

BART WARM SPRINGS EXTENSION FINAL SUPPLEMENTAL EIR – ADDENDUM 2 Modifications to Irvington Station and Gallegos Winery Components

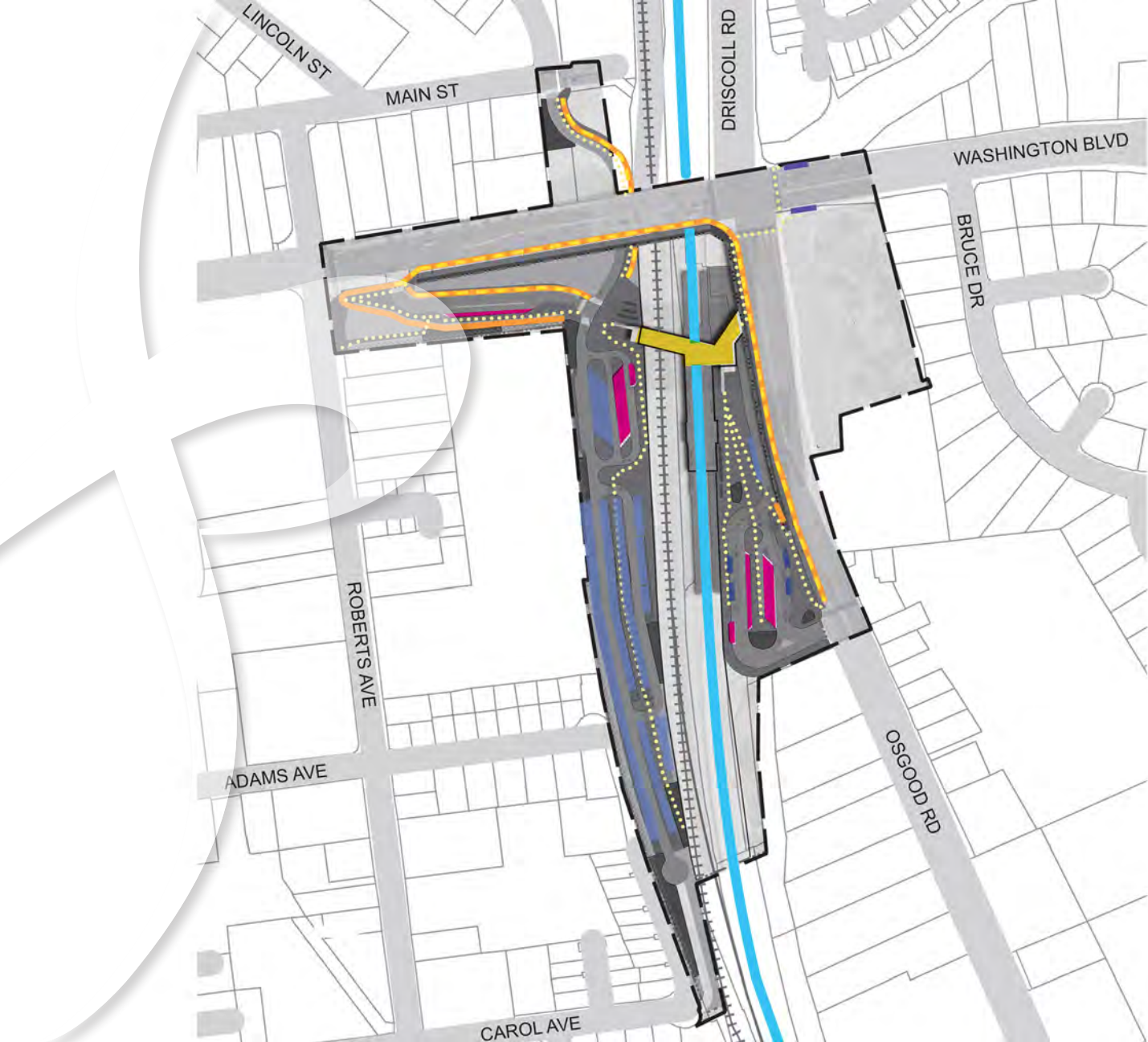
San Francisco Bay Area Rapid Transit District

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APPENDIX D: TRANSPORTATION IMPACT STUDY

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Transportation Impact Study

Irvington BART Station

Prepared for:
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1. INTRODUCTION

This report is the transportation deliverable for Task 6.2, CEQA Analyses, for the Irvington BART Station (the project). The purposes of the report are:

- Present ridership and access mode forecasts to reflect the proposed Station Site Plan.
- Evaluate the impact of the project on traffic operations in surrounding roadways. The traffic operations analysis also accounts for the potential impacts of the pedestrian and bicycle improvements under consideration.
- Evaluate and recommend improvements to the pedestrian and bicycle infrastructure on key corridors providing access to the station.

