roundabout
9: Pocket Canyon Hwy/Front St & Mirabel Rd

Cumulative plus Project Conditions AM

Intersection			
Intersection Delay, s/veh	11.2		
Intersection LOS	B		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	506	485	584
Demand Flow Rate, veh/h	516	495	596
Vehicles Circulating, veh/h	550	113	242
Vehicles Exiting, veh/h	288	953	366
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	16.3	7.0	10.3
Approach LOS	C	A	B
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	516	495	596
Cap Entry Lane, veh/h	787	1230	1078
Entry HV Adj Factor	0.981	0.980	0.980
Flow Entry, veh/h	506	485	584
Cap Entry, veh/h	772	1205	1056
V/C Ratio	0.655	0.403	0.553
Control Delay, s/veh	16.3	7.0	10.3
LOS	C	A	B
95th %tile Queue, veh	5	2	4

HCM 6th Signalized Intersection Summary

11: Private Dwy/Moorland Ave & Todd Rd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	549	20	20	535	409	20	20	20	385	20	92
Future Volume (veh/h)	72	549	20	20	535	409	20	20	20	385	20	92
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	578	21	21	563	431	21	21	21	405	21	97
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	98	728	26	42	701	594	28	28	28	487	25	455
Arrive On Green	0.05	0.41	0.41	0.02	0.37	0.37	0.05	0.05	0.05	0.29	0.29	0.29
Sat Flow, veh/h	1781	1793	65	1781	1870	1585	579	579	579	1697	88	1585
Grp Volume(v), veh/h	76	0	599	21	563	431	63	0	0	426	0	97
Grp Sat Flow(s),veh/h/ln	1781	0	1859	1781	1870	1585	1737	0	0	1785	0	1585
Q Serve(g_s), s	3.2	0.0	21.6	0.9	20.6	17.9	2.7	0.0	0.0	17.1	0.0	3.6
Cycle Q Clear(g_c), s	3.2	0.0	21.6	0.9	20.6	17.9	2.7	0.0	0.0	17.1	0.0	3.6
Prop In Lane	1.00		0.04	1.00		1.00	0.33		0.33	0.95		1.00
Lane Grp Cap(c), veh/h	98	0	755	42	701	594	84	0	0	512	0	455
V/C Ratio(X)	0.78	0.00	0.79	0.50	0.80	0.73	0.75	0.00	0.00	0.83	0.00	0.21
Avail Cap(c_a), veh/h	175	0	1991	140	1967	1667	170	0	0	851	0	756
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.7	0.0	19.9	36.9	21.4	20.6	36.0	0.0	0.0	25.6	0.0	20.7
Incr Delay (d2), s/veh	12.3	0.0	1.9	9.0	2.2	1.7	12.7	0.0	0.0	3.6	0.0	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	8.8	0.5	8.6	6.3	1.4	0.0	0.0	7.4	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	0.0	21.9	45.9	23.6	22.3	48.6	0.0	0.0	29.1	0.0	21.0
LnGrp LOS	D	A	C	D	C	C	D	A	A	C	A	C
Approach Vol, veh/h	675		1015				63		523			
Approach Delay, s/veh	24.8		23.5				48.6		27.6			
Approach LOS	C		C				D		C			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	8.2		6.3		35.6		26.5		8.7		33.2	
Change Period (Y+Rc), s	4.5		4.5		4.5		4.5		4.5		4.5	
Max Green Setting (Gmax), s	7.5		6.0		82.0		36.5		7.5		80.5	
Max Q Clear Time (g_c+I1), s	4.7		2.9		23.6		19.1		5.2		22.6	
Green Ext Time (p_c), s	0.0		0.0		4.5		2.9		0.0		6.1	
Intersection Summary												
HCM 6th Ctrl Delay	25.5											
HCM 6th LOS	C											

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱		↰	↱	↱		↰	
Traffic Volume (veh/h)	0	530	424	420	337	0	627	0	207	0	0	0
Future Volume (veh/h)	0	530	424	420	337	0	627	0	207	0	0	0
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	984	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	558	446	442	355	0	660	0	146	0	0	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	0	667	932	524	550	0	824	0	366	0	2	0
Arrive On Green	0.00	0.36	0.36	0.29	0.29	0.00	0.23	0.00	0.23	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	3563	0	1585	0	1870	0
Grp Volume(v), veh/h	0	558	446	442	355	0	660	0	146	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	21.3	12.6	18.1	12.9	0.0	13.6	0.0	6.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	21.3	12.6	18.1	12.9	0.0	13.6	0.0	6.1	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	667	932	524	550	0	824	0	366	0	2	0
V/C Ratio(X)	0.00	0.84	0.48	0.84	0.65	0.00	0.80	0.00	0.40	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	885	1116	710	745	0	1190	0	530	0	96	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	22.9	9.2	25.8	23.9	0.0	28.2	0.0	25.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.4	0.4	6.9	1.3	0.0	2.6	0.0	0.7	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	0.0	9.6	6.8	8.2	5.5	0.0	5.9	0.0	2.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	28.4	9.6	32.7	25.2	0.0	30.8	0.0	26.0	0.0	0.0	0.0
LnGrp LOS	A	C	A	C	C	A	C	A	C	A	A	A
Approach Vol, veh/h		1004			797			806			0	
Approach Delay, s/veh		20.0			29.4			29.9			0.0	
Approach LOS		C			C			C				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		0.0		30.9		21.0		25.9				
Change Period (Y+Rc), s		3.0		3.2		3.0		3.0				
Max Green Setting (Gmax), s		4.0		36.8		26.0		31.0				
Max Q Clear Time (g_c+I1), s		0.0		23.3		15.6		20.1				
Green Ext Time (p_c), s		0.0		4.5		2.4		2.7				
Intersection Summary												
HCM 6th Ctrl Delay				25.9								
HCM 6th LOS				C								
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												

HCM 6th Roundabout
16: Riverside Dr & Verano Ave

Cumulative plus Project Conditions AM

Intersection				
Intersection Delay, s/veh	7.3			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	392	475	96	247
Demand Flow Rate, veh/h	399	484	99	252
Vehicles Circulating, veh/h	298	122	536	451
Vehicles Exiting, veh/h	405	513	161	155
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.9	7.0	5.9	7.4
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	399	484	99	252
Cap Entry Lane, veh/h	1018	1218	799	871
Entry HV Adj Factor	0.982	0.981	0.973	0.982
Flow Entry, veh/h	392	475	96	247
Cap Entry, veh/h	1000	1196	777	855
V/C Ratio	0.392	0.397	0.124	0.289
Control Delay, s/veh	7.9	7.0	5.9	7.4
LOS	A	A	A	A
95th %tile Queue, veh	2	2	0	1

HCM 6th Signalized Intersection Summary

17: Main St/Petaluma Hill Rd & Old Adobe Rd/Adobe Rd

Cumulative plus Project Conditions AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (veh/h)	64	264	100	20	132	410	60	283	20	510	664	71
Future Volume (veh/h)	64	264	100	20	132	410	60	283	20	510	664	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	67	278	105	21	139	432	63	298	21	537	699	75
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	72	241	85	42	138	403	54	255	18	646	601	65
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.18	0.18	0.18	0.36	0.36	0.36
Sat Flow, veh/h	112	725	255	33	417	1214	303	1433	101	1781	1659	178
Grp Volume(v), veh/h	450	0	0	592	0	0	382	0	0	537	0	774
Grp Sat Flow(s),veh/h/ln	1092	0	0	1664	0	0	1837	0	0	1781	0	1837
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0	33.1	0.0	43.6
Cycle Q Clear(g_c), s	39.9	0.0	0.0	39.9	0.0	0.0	21.4	0.0	0.0	33.1	0.0	43.6
Prop In Lane	0.15		0.23	0.04		0.73	0.16		0.05	1.00		0.10
Lane Grp Cap(c), veh/h	397	0	0	583	0	0	327	0	0	646	0	666
V/C Ratio(X)	1.13	0.00	0.00	1.02	0.00	0.00	1.17	0.00	0.00	0.83	0.00	1.16
Avail Cap(c_a), veh/h	397	0	0	583	0	0	327	0	0	646	0	666
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.7	0.0	0.0	41.4	0.0	0.0	49.5	0.0	0.0	35.0	0.0	38.4
Incr Delay (d2), s/veh	87.1	0.0	0.0	41.3	0.0	0.0	103.9	0.0	0.0	8.6	0.0	89.1
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	21.5	0.0	0.0	23.7	0.0	0.0	19.3	0.0	0.0	15.5	0.0	35.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	126.8	0.0	0.0	82.7	0.0	0.0	153.4	0.0	0.0	43.6	0.0	127.4
LnGrp LOS	F	A	A	F	A	A	F	A	A	D	A	F
Approach Vol, veh/h		450			592			382			1311	
Approach Delay, s/veh		126.8			82.7			153.4			93.1	
Approach LOS		F			F			F			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		26.0		45.3		49.0		45.3				
Change Period (Y+Rc), s		4.6		* 5.4		5.4		5.4				
Max Green Setting (Gmax), s		21.4		* 40		43.6		39.6				
Max Q Clear Time (g_c+I1), s		23.4		41.9		45.6		41.9				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 104.8

HCM 6th LOS F

Notes

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

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

4: Old Redwood Hwy & Fulton Rd

08/02/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↱	↰
Traffic Volume (veh/h)	412	80	60	804	645	325
Future Volume (veh/h)	412	80	60	804	645	325
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
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	434	84	63	846	679	342
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	501	446	98	1052	802	680
Arrive On Green	0.28	0.28	0.06	0.56	0.43	0.43
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	434	84	63	846	679	342
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	13.3	2.3	2.0	20.8	18.7	9.0
Cycle Q Clear(g_c), s	13.3	2.3	2.0	20.8	18.7	9.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	501	446	98	1052	802	680
V/C Ratio(X)	0.87	0.19	0.64	0.80	0.85	0.50
Avail Cap(c_a), veh/h	635	565	155	1317	1008	854
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	19.7	15.7	26.6	10.1	14.7	12.0
Incr Delay (d2), s/veh	10.1	0.2	6.8	3.0	5.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	1.0	6.9	7.2	2.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.7	15.9	33.4	13.0	20.3	12.5
LnGrp LOS	C	B	C	B	C	B
Approach Vol, veh/h	518			909	1021	
Approach Delay, s/veh	27.5			14.5	17.7	
Approach LOS	C			B	B	
Timer - Assigned Phs	2			4	5	6
Phs Duration (G+Y+Rc), s	36.9			20.7	7.7	29.2
Change Period (Y+Rc), s	4.5			4.5	4.5	4.5
Max Green Setting (Gmax), s	40.5			20.5	5.0	31.0
Max Q Clear Time (g_c+I1), s	22.8			15.3	4.0	20.7
Green Ext Time (p_c), s	5.9			0.9	0.0	4.0
Intersection Summary						
HCM 6th Ctrl Delay			18.6			
HCM 6th LOS			B			

HCM 6th Roundabout
4: Old Redwood Hwy & Fulton Rd

08/02/2020

Intersection				
Intersection Delay, s/veh	33.6			
Intersection LOS	D			
Approach	EB	NB	SB	
Entry Lanes	1	1	2	
Conflicting Circle Lanes	1	1	1	
Adj Approach Flow, veh/h	518	909	1021	
Demand Flow Rate, veh/h	529	927	1042	
Vehicles Circulating, veh/h	693	443	64	
Vehicles Exiting, veh/h	413	779	1306	
Ped Vol Crossing Leg, #/h	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	
Approach Delay, s/veh	25.5	67.9	7.1	
Approach LOS	D	F	A	
Lane	Left	Left	Left	Right
Designated Moves	LR	LT	LT	R
Assumed Moves	LR	LT	LT	R
RT Channelized				
Lane Util	1.000	1.000	0.665	0.335
Follow-Up Headway, s	2.609	2.609	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544
Entry Flow, veh/h	529	927	693	349
Cap Entry Lane, veh/h	681	878	1340	1340
Entry HV Adj Factor	0.979	0.981	0.980	0.980
Flow Entry, veh/h	518	909	679	342
Cap Entry, veh/h	666	861	1313	1313
V/C Ratio	0.777	1.056	0.517	0.260
Control Delay, s/veh	25.5	67.9	8.2	5.0
LOS	D	F	A	A
95th %tile Queue, veh	7	22	3	1