1.1 REPORT ORGANIZATION

This report is divided into the following four chapters:

- **Chapter 1 – Introduction** provides an overview of this report and briefly describes the proposed Station Site Plan
- **Chapter 2 – Ridership Forecasting** describes the ridership forecasting methodology and summarizes the results for the project
- **Chapter 3 – Traffic Forecasts and Operations Evaluation** summarizes the existing traffic conditions in the station area, describes the process used to develop the traffic volume forecasts, and assesses the potential impacts of the project on traffic operations in 2040
- **Chapter 4 – Active Access Comfort Evaluation** evaluates the existing conditions of the transportation infrastructure for walking and biking in the station area and provides recommendations for active access improvements

1.2 PROJECT DESCRIPTION

The proposed two-level, side-platform BART station design would feature an elevated concourse that spans across the BART and Union Pacific Railroad (UPRR) tracks. Station Site access would be provided from Osgood Road (east of the station), Main Street/High Street (northwest of the station), and Roberts Avenue/Washington Boulevard (west of the station). Elevated walkways from multi-modal access facilities on the east and west side of the BART and UPRR tracks would be accessed from stairs and elevators. Key transportation elements of the Station Site Plan include the following:



- A pedestrian bridge from the southwest corner of the Washington Boulevard/Osgood Road/Driscoll Road intersection to the concourse.
- An extension of the East Bay Greenway (EBGW) through the station site, connecting to the Washington Boulevard bridge and continuing southbound along the west side of Osgood Road.
- Approximately 180 bicycle parking spaces, consisting of about 75 percent bicycle lockers and 25 percent Class II bicycle racks. About 60 percent of these spaces would be located on the west of the tracks, and 40 percent on the east of the tracks.
- Four bus loading bays would be located to the west of Osgood Road.
- Approximately 39 pick-up/drop-off spaces, which would include four ADA pick-up/drop-off spaces. 51 percent of these spaces would be located on the west of the tracks, and 49 percent would be located to the east of the tracks.
- Approximately 225 to 275 automobile parking spaces, including 5 to 10 accessible parking spaces, and 30 to 40 motorcycle parking spaces, for a total of 255-315 parking spaces. All parking spaces would be located on the west of the tracks.

Automobile access to the facilities on the west side of the tracks would be provided through a full access driveway at the Main Street/High Street intersection and a right-in/right-out driveway on Washington Boulevard, just east of Roberts Avenue. Automobile access to the facilities on the east side of the tracks would be provided through a signalized full access driveway on Osgood Road, about 950 feet south of Washington Boulevard.

2. RIDERSHIP FORECASTING

This chapter presents the ridership forecasts for the proposed Station Site Plan.

2.1 ANALYSIS METHODS AND ASSUMPTIONS

The models and datasets used in this analysis assume the transportation network improvements outlined in the 2013 Metropolitan Transportation Commission (MTC) Regional Transportation Plan (RTP) Plan Bay Area for the year 2040. In particular, they assume increased BART service frequency, the completion of the BART Silicon Valley Extension project to Santa Clara, and the East Contra Costa BART Extension (eBART) extending BART service to Antioch in east Contra Costa County.

The following models and datasets were used to estimate the influence of the Irvington BART Station on the transportation network:

- The 2012 BART Direct Ridership Model (BART DRM), described in more detail below, was the basis of the detailed ridership forecasts.
- The 2013 MTC Model was used to update BART DRM inputs to be consistent with the 2013 RTP and Sustainable Communities Strategy (SCS).
- The 2015 BART Station Profile Survey was used to adjust the BART DRM mode split outputs to account for changes in the transportation network and rider behavior since 2008 (the 2008 BART Station Profile Survey was used to develop the BART DRM Model).
- The 2015 Alameda CTC Regional Travel Demand Model was used to estimate BART systemwide boarding results, VMT calculations, and regional travel pattern changes.