HCM 6th Signalized Intersection Summary

7: Old Redwood Hwy & Creekside Apts/Faught Rd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	20	30	101	20	60	30	929	172	50	1005	50
Future Volume (veh/h)	20	20	30	101	20	60	30	929	172	50	1005	50
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	21	32	106	21	63	32	978	181	53	1058	53
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	27	27	42	124	25	74	50	1146	971	69	1100	55
Arrive On Green	0.06	0.06	0.06	0.13	0.13	0.13	0.03	0.61	0.61	0.04	0.62	0.62
Sat Flow, veh/h	486	486	741	959	190	570	1781	1870	1585	1781	1766	88
Grp Volume(v), veh/h	74	0	0	190	0	0	32	978	181	53	0	1111
Grp Sat Flow(s),veh/h/ln	1713	0	0	1720	0	0	1781	1870	1585	1781	0	1854
Q Serve(g_s), s	4.7	0.0	0.0	11.9	0.0	0.0	2.0	46.8	5.5	3.2	0.0	62.1
Cycle Q Clear(g_c), s	4.7	0.0	0.0	11.9	0.0	0.0	2.0	46.8	5.5	3.2	0.0	62.1
Prop In Lane	0.28		0.43	0.56		0.33	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	96	0	0	222	0	0	50	1146	971	69	0	1156
V/C Ratio(X)	0.77	0.00	0.00	0.86	0.00	0.00	0.63	0.85	0.19	0.77	0.00	0.96
Avail Cap(c_a), veh/h	284	0	0	281	0	0	234	1208	1024	234	0	1198
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.3	0.0	0.0	47.0	0.0	0.0	53.0	17.3	9.3	52.5	0.0	19.5
Incr Delay (d2), s/veh	12.0	0.0	0.0	18.5	0.0	0.0	12.4	5.9	0.1	16.4	0.0	17.3
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	2.3	0.0	0.0	6.2	0.0	0.0	1.0	19.8	1.8	1.8	0.0	28.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.3	0.0	0.0	65.5	0.0	0.0	65.4	23.2	9.4	68.9	0.0	36.8
LnGrp LOS	E	A	A	E	A	A	E	C	A	E	A	D
Approach Vol, veh/h	74		190			1191			1164			
Approach Delay, s/veh	63.3		65.5			22.2			38.3			
Approach LOS	E		E			C			D			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	10.7		8.8		72.1		18.7		7.6		73.2	
Change Period (Y+Rc), s	4.5		4.5		4.5		4.5		4.5		4.5	
Max Green Setting (Gmax), s	18.3		14.5		71.2		18.0		14.5		71.2	
Max Q Clear Time (g_c+I1), s	6.7		5.2		48.8		13.9		4.0		64.1	
Green Ext Time (p_c), s	0.2		0.1		8.9		0.3		0.0		4.6	
Intersection Summary												
HCM 6th Ctrl Delay			33.7									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary

8: Old Redwood Hwy & Mark West Commons Cir/Wikiup Dr

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	20	20	20	199	20	158	40	894	216	115	921	20
Future Volume (veh/h)	20	20	20	199	20	158	40	894	216	115	921	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	21	21	209	21	166	42	941	227	121	969	21
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	42	41	20	225	17	417	54	978	825	147	1076	908
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.03	0.52	0.52	0.08	0.58	0.58
Sat Flow, veh/h	0	154	77	620	62	1570	1781	1870	1577	1781	1870	1578
Grp Volume(v), veh/h	63	0	0	230	0	166	42	941	227	121	969	21
Grp Sat Flow(s),veh/h/ln	231	0	0	683	0	1570	1781	1870	1577	1781	1870	1578
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	9.9	2.7	55.3	9.2	7.7	52.3	0.7
Cycle Q Clear(g_c), s	30.4	0.0	0.0	30.4	0.0	9.9	2.7	55.3	9.2	7.7	52.3	0.7
Prop In Lane	0.33		0.33	0.91		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	103	0	0	241	0	417	54	978	825	147	1076	908
V/C Ratio(X)	0.61	0.00	0.00	0.95	0.00	0.40	0.78	0.96	0.28	0.82	0.90	0.02
Avail Cap(c_a), veh/h	103	0	0	241	0	417	62	1060	894	154	1156	976
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	0.0	0.0	45.3	0.0	34.5	55.2	26.2	15.2	51.7	21.4	10.5
Incr Delay (d2), s/veh	7.4	0.0	0.0	44.7	0.0	0.2	35.6	18.1	0.1	26.0	8.9	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	1.6	0.0	0.0	9.7	0.0	3.8	1.7	27.8	3.2	4.4	23.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.5	0.0	0.0	90.0	0.0	34.8	90.7	44.3	15.3	77.7	30.3	10.5
LnGrp LOS	D	A	A	F	A	C	F	D	B	E	C	B
Approach Vol, veh/h		63			396			1210			1111	
Approach Delay, s/veh		42.5			66.8			40.5			35.1	
Approach LOS		D			E			D			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		35.0	8.6	71.0		35.0	14.6	65.0				
Change Period (Y+Rc), s		4.6	5.1	5.1		4.6	5.1	5.1				
Max Green Setting (Gmax), s		30.4	4.0	70.8		30.4	9.9	64.9				
Max Q Clear Time (g_c+I1), s		32.4	4.7	54.3		32.4	9.7	57.3				
Green Ext Time (p_c), s		0.0	0.0	3.5		0.0	0.0	2.5				

Intersection Summary

HCM 6th Ctrl Delay 42.1

HCM 6th LOS D

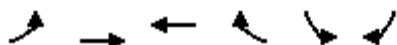
Notes

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

HCM 6th Signalized Intersection Summary

9: Pocket Canyon Hwy/Front St & Mirabel Rd

08/02/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰	↰	↰	↰
Traffic Volume (veh/h)	52	285	299	653	413	80
Future Volume (veh/h)	52	285	299	653	413	80
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
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	300	315	687	435	84
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	154	733	951	806	534	475
Arrive On Green	0.51	0.51	0.51	0.51	0.30	0.30
Sat Flow, veh/h	129	1443	1870	1585	1781	1585
Grp Volume(v), veh/h	355	0	315	687	435	84
Grp Sat Flow(s), veh/h/ln	1571	0	1870	1585	1781	1585
Q Serve(g_s), s	0.0	0.0	4.7	17.6	10.6	1.8
Cycle Q Clear(g_c), s	5.4	0.0	4.7	17.6	10.6	1.8
Prop In Lane	0.15			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	888	0	951	806	534	475
V/C Ratio(X)	0.40	0.00	0.33	0.85	0.82	0.18
Avail Cap(c_a), veh/h	1142	0	1297	1100	1084	964
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	7.0	0.0	6.8	10.0	15.2	12.1
Incr Delay (d2), s/veh	0.3	0.0	0.2	4.9	3.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	1.5	5.6	3.6	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.3	0.0	7.0	14.9	18.3	12.3
LnGrp LOS	A	A	A	B	B	B
Approach Vol, veh/h		355	1002		519	
Approach Delay, s/veh		7.3	12.4		17.3	
Approach LOS		A	B		B	
Timer - Assigned Phs			4	6	8	
Phs Duration (G+Y+Rc), s			28.3	18.5	28.3	
Change Period (Y+Rc), s			4.5	4.5	4.5	
Max Green Setting (Gmax), s			32.5	28.5	32.5	
Max Q Clear Time (g_c+I1), s			7.4	12.6	19.6	
Green Ext Time (p_c), s			2.4	1.4	4.2	
Intersection Summary						
HCM 6th Ctrl Delay			12.8			
HCM 6th LOS			B			

HCM 6th Roundabout
9: Pocket Canyon Hwy/Front St & Mirabel Rd

08/02/2020

Intersection			
Intersection Delay, s/veh	13.2		
Intersection LOS	B		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	355	1002	519
Demand Flow Rate, veh/h	362	1022	530
Vehicles Circulating, veh/h	444	56	321
Vehicles Exiting, veh/h	407	750	757
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	9.2	16.1	10.5
Approach LOS	A	C	B
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	362	1022	530
Cap Entry Lane, veh/h	877	1303	995
Entry HV Adj Factor	0.981	0.980	0.979
Flow Entry, veh/h	355	1002	519
Cap Entry, veh/h	860	1277	974
V/C Ratio	0.413	0.784	0.533
Control Delay, s/veh	9.2	16.1	10.5
LOS	A	C	B
95th %tile Queue, veh	2	9	3

HCM 6th Signalized Intersection Summary

11: Private Dwy/Moorland Ave & Todd Rd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	748	20	30	625	490	20	30	30	505	30	42
Future Volume (veh/h)	72	748	20	30	625	490	20	30	30	505	30	42
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	787	21	32	658	516	21	32	32	532	32	44
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	89	852	23	47	834	707	26	40	40	513	31	482
Arrive On Green	0.05	0.47	0.47	0.03	0.45	0.45	0.06	0.06	0.06	0.30	0.30	0.30
Sat Flow, veh/h	1781	1813	48	1781	1870	1585	428	652	652	1685	101	1585
Grp Volume(v), veh/h	76	0	808	32	658	516	85	0	0	564	0	44
Grp Sat Flow(s),veh/h/ln	1781	0	1862	1781	1870	1585	1732	0	0	1786	0	1585
Q Serve(g_s), s	5.5	0.0	52.8	2.3	39.0	34.7	6.3	0.0	0.0	39.5	0.0	2.6
Cycle Q Clear(g_c), s	5.5	0.0	52.8	2.3	39.0	34.7	6.3	0.0	0.0	39.5	0.0	2.6
Prop In Lane	1.00		0.03	1.00		1.00	0.25		0.38	0.94		1.00
Lane Grp Cap(c), veh/h	89	0	875	47	834	707	106	0	0	543	0	482
V/C Ratio(X)	0.85	0.00	0.92	0.68	0.79	0.73	0.81	0.00	0.00	1.04	0.00	0.09
Avail Cap(c_a), veh/h	89	0	1131	70	1116	946	113	0	0	543	0	482
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	61.2	0.0	32.2	62.7	30.7	29.5	60.2	0.0	0.0	45.2	0.0	32.3
Incr Delay (d2), s/veh	50.8	0.0	10.5	15.9	2.8	1.9	31.5	0.0	0.0	48.8	0.0	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	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	25.4	1.3	17.8	13.3	3.7	0.0	0.0	24.7	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	111.9	0.0	42.8	78.6	33.5	31.5	91.8	0.0	0.0	94.0	0.0	32.4
LnGrp LOS	F	A	D	E	C	C	F	A	A	F	A	C
Approach Vol, veh/h	884			1206			85			608		
Approach Delay, s/veh	48.7			33.8			91.8			89.5		
Approach LOS	D			C			F			F		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	12.4		7.9	65.5		44.0	11.0	62.4				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	8.5		5.1	78.9		39.5	6.5	77.5				
Max Q Clear Time (g_c+I1), s	8.3		4.3	54.8		41.5	7.5	41.0				
Green Ext Time (p_c), s	0.0		0.0	6.2		0.0	0.0	7.5				

Intersection Summary

HCM 6th Ctrl Delay	52.5
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

12: S Moreland Ave & Todd Rd

08/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱		↰	↱	↱		↰	
Traffic Volume (veh/h)	0	585	698	460	413	0	732	0	197	0	0	0
Future Volume (veh/h)	0	585	698	460	413	0	732	0	197	0	0	0
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	984	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	616	735	484	435	0	771	0	207	0	0	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	0	693	975	526	552	0	872	0	388	0	2	0
Arrive On Green	0.00	0.37	0.37	0.30	0.30	0.00	0.24	0.00	0.24	0.00	0.00	0.00
Sat Flow, veh/h	0	1870	1585	1781	1870	0	3563	0	1585	0	1870	0
Grp Volume(v), veh/h	0	616	735	484	435	0	771	0	207	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	1870	0	1781	0	1585	0	1870	0
Q Serve(g_s), s	0.0	31.7	34.2	27.0	21.9	0.0	21.4	0.0	11.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	31.7	34.2	27.0	21.9	0.0	21.4	0.0	11.6	0.0	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	693	975	526	552	0	872	0	388	0	2	0
V/C Ratio(X)	0.00	0.89	0.75	0.92	0.79	0.00	0.88	0.00	0.53	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	711	990	555	583	0	965	0	429	0	73	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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	30.3	14.2	35.0	33.2	0.0	37.4	0.0	33.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	13.1	3.3	20.2	6.8	0.0	9.2	0.0	1.1	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	0.0	16.2	19.5	14.2	10.7	0.0	10.3	0.0	4.6	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	43.4	17.5	55.2	40.0	0.0	46.6	0.0	34.8	0.0	0.0	0.0
LnGrp LOS	A	D	B	E	D	A	D	A	C	A	A	A
Approach Vol, veh/h	1351			919			978			0		
Approach Delay, s/veh	29.3			48.0			44.1			0.0		
Approach LOS	C			D			D					
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	0.0			41.2			28.1			33.3		
Change Period (Y+Rc), s	3.0			3.2			3.0			3.0		
Max Green Setting (Gmax), s	4.0			39.0			27.8			32.0		
Max Q Clear Time (g_c+I1), s	0.0			36.2			23.4			29.0		
Green Ext Time (p_c), s	0.0			1.9			1.7			1.3		

Intersection Summary

HCM 6th Ctrl Delay	39.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 User approved volume balancing among the lanes for turning movement.

Intersection				
Intersection Delay, s/veh	10.2			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	589	689	159	199
Demand Flow Rate, veh/h	601	703	163	203
Vehicles Circulating, veh/h	241	199	552	565
Vehicles Exiting, veh/h	527	516	290	337
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.4	11.6	7.0	7.7
Approach LOS	B	B	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	601	703	163	203
Cap Entry Lane, veh/h	1079	1126	786	775
Entry HV Adj Factor	0.981	0.980	0.976	0.979
Flow Entry, veh/h	589	689	159	199
Cap Entry, veh/h	1058	1104	767	759
V/C Ratio	0.557	0.624	0.207	0.262
Control Delay, s/veh	10.4	11.6	7.0	7.7
LOS	B	B	A	A
95th %tile Queue, veh	4	5	1	1

HCM 6th Signalized Intersection Summary

18: Old Redwood Hwy & Main St

08/02/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	453	32	725	922	32	340
Future Volume (veh/h)	453	32	725	922	32	340
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	477	34	763	971	34	358
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	456	405	1079	915	43	1222
Arrive On Green	0.26	0.26	0.58	0.58	0.02	0.65
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	477	34	763	971	34	358
Grp Sat Flow(s), veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	30.4	1.9	34.6	68.6	2.3	9.8
Cycle Q Clear(g_c), s	30.4	1.9	34.6	68.6	2.3	9.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	456	405	1079	915	43	1222
V/C Ratio(X)	1.05	0.08	0.71	1.06	0.79	0.29
Avail Cap(c_a), veh/h	456	405	1079	915	60	1240
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	44.2	33.6	18.0	25.1	57.7	8.8
Incr Delay (d2), s/veh	55.0	0.0	1.8	47.5	25.3	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	20.4	0.8	14.2	35.1	1.3	3.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	99.3	33.7	19.8	72.6	83.0	8.9
LnGrp LOS	F	C	B	F	F	A
Approach Vol, veh/h	511		1734			392
Approach Delay, s/veh	94.9		49.4			15.3
Approach LOS	F		D			B
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.1	74.8		35.0		83.9
Change Period (Y+Rc), s	6.2	6.2		4.6		6.2
Max Green Setting (Gmax), s	4.0	68.6		30.4		78.8
Max Q Clear Time (g_c+I), s	14.3	70.6		32.4		11.8
Green Ext Time (p_c), s	0.0	0.0		0.0		0.6

Intersection Summary

HCM 6th Ctrl Delay	53.1
HCM 6th LOS	D

Notes

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

ATTACHMENT D

VOLUME FIGURES



Major Street **Old Redwood Highway**
 Minor Street **Fulton Road**

Project **Sonoma County Housing Rezone**
 Scenario **Existing Conditions**
 Peak Hour **PM Peak Hour**

Turn Movement Volumes

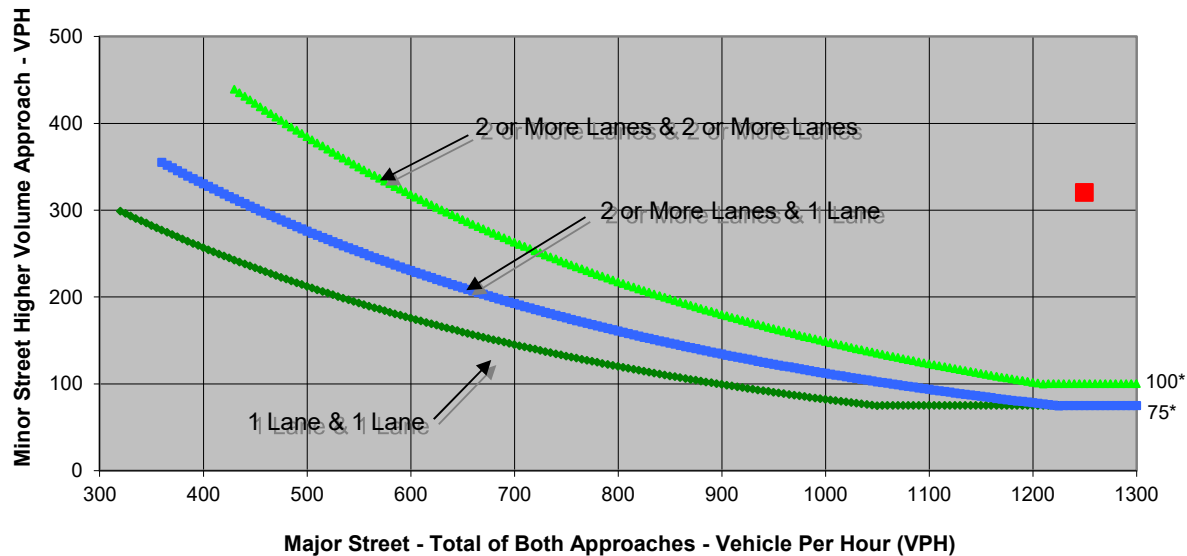
	NB	SB	EB	WB
Left	40	0	270	0
Through	550	440	0	0
Right	0	220	50	0
Total	590	660	320	0

Major Street Direction

x	North/South
	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Fulton Road	
Number of Approach Lanes	1	2	YES
Traffic Volume (VPH) *	1,250	320	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Old Redwood Highway**
 Minor Street **Fulton Road**

Project **Sonoma County Housing Rezone**
 Scenario **Cumulative Conditions**
 Peak Hour **AM Peak Hour**

Turn Movement Volumes

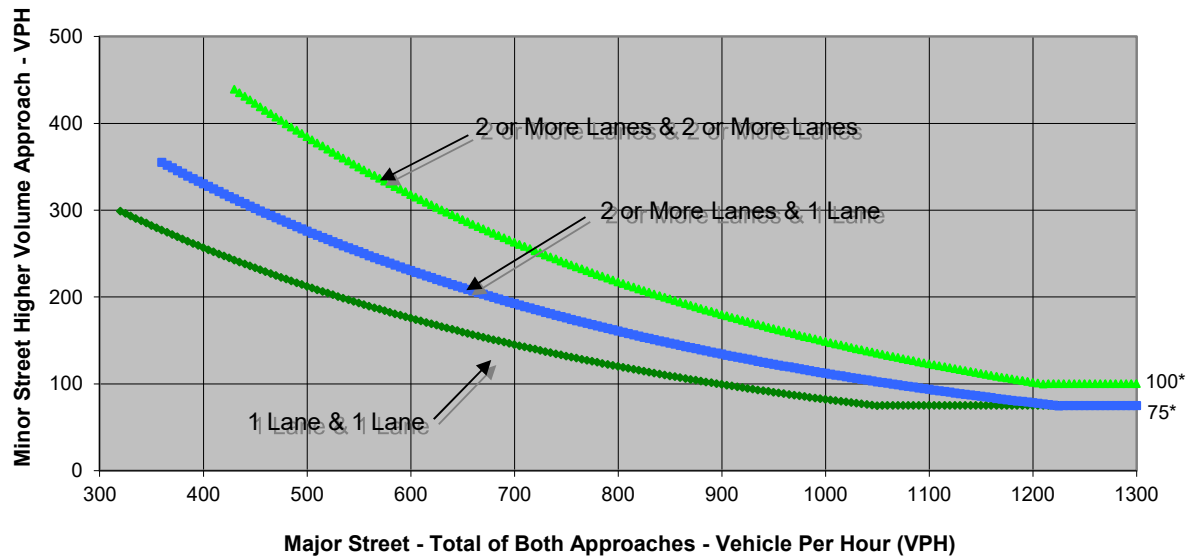
	NB	SB	EB	WB
Left	40	0	180	0
Through	190	860	0	0
Right	0	400	40	0
Total	230	1,260	220	0

Major Street Direction

x	North/South
	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Fulton Road	
Number of Approach Lanes	2	2	<u>YES</u>
Traffic Volume (VPH) *	1,490	220	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Old Redwood Highway**
 Minor Street **Fulton Road**

Project **Sonoma County Housing Rezone**
 Scenario **Cumulative Conditions**
 Peak Hour **PM Peak Hour**

Turn Movement Volumes

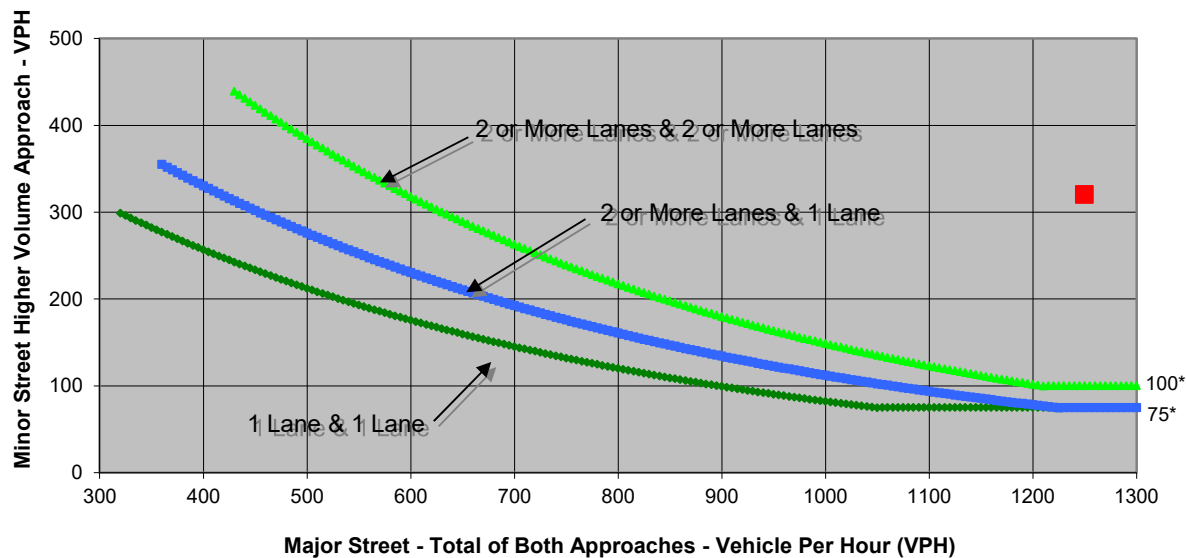
	NB	SB	EB	WB
Left	40	0	270	0
Through	550	440	0	0
Right	0	220	50	0
Total	590	660	320	0