The BART DRM that was developed in 2008 and updated in 2012 was used for Irvington Station ridership forecasts. Fehr & Peers was part of the team that developed the model and has been applying it for BART-related projects since its initial development. The model, based on 2008 BART Station Profile Survey data, established relationships primarily based on linear regression equations between station area characteristics, ridership, and mode of access for BART stations. The BART DRM was used for Irvington Station forecasts because direct ridership models are a more efficient and responsive means of forecasting the effects of individual station activities than conventional transit models such as those in a regional travel demand model. Regional travel demand models represent transportation networks and land use at an aggregate scale and thus are relatively unresponsive to changes in station-level land use and transit service characteristics.

The BART DRM model contained assumptions for the Irvington Station and area characteristics. We updated these characteristics based on the latest station-area information available and consistent with MTC's 2013 Plan Bay Area. **Table 2-1** summarizes the model inputs for the Irvington BART Station.

The BART DRM is based on 2008 BART Station Profile Study and was last validated to 2012 conditions. Since 2012, BART has seen a rapidly changing transportation environment due to changing land use and travel behavior patterns and the rise of Transportation Network Companies (TNCs) such as Uber and Lyft. Systemwide, these patterns have resulted in a slight increase in systemwide BART ridership and a shift in mode of access from driving and bus transfers to active transportation and passenger pick-up/drop-off.

To ensure that the outputs from the BART DRM were appropriate for our analysis, we used the 2015 BART Station Profile Study and 2017 passenger pick-up/drop-off and TNC Study. Based on those datasets, we adjusted the Irvington BART forecasts to better reflect the more recent transportation environment.

2.2 FUTURE YEAR IRVINGTON STATION RIDERSHIP FORECASTS

Table 2-2 shows ridership and access mode share for the proposed Station Site Plan. An estimated 3,700 people would board at the Irvington BART station, and 43 percent of those users would either walk or ride a bicycle to the station. Another 42 percent would take bus transit or be picked up/dropped off at the station, and the remaining 15 percent would drive and park at the station.

TABLE 2-1 - DRM MODEL INPUTS FOR IRVINGTON BART STATION

Inputs	2010	2040	Source
Population within 1/2 mile of station	5,700	7,940	MTC Model
Retail jobs within 1/2 mile of station	210	240	MTC Model
Non-retail jobs within 1/2 mile of station	1,460	1,350	MTC Model
Catchment population ¹	N/A	58,340	BART DRM
Bicycle parking spaces	N/A	150	Estimated based on current supply at comparable stations
Feeder transit (peak hour buses) ²	6	10	Estimated assuming an increase in current service
Shuttles (peak hour shuttles)	0	2	Estimated based on comparable stations to serve Ohlone College
Walkability index ³	N/A	2	Estimated based on comparable stations
Near freeway	N/A	Yes	BART DRM
Underground station	N/A	No	BART DRM
Off-site parking spaces within 1/2 mile of station ⁴	2,500	0	Assumes Residential Permit Parking (RPP) implemented
On-site station parking	N/A	315	Input parameter

1. Catchment population is defined as the population within the area from which the station attracts its ridership. Each station has an exclusive catchment area with no overlap between the stations. Catchment areas for existing stations were determined using 2008 BART Station Profile home origin data, while the catchment area for the Irvington Station generally consists of areas of Fremont near the station. These areas were previously in the catchment areas for the Fremont and Warm Springs stations, and do not include the Tri-Valley (the Tri-Valley is discussed in the Automobile Trip Generation section). The catchment population includes the population within a 1/2 mile of the station, and is the same for AM and PM travel.
 2. AC Transit is not assuming any increase in service; this assumes one more peak hour bus in each direction for the two current lines serving the area (Lines 210 and 215), or diverting Line 212 that currently operates on Fremont Boulevard.
 3. Walkability index has a range of 0 to 4. Urban stations such as Downtown Berkeley and Montgomery Street have a walkability index of 4 and the more suburban stations, such as Castro Valley and South Hayward, have a walkability index of 1.
 4. This only applies to BART stations so it is not applicable to 2010.
- Source: Fehr & Peers, 2019.

TABLE 2-2 - IRVINGTON STATION 2040 DAILY RIDERSHIP OUTPUTS

Description		Proposed Station Site Plan
2040 Ridership¹	Daily Boardings	3,700
2040 Access Mode Share²	Active Access	
	Walk	34% (1,280)
	Bike	9% (320)
	Active Access Total	43% (1,600)
	Shared Mobility	
	Transit	18% (660)
	Passenger Pick-up/Drop-off	24% (890)
	Shared Mobility Total	42% (1,550)
	Drive & Park	15% (550)

1. See Section 2.3.1 of this report for a discussion of BART systemwide boardings

2. See Appendix A for more detailed forecasts

Source: Fehr & Peers, 2019.