Major Street Direction

x	North/South
	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Fulton Road	
Number of Approach Lanes	1	2	<u>YES</u>
Traffic Volume (VPH) *	1,250	320	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Old Redwood Highway
Minor Street Faught Road

Project Sonoma County Housing Rezone
Scenario Existing Conditions
Peak Hour AM Peak Hour

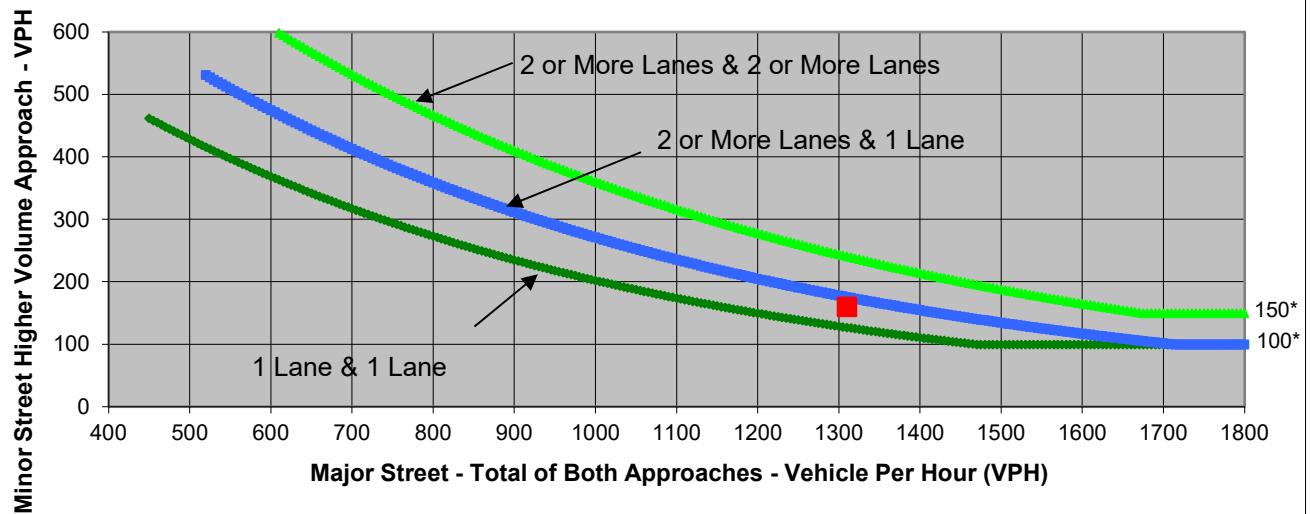
Turn Movement Volumes

	NB	SB	EB	WB
Left	10	20	40	140
Through	330	850	10	10
Right	80	20	20	10
Total	420	890	70	160

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Faught Road	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	1,310	160	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Old Redwood Highway
Minor Street Faught Road

Project Sonoma County Housing Rezone
Scenario Existing Conditions
Peak Hour PM Peak Hour

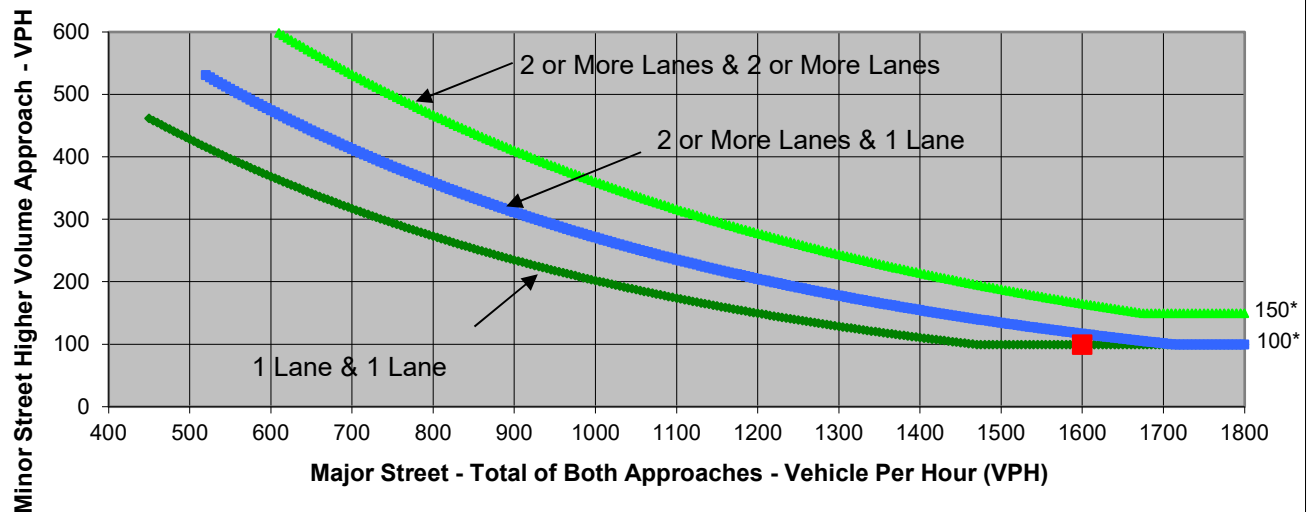
Turn Movement Volumes

	NB	SB	EB	WB
Left	20	30	10	70
Through	700	700	10	10
Right	120	30	20	20
Total	840	760	40	100

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Faught Road	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	1,600	100	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Old Redwood Highway
 Minor Street Faught Road

Project Sonoma County Housing Rezone
 Scenario Existing + Program Conditions
 Peak Hour AM Peak Hour

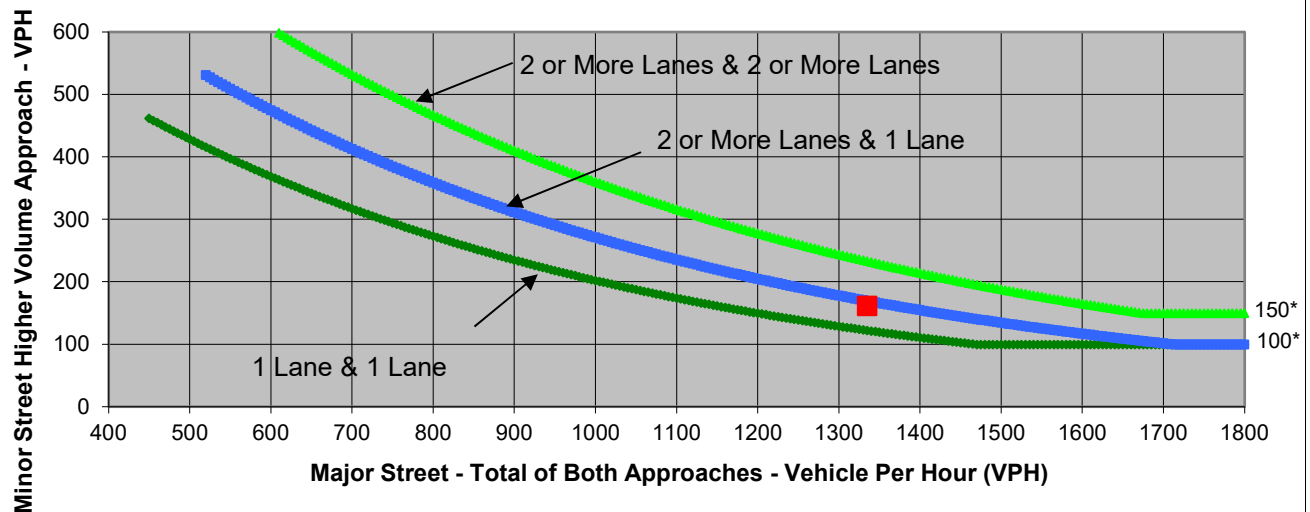
Turn Movement Volumes

	NB	SB	EB	WB
Left	10	20	40	142
Through	347	858	10	10
Right	80	20	20	10
Total	437	898	70	162

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Faught Road	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	1,335	162	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Old Redwood Highway
Minor Street Faught Road

Project Sonoma County Housing Rezone
Scenario Existing + Program Conditions
Peak Hour PM Peak Hour

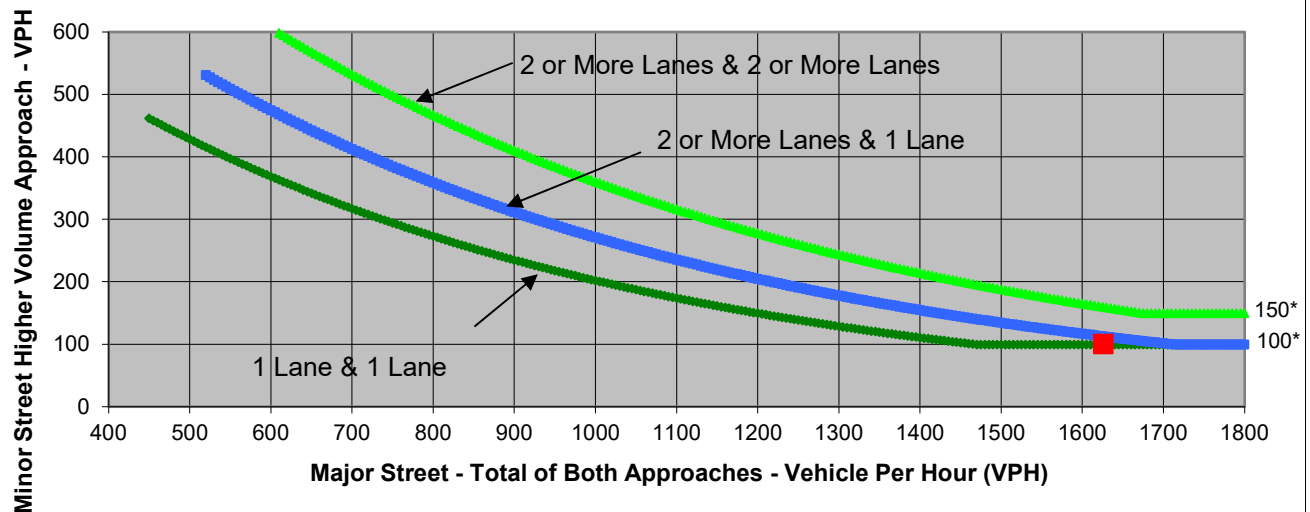
Turn Movement Volumes

	NB	SB	EB	WB
Left	20	30	10	71
Through	709	715	10	10
Right	122	30	20	20
Total	851	775	40	101

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Faught Road	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	1,626	101	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Old Redwood Highway
Minor Street Faught Road

Project Sonoma County Housing Rezone
Scenario Cumulative Conditions
Peak Hour AM Peak Hour

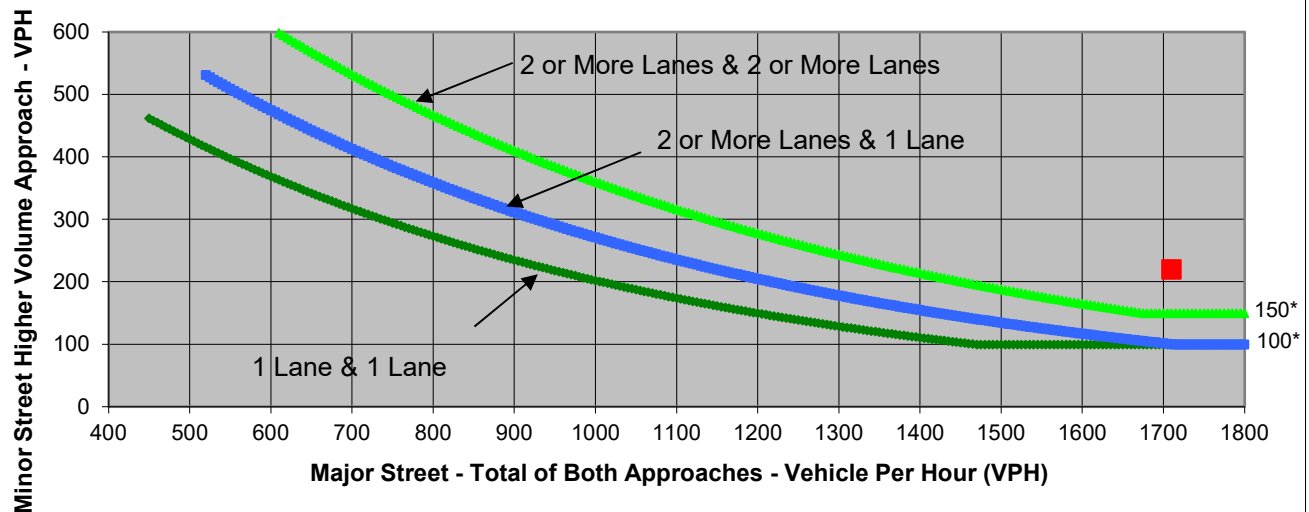
Turn Movement Volumes

	NB	SB	EB	WB
Left	20	30	60	180
Through	420	1,100	20	20
Right	110	30	30	20
Total	550	1,160	110	220