2.3 REGIONAL TRANSPORTATION NETWORK METRICS

This section describes measures of effectiveness for the regional transportation network that can be attributed to the completion of the Irvington Station. The measures of effectiveness discussed are:

1. Changes in BART system-wide boardings and at the other two Fremont stations
2. Reductions in passenger vehicle miles traveled (VMT)
3. Station automobile trip generation

2.3.1 BART SYSTEMWIDE BOARDINGS

The station level forecasts estimated using the BART DRM were combined with system-wide BART forecasts from the Alameda CTC Regional Travel Demand Model. The forecasts show that about half of the Irvington



Station riders shift from the two existing Fremont stations. Approximately two thirds shift from the Fremont Station with the remaining one third from the Warm Springs Station. This translates to systemwide boardings increasing by 3,700 riders under the proposed Station Site Plan. **Table 2-3** summarizes the forecasted boardings systemwide and at the three Fremont stations under existing (2017) conditions, 2040 No Project conditions, and 2040 Plus Project conditions. This is higher than the systemwide boarding increase reported in the Warm Springs EIR (WSX EIR) with the Silicon Valley Extension Project (SVRTC), which used different modeling methodology and assumptions (a modified version of the Santa Clara Valley Transportation Authority travel demand model based on the 2002 MTC RTP).

TABLE 2-3 - ESTIMATED WEEKDAY BART BOARDINGS

Scenario	Fremont	Irvington	Warm Springs	Fremont Stations		Systemwide	
				Total	New	Total	New
Existing (2019)¹	5,930	-	4,290	10,220	-	405,500	-
2040 No Project²	9,500	-	8,440	17,940	-	608,700	-
2040 Plus Project²	8,240	3,700	7,900	19,840	1,900	612,400	3,700
WSX EIR Results (2006)							
No Project with SVRTC³	8,450	-	10,750	19,200	-	568,200	-
Plus Project with SVRTC³	7,050	4,700	7,700	19,450	400	569,000	800

1. Based on BART Ridership Report for March 2019

2. Based on the ridership forecasts in this report

3. Based on WSX EIR (2006); included only for comparison to current forecasts. The WSX EIR used a different modeling methodology and assumptions to develop forecasts for year 2025.

Sources: Fehr & Peers, 2019; BART, 2017, Alameda CTC Model, BART DRM, WSX EIR (2006).

2.3.2 VEHICLE MILES TRAVELED (VMT)

The station level forecasts estimated using the BART DRM were combined with trip lengths from the Alameda CTC Regional Travel Demand Model to estimate reductions in VMT on a typical weekday due to the Irvington Station. The calculations of the net reduction in VMT account for the following:

- VMT would decrease from users traveling on BART instead of driving to and from their destination
- VMT would increase from users driving to BART for park-and-ride trips
- VMT would increase from users driving to BART for passenger pick-up/drop-off trips, including TNCs
- VMT would decrease from users that were already traveling on BART shifting to the Irvington Station

The proposed Station Site Plan would result in a net daily VMT reduction of 65,700.

2.3.3 AUTOMOBILE TRIP GENERATION

The completion of the Irvington Station would generate automobile trips in the vicinity of the station. BART riders that access the station via park-and-ride or passenger pick-up/drop-off generate automobile trips. The daily and peak hour automobile trip generation for the project is estimated based on the detailed ridership and access mode forecasts presented in Appendix A.

Table 2-4 summarizes the daily and the AM and PM peak hour automobile trip generation. The peak hour trip generation represents the peak hour of the adjacent streets and not the peak hour of the station.

Approximately 380 to 400 vehicles are estimated to use the station for passenger pick-up/drop-off during the AM or PM peak hours. During the AM peak hour, fewer than 50 vehicles are estimated to drive to the station and park because the parking lot would be over 85 percent occupied by 7:30 AM. During the PM peak hour, more vehicles would exit the station as riders who parked earlier in the morning leave the station.

TABLE 2-4 - ESTIMATED AUTOMOBILE TRIP GENERATION

Automobile Trip Source	Daily	AM Peak Hour (7:30 – 8:30 AM) ¹	PM Peak Hour (5:00 – 6:00 PM) ¹
Passenger Pick-up/Drop-off	3,200	400	380
Drive & Park	1,000	30	180
Total	4,200	430	560

1. BART systemwide peak hour
Sources: Fehr & Peers, 2019; BART, BART DRM.

We estimate that about 20 percent of the Drive & Park BART riders at the Irvington Station (3 percent of all BART riders at the station) would drive from Tri-Valley (Pleasanton, Livermore, Dublin, and surrounding areas) to the station to travel to destinations along the BART Silicon Valley Extension (consisting of Berryessa, Alum Rock, San Jose Downtown, San Jose Diridon, and Santa Clara stations). This estimate accounts for the location of the Irvington Station near I-680, the number of residents in the Tri-Valley area, jobs along the BART Silicon Valley Extension, and travel times between the two areas using different modes. Overall, it is estimated that residents in the southern parts of Pleasanton who work within walking distance of the stations along the Silicon Valley Extension would most likely park at the Irvington BART Station as travelers between other origins and destinations would have shorter travel times driving alone, carpooling, riding the ACE train, or using other BART stations.

Section 3 discusses the effect of these automobile trips on the surrounding street network.

3. TRAFFIC FORECASTS AND OPERATIONS EVALUATION

This chapter presents the impacts of the proposed Station Site Plan on traffic operations in the vicinity of the Irvington BART Station. It provides an overview of the analysis methodology, summarizes existing conditions, describes the development of the traffic volume forecasts, and describes the potential impacts and mitigations.