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Faught Road	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,710	220	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Old Redwood Highway
Minor Street Faught Road

Project Sonoma County Housing Rezone
Scenario Cumulative Conditions
Peak Hour PM Peak Hour

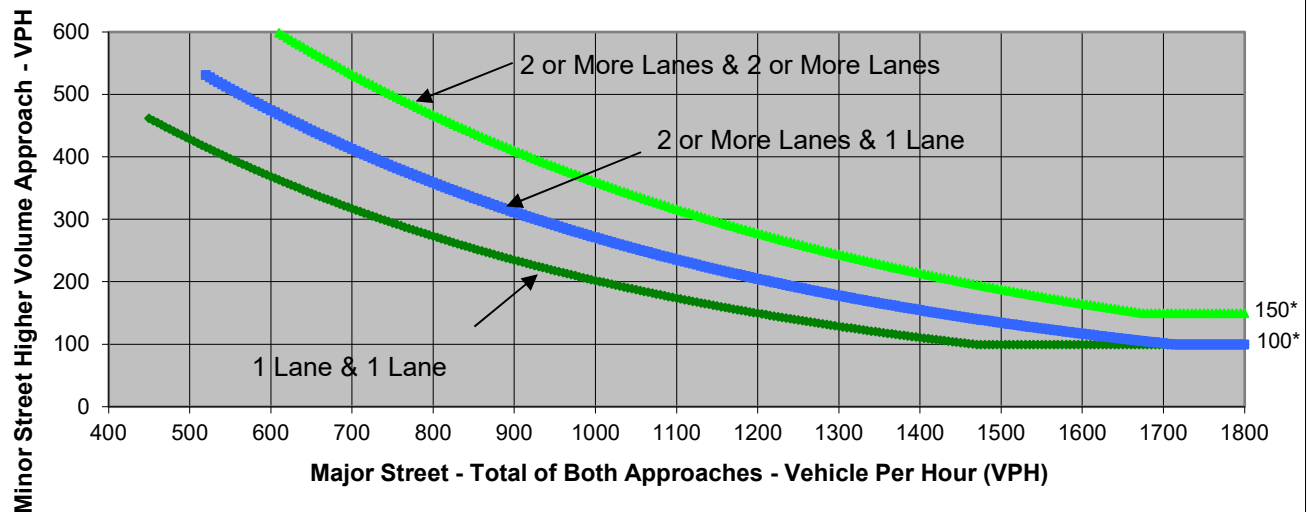
Turn Movement Volumes

	NB	SB	EB	WB
Left	30	50	20	100
Through	920	990	20	20
Right	170	50	30	60
Total	1,120	1,090	70	180

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Old Redwood Highway	Faught Road	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	2,210	180	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **SR 116/Front Street**
 Minor Street **Mirabel Road**

Project **Sonoma County Housing Rezone**
 Scenario **Existing + Program Conditions**
 Peak Hour **AM Peak Hour**

Turn Movement Volumes

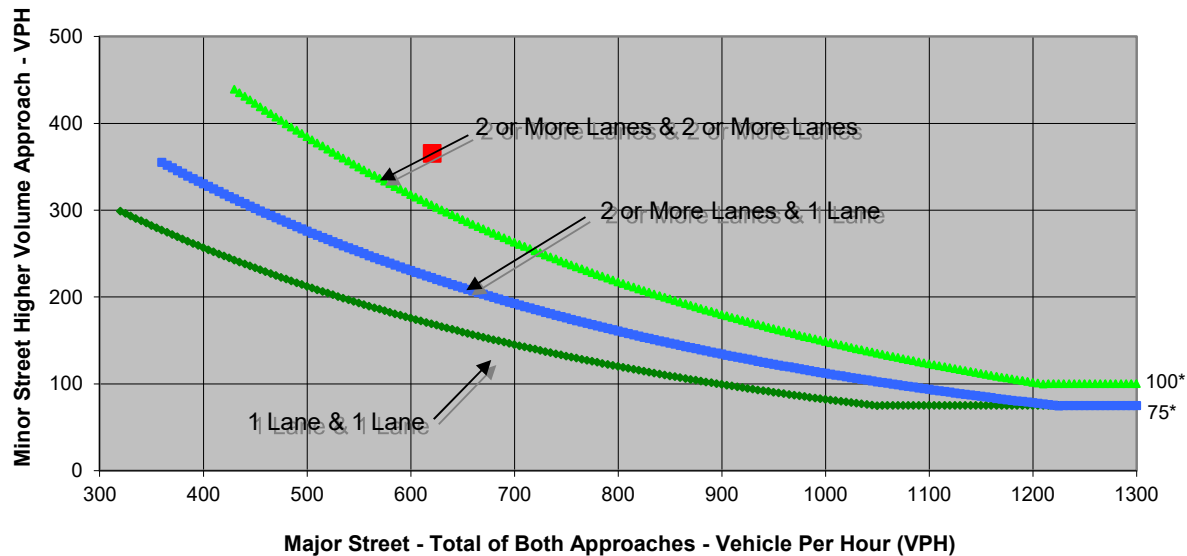
	NB	SB	EB	WB
Left	0	342	65	0
Through	0	0	255	145
Right	0	23	0	156
Total	0	365	320	301

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	SR 116/Front Street	Mirabel Road	
Number of Approach Lanes	1	2	YES
Traffic Volume (VPH) *	621	365	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **SR 116/Front Street**
 Minor Street **Mirabel Road**

Project **Sonoma County Housing Rezone**
 Scenario **Cumulative Conditions**
 Peak Hour **AM Peak Hour**

Turn Movement Volumes

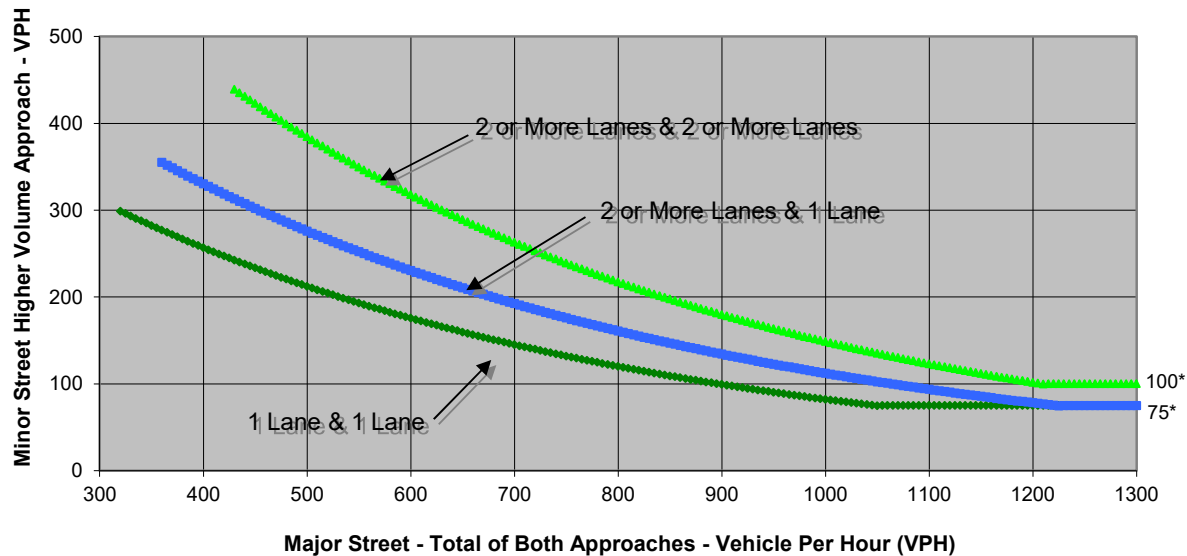
	NB	SB	EB	WB
Left	0	470	100	0
Through	0	0	340	220
Right	0	40	0	210
Total	0	510	440	430

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	SR 116/Front Street	Mirabel Road	
Number of Approach Lanes	1	2	YES
Traffic Volume (VPH) *	870	510	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **SR 116/Front Street**
 Minor Street **Mirabel Road**

Project **Sonoma County Housing Rezone**
 Scenario **Cumulative Conditions**
 Peak Hour **PM Peak Hour**

Turn Movement Volumes

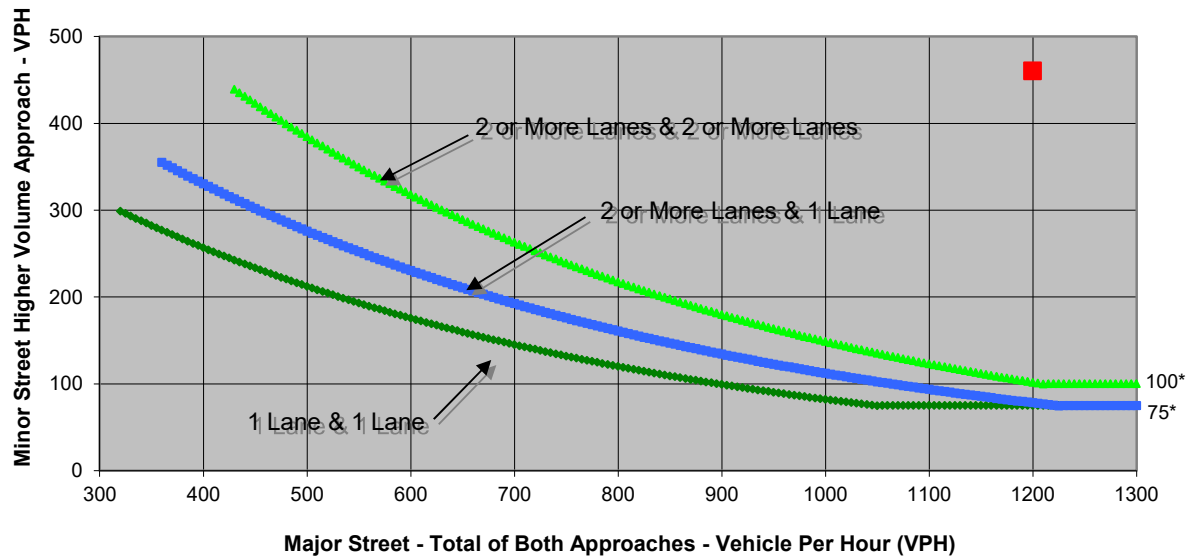
	NB	SB	EB	WB
Left	0	380	50	0
Through	0	0	270	270
Right	0	80	0	610
Total	0	460	320	880

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	SR 116/Front Street	Mirabel Road	
Number of Approach Lanes	1	2	YES
Traffic Volume (VPH) *	1,200	460	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Todd Road**
Minor Street **Moorland Avenue**

Project **Sonoma County Housing Rezone**
Scenario **Existing Conditions**
Peak Hour **AM Peak Hour**

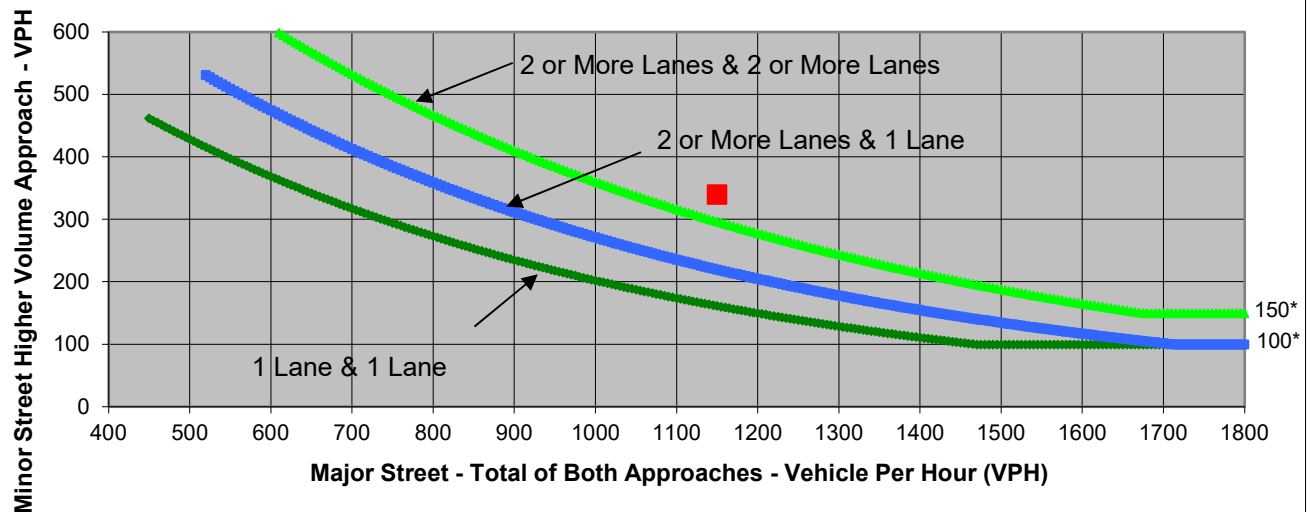
Turn Movement Volumes

	NB	SB	EB	WB
Left	10	260	50	10
Through	10	10	360	410
Right	10	70	10	310
Total	30	340	420	730

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Todd Road	Moorland Avenue	
Number of Approach Lanes	2	2	YES
Traffic Volume (VPH) *	1,150	340	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.



Major Street **Todd Road**
 Minor Street **Moorland Avenue**

Project **Sonoma County Housing Rezone**
 Scenario **Existing Conditions**
 Peak Hour **PM Peak Hour**

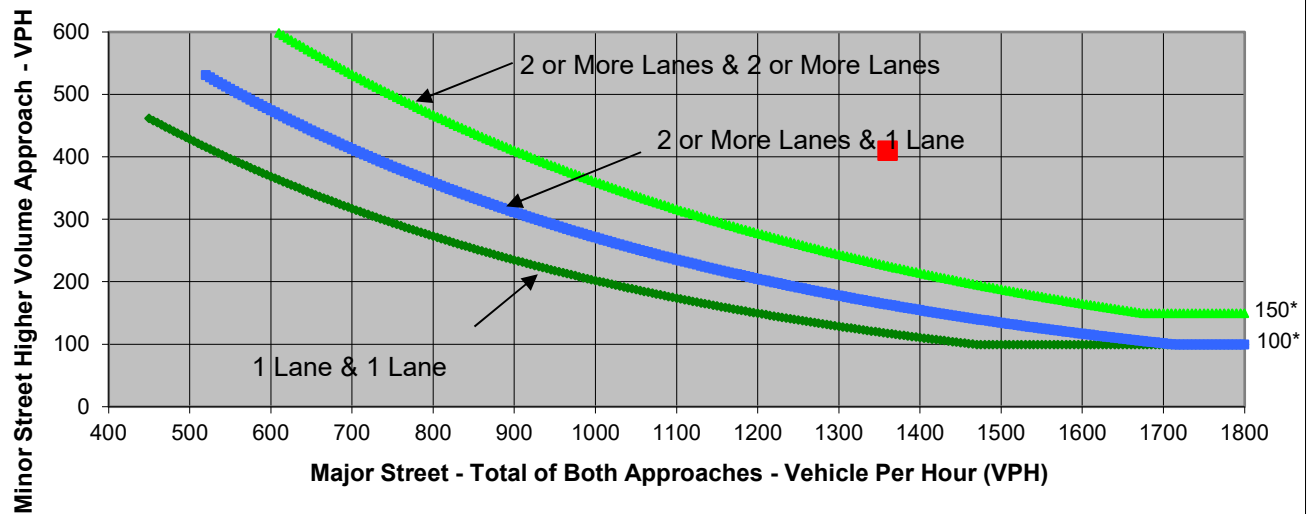
Turn Movement Volumes

	NB	SB	EB	WB
Left	10	360	50	20
Through	20	20	520	420
Right	20	30	10	340
Total	50	410	580	780

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Todd Road	Moorland Avenue	
Number of Approach Lanes	2	2	<u>YES</u>
Traffic Volume (VPH) *	1,360	410	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.



Major Street Verano Avenue
 Minor Street Riverside Drive

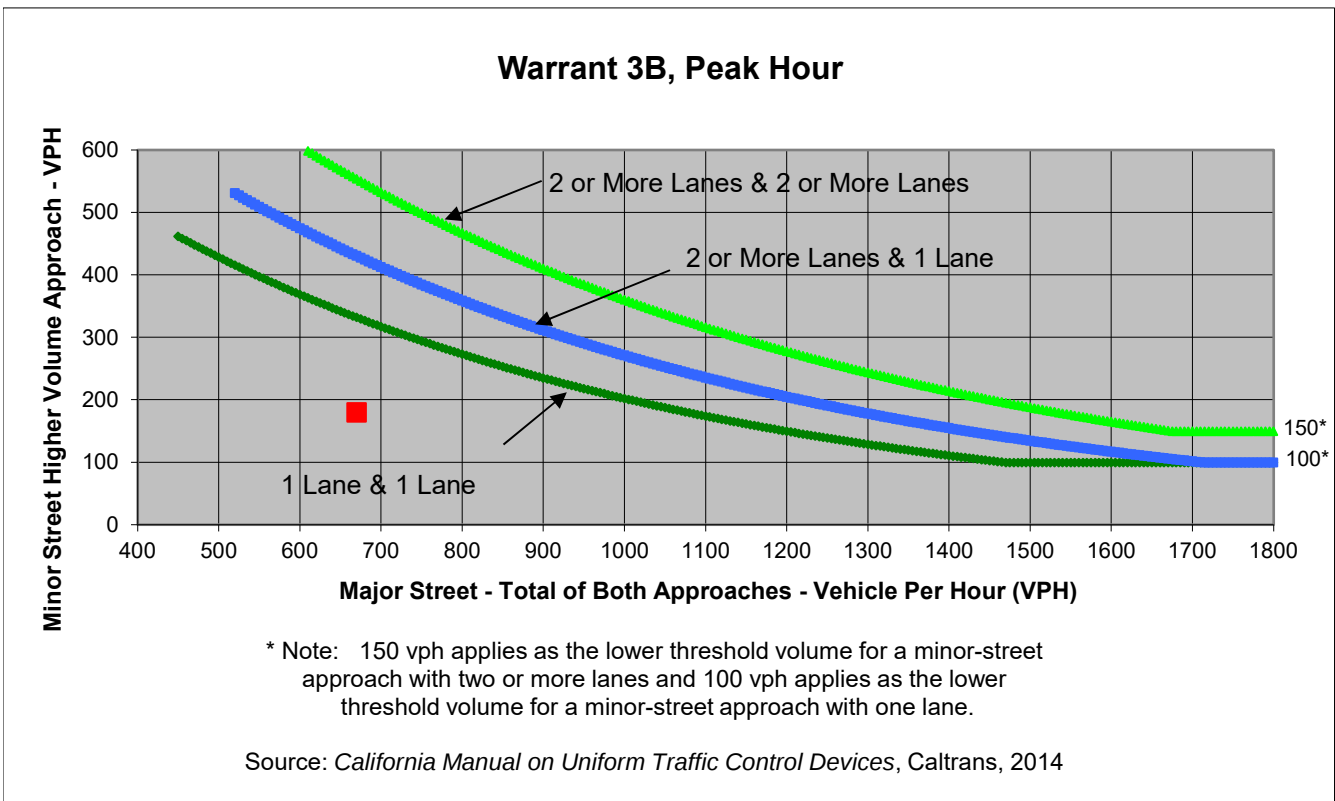
Project Sonoma County Housing Rezone
 Scenario Existing Conditions
 Peak Hour AM Peak Hour

Turn Movement Volumes

	NB	SB	EB	WB
Left	20	120	40	90
Through	20	20	260	220
Right	20	40	10	50
Total	60	180	310	360

Major Street Direction

	North/South
x	East/West



	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	670	180	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			



Major Street **Verano Avenue**
 Minor Street **Riverside Drive**

Project **Sonoma County Housing Rezone**
 Scenario **Existing Conditions**
 Peak Hour **PM Peak Hour**

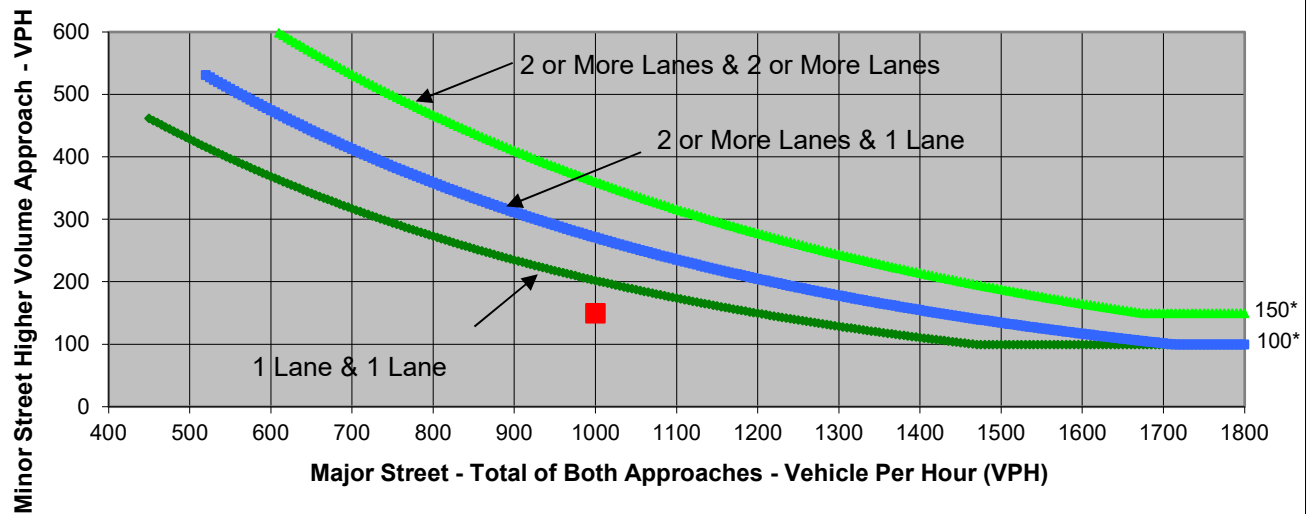
Turn Movement Volumes

	NB	SB	EB	WB
Left	20	70	50	70
Through	80	50	290	350
Right	20	30	110	130
Total	120	150	450	550

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	1,000	150	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.