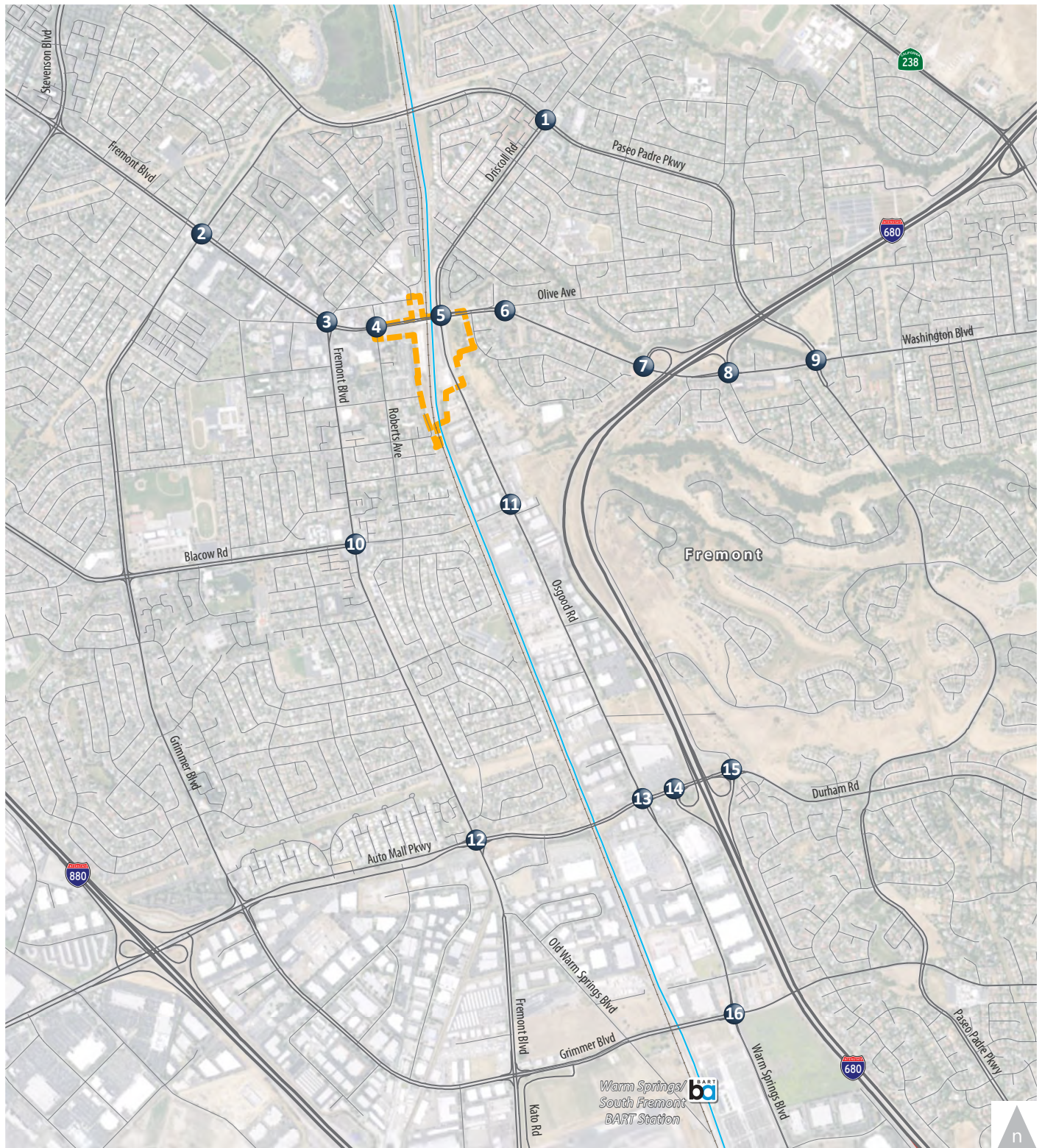
3.1 STUDY INTERSECTIONS

The study intersections in this analysis were selected in consultation with City staff and are intersections that would be most affected by the proposed BART Station. This study evaluates existing traffic operations during typical weekday AM and PM peak hours at the following sixteen intersections in the vicinity of the project, as shown on **Figure 3-1**:

1. Driscoll Road/Paseo Padre Parkway
2. Fremont Boulevard/Grimmer Boulevard
3. Fremont Boulevard-Union Street/Washington Boulevard
4. Roberts Avenue/Washington Boulevard
5. Osgood Road-Driscoll Road/Washington Boulevard
6. Olive Avenue/Washington Boulevard
7. I-680 Southbound Ramps/Washington Boulevard
8. I-680 Northbound Ramps/Washington Boulevard
9. Paseo Padre Parkway/Washington Boulevard
10. Fremont Boulevard/Blacow Road
11. Osgood Road/Blacow Road
12. Fremont Boulevard/Auto Mall Parkway
13. Osgood Road/Auto Mall Parkway
14. I-680 Southbound Ramps/Auto Mall Parkway
15. I-680 Northbound Ramps-Sabercat Road/Auto Mall Parkway-Durham Road
16. Warm Springs Boulevard-Osgood Road/South Grimmer Boulevard
17. Osgood Road/North Station Entrance (Future conditions only)
18. Washington Boulevard/Station Entrance (Future conditions only)

3.2 ANALYSIS METHODOLOGY

Intersection operations are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic operations from the vehicle driver perspective and consists of the delay experienced by the driver at the intersection. It ranges from LOS A, with no congestion and little delay, to LOS F, with excessive congestion and delays. Different methods are used to assess signalized and unsignalized (stop-controlled) intersections.



LEGEND



Station Site Plan Study Area



Study Intersection



3.2.1 SIGNALIZED INTERSECTIONS

Where possible, signalized intersection operations are evaluated using the method provided in the 2010 Highway Capacity Manual (HCM). This method uses intersection characteristics to estimate average control delay and then assigns a LOS value. Control delay is defined as the delay associated with deceleration, stopping, moving up in the queue, and acceleration experienced by drivers at a signalized intersection. **Table 3-1** provides descriptions of various LOS and the corresponding ranges of delays for signalized intersections. Intersections with atypical configuration or signal phasings that could not be evaluated in the 2010 HCM method were instead evaluated using the HCM 2000 method.

3.2.2 UNSIGNALIZED INTERSECTIONS

Unsignalized intersection (side-street stop-controlled) LOS is also analyzed using the 2010 HCM. Delay is calculated for movements that are controlled by a stop sign or that must yield the right-of-way. This method defines operations by average control delay per vehicle (measured in seconds) for each stop-controlled movement. This incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side-street stop-controlled intersections, the movement or approach with the highest delay is reported. Although the 2010 HCM methodology does not report the average intersection LOS for side-street stop-controlled intersections, this report also presents the average intersection delay and the corresponding LOS. Table 3-1 summarizes the LOS ranges for unsignalized intersections. They are lower than the delay ranges for signalized intersections because drivers generally tolerate more delay at signals.

3.2.3 ANALYSIS TOOLS

The Synchro 10 Software was used to estimate delay and LOS for all study intersections. Synchro uses the equations provided in 2010 HCM to calculate control delay. These equations use intersection characteristics, such as vehicle and pedestrian volumes, lane geometry, and signal phasings, as inputs in estimating control delay.