Major Street **Verano Avenue**
 Minor Street **Riverside Drive**

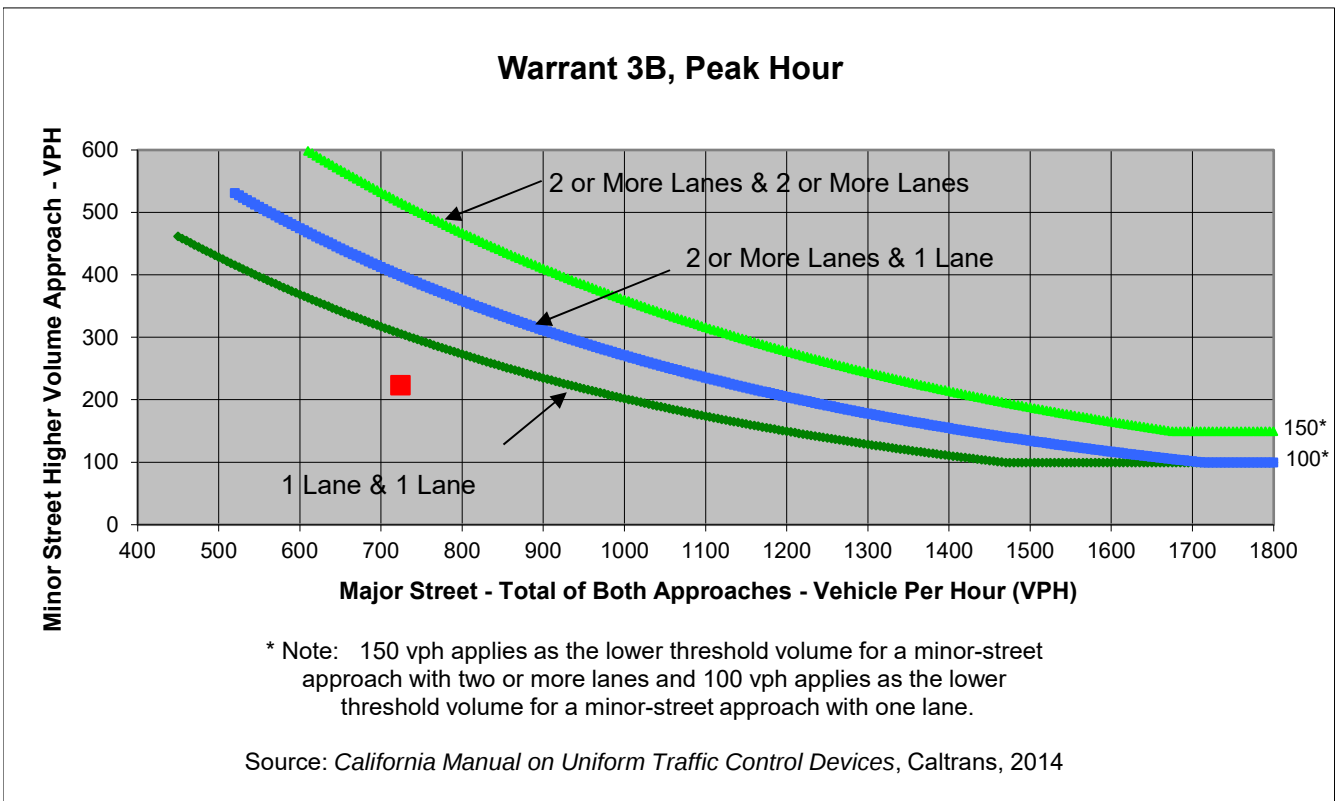
Project **Sonoma County Housing Rezone**
 Scenario **Existing + Program Conditions**
 Peak Hour **AM Peak Hour**

Turn Movement Volumes

	NB	SB	EB	WB
Left	20	127	42	90
Through	20	50	270	260
Right	20	47	10	52
Total	60	224	322	402

Major Street Direction

	North/South
x	East/West



	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	724	224	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			



Major Street **Verano Avenue**
 Minor Street **Riverside Drive**

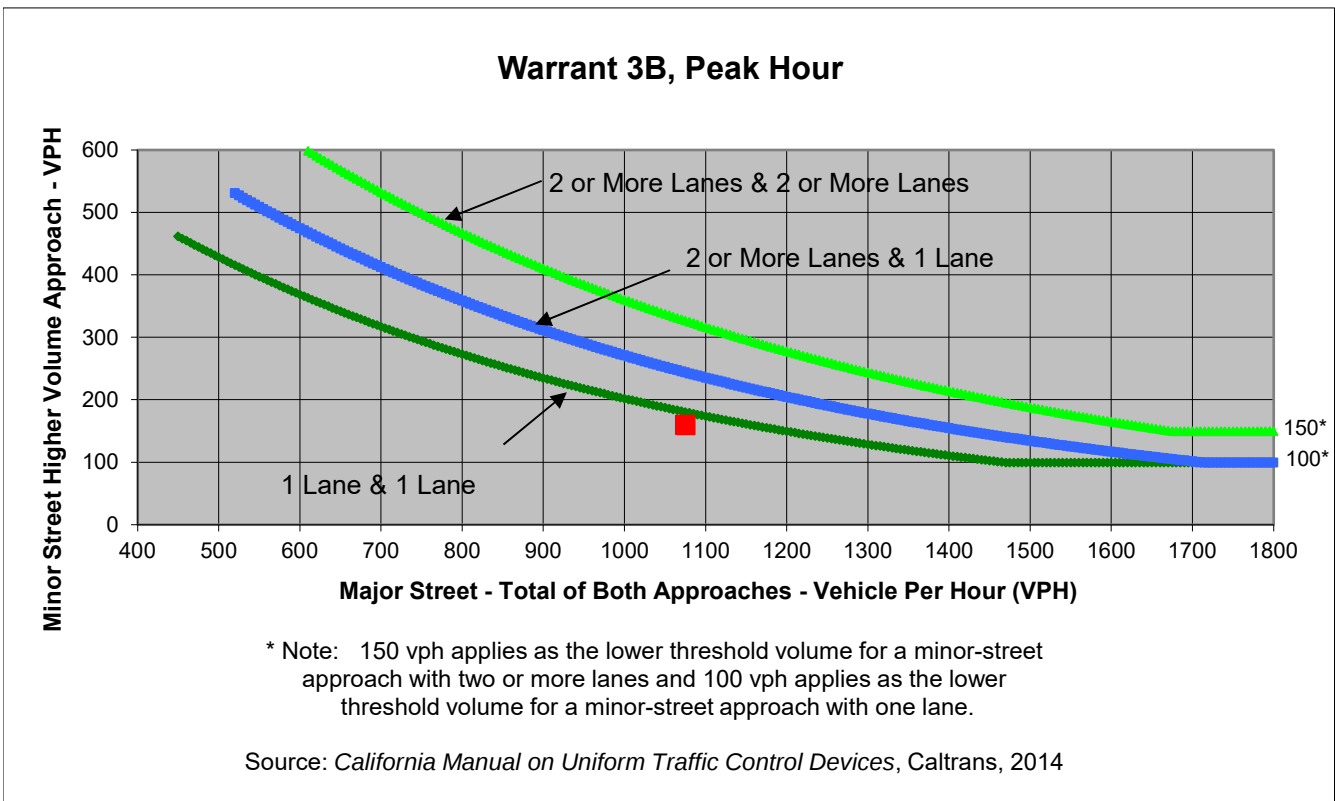
Project **Sonoma County Housing Rezone**
 Scenario **Existing + Program Conditions**
 Peak Hour **PM Peak Hour**

Turn Movement Volumes

	NB	SB	EB	WB
Left	20	75	55	70
Through	80	50	325	375
Right	20	35	110	140
Total	120	160	490	585

Major Street Direction

	North/South
x	East/West



	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	1,075	160	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Verano Avenue
Minor Street Riverside Drive

Project Sonoma County Housing Rezone
Scenario Cumulative Conditions
Peak Hour AM Peak Hour

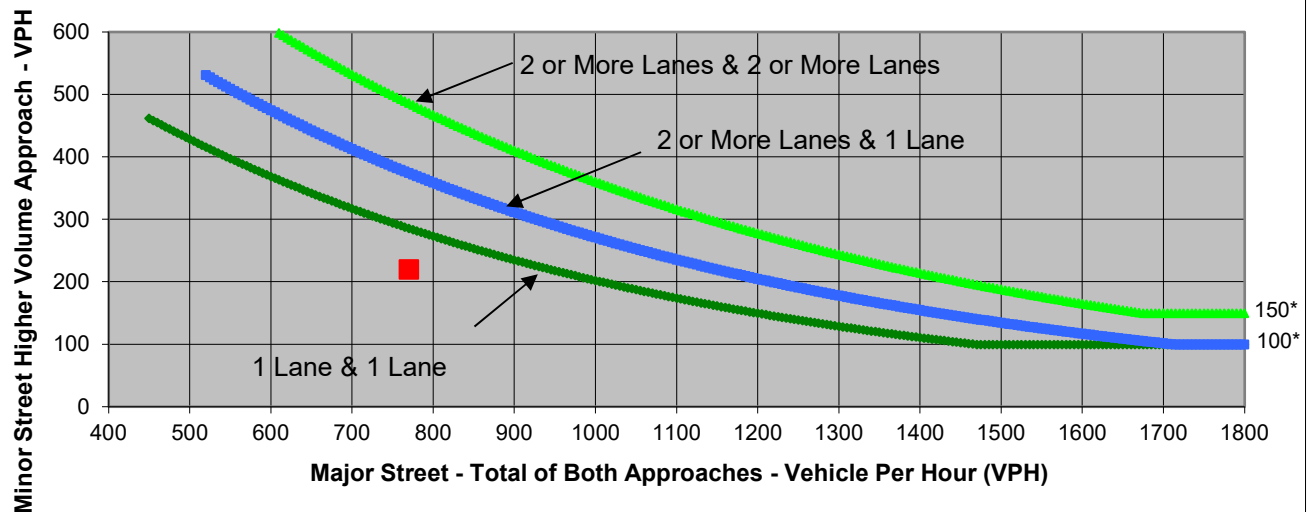
Turn Movement Volumes

	NB	SB	EB	WB
Left	30	140	50	100
Through	30	30	290	250
Right	30	50	20	60
Total	90	220	360	410

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	770	220	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			



Major Street **Verano Avenue**
 Minor Street **Riverside Drive**

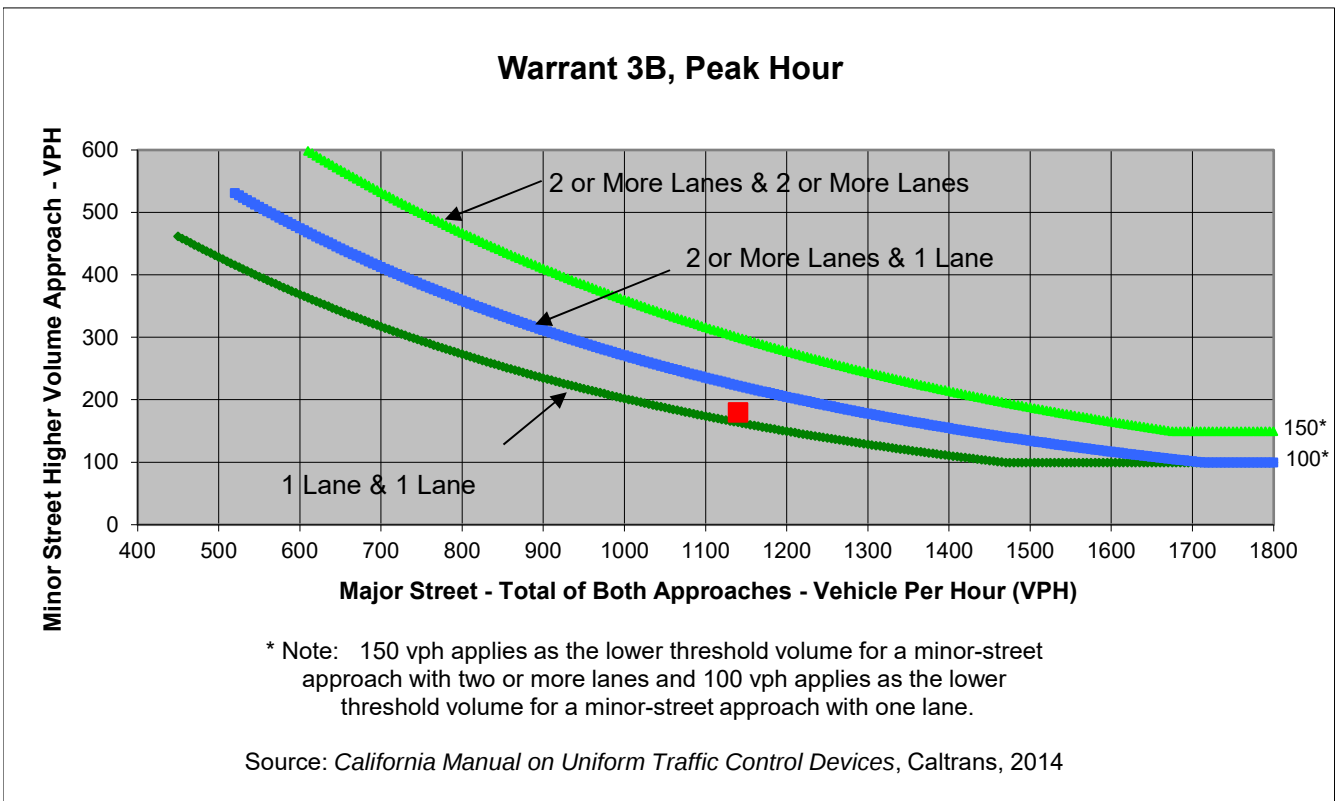
Project **Sonoma County Housing Rezone**
 Scenario **Cumulative Conditions**
 Peak Hour **PM Peak Hour**

Turn Movement Volumes

	NB	SB	EB	WB
Left	30	80	60	80
Through	90	60	330	390
Right	30	40	130	150
Total	150	180	520	620

Major Street Direction

	North/South
x	East/West



	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	<u>YES</u>
Traffic Volume (VPH) *	1,140	180	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Verano Avenue**
 Minor Street **Riverside Drive**

Project **Sonoma County Housing Rezone**
 Scenario **Cumulative + Program Conditions**
 Peak Hour **AM Peak Hour**

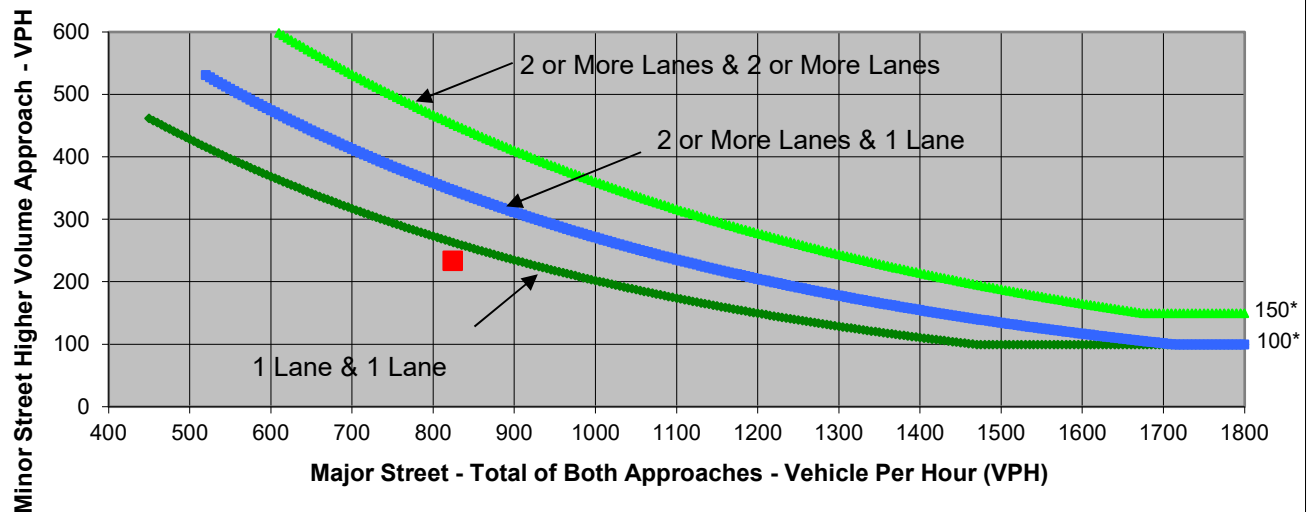
Turn Movement Volumes

	NB	SB	EB	WB
Left	30	147	52	100
Through	30	30	300	290
Right	30	57	20	62
Total	90	234	372	452

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	824	234	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Verano Avenue**
 Minor Street **Riverside Drive**

Project **Sonoma County Housing Rezone**
 Scenario **Cumulative + Program Conditions**
 Peak Hour **PM Peak Hour**

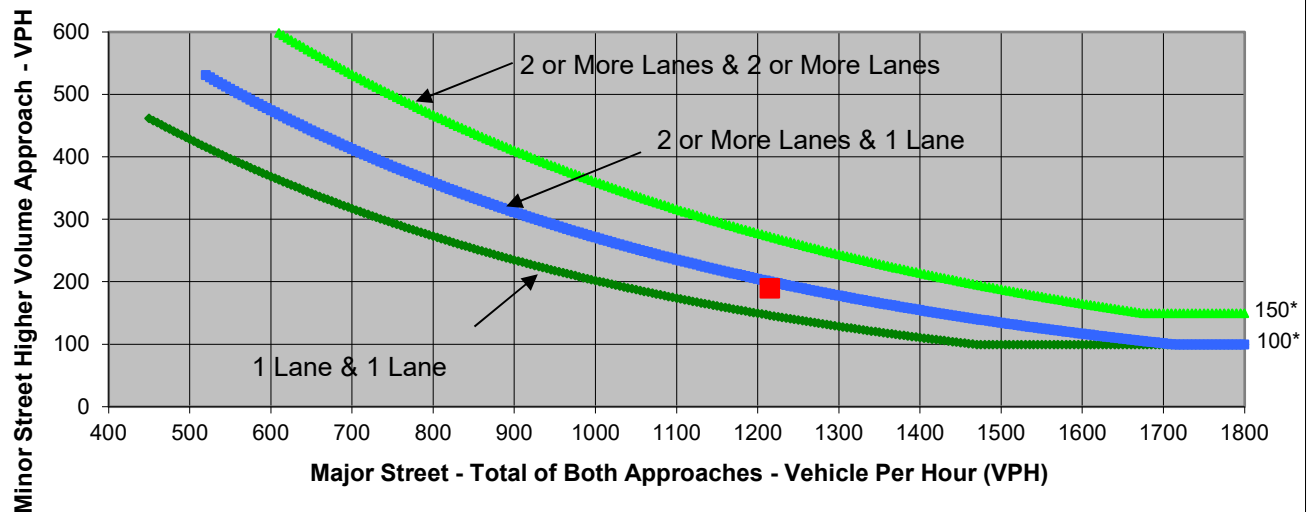
Turn Movement Volumes

	NB	SB	EB	WB
Left	30	85	65	80
Through	90	60	365	415
Right	30	45	130	160
Total	150	190	560	655

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Verano Avenue	Riverside Drive	
Number of Approach Lanes	1	1	YES
Traffic Volume (VPH) *	1,215	190	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Bodega Avenue**
Minor Street **Paula Lane**

Project **Sonoma County Housing Rezone**
Scenario **Cumulative Conditions**
Peak Hour **PM Peak Hour**

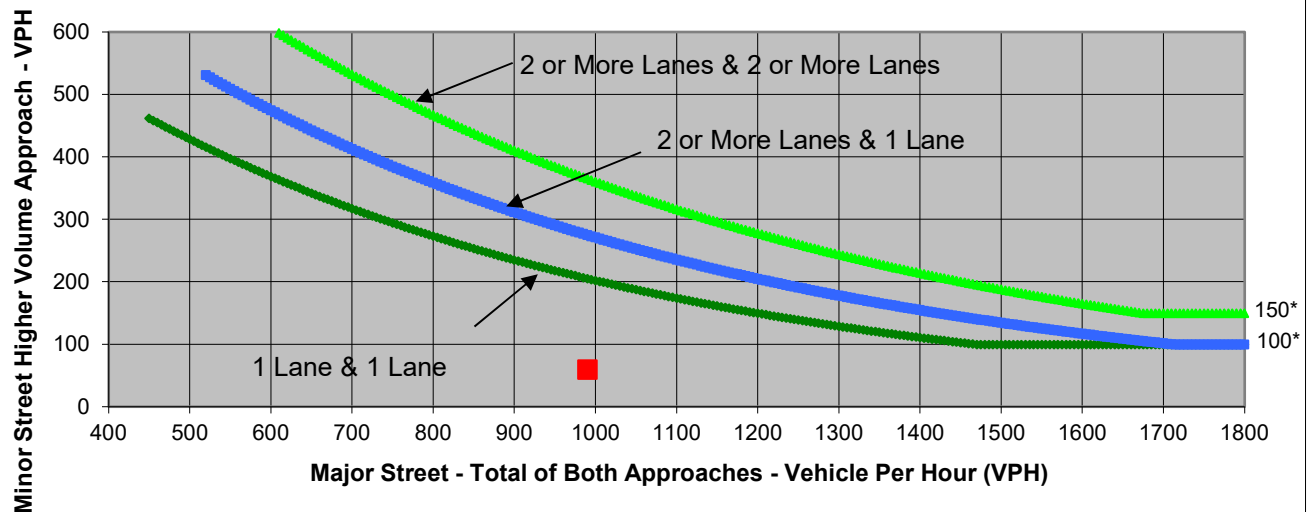
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	30	30	0
Through	0	0	420	510
Right	0	30	0	30
Total	0	60	450	540

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Bodega Avenue	Paula Lane	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	990	60	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Bodega Avenue**
Minor Street **Paula Lane**

Project **Sonoma County Housing Rezone**
Scenario **Cumulative Conditions**
Peak Hour **PM Peak Hour**

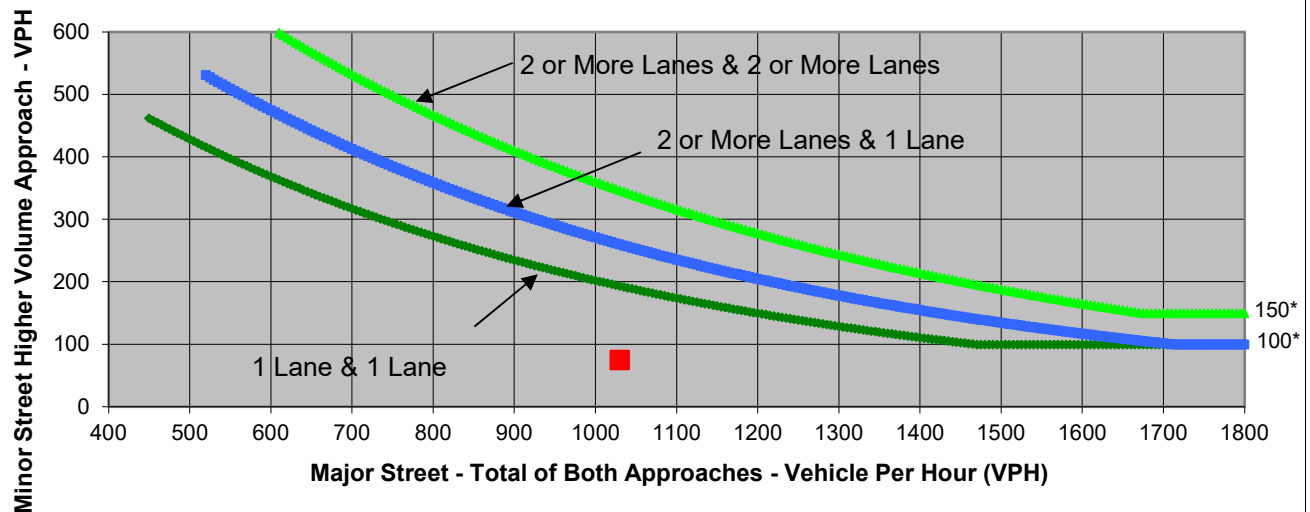
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	35	30	25
Through	5	10	425	515
Right	20	30	5	30
Total	30	75	460	570

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Bodega Avenue	Paula Lane	
Number of Approach Lanes	1	1	NO
Traffic Volume (VPH) *	1,030	75	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.