TABLE 3-1 - INTERSECTION LEVEL OF SERVICE DEFINITIONS

Unsignalized Intersections		Level of Service Grade	Signalized Intersections	
Description	Average Total Vehicle Delay (Seconds)		Average Control Vehicle Delay (Seconds)	Description
No delay for stop-controlled approaches.	≤10.0	A	≤10.0	Free Flow or Insignificant Delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all.
Operations with minor delay.	> 10.0 and ≤15.0	B	> 10.0 and ≤20.0	Stable Operation or Minimal Delays: Generally occurs with good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay. An occasional approach phase is fully utilized.
Operations with moderate delays.	> 15.0 and ≤25.0	C	> 20.0 and ≤35.0	Stable Operation or Acceptable Delays: Higher delays resulting from fair signal progression and/or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted.
Operations with increasingly unacceptable delays.	> 25.0 and ≤35.0	D	> 35.0 and ≤55.0	Approaching Unstable or Tolerable Delays: Influence of congestion becomes more noticeable. Longer delays result from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays.
Operations with high delays, and long queues.	> 35.0 and ≤50.0	E	> 55.0 and ≤80.0	Unstable Operation or Significant Delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection.
Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers.	> 50.0	F	> 80.0	Forced Flow or Excessive Delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections.

Source: Highway Capacity Manual, Transportation Research Board, 2010.

3.3 EXISTING DATA COLLECTION

Weekday AM and PM peak period (7:00 to 9:00 AM and 4:00 to 6:00 PM) traffic counts, including counts of heavy vehicles, pedestrians and bicycles, were collected in September 2017 at the 16 existing study intersections. The count data were collected on clear days, while area schools were in normal session.

In addition, during traffic data collection, intersection lane configurations and signal operations were documented. The City of Fremont provided signal timing data for the signalized study intersections. The signal timing data was then verified against the actual observed conditions at each study intersection. Field observations of the study intersections were also conducted to confirm the calculated LOS operations and to observe overall transportation characteristics at the study facilities.

For each study intersection, the hour with the highest traffic volume within each peak period was selected for analysis. **Figure 1** in **Appendix B** shows the existing AM and PM peak hour traffic volumes, intersection lane configurations, and traffic control devices at all the study intersections. The raw traffic data collected at the study intersections is provided in **Appendix C**.

3.4 EXISTING TRAFFIC OPERATIONS

Based on the volumes, intersection controls, and roadway configurations presented on **Figure 1** in **Appendix B**, Fehr & Peers calculated the AM and PM peak hour LOS at the study intersections. **Table 3-2** summarizes the existing weekday AM and PM peak hour LOS at the study intersections. **Appendix D** provides the detailed LOS calculation work sheets.

As shown in the table, most study intersections operate at LOS D or better during both AM and PM peak hours, except the following:

- The stop-controlled Olive Avenue approach at the Olive Avenue/Washington Boulevard intersection (#6) operates at LOS F during both AM and PM peak hours
- The signalized Fremont Boulevard/Blacow Road intersection (#10) operates at LOS E during the AM peak hour

TABLE 3-2 - STUDY INTERSECTION EXISTING CONDITIONS LOS SUMMARY

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay (Seconds) ¹	LOS ²	Delay (Seconds) ¹	LOS ²
1. Driscoll Road/Paseo Padre Parkway	Signal	42	D	40	D
2. Fremont Boulevard/Grimmer Boulevard	Signal	33	C	47	D
3. Fremont Boulevard-Union Street/Washington Boulevard/ Bay Street ³	Signal	51	D	35	C
4. Roberts Avenue/Washington Boulevard ⁴	Signal	43	D	24	C
5. Osgood Road-Driscoll Road/Washington Boulevard	Signal	46	D	50	D
6. Olive Avenue/Washington Boulevard	Side-Street Stop	11 (>120)	B (F)	2 (>120)	A (F)
7. I-680 Southbound Ramps/Washington Boulevard	Signal	20	B	7	A
8. I-680 Northbound Ramps/Washington Boulevard	Signal	31	C	16	B
9. Paseo Padre Parkway/Washington Boulevard	Signal	30	C	32	C
10. Fremont Boulevard/Blacow Road	Signal	61	E	39	D
11. Osgood Road/Blacow Road	Signal	4	A	6	A
12. Fremont Boulevard/Auto Mall Parkway	Signal	47	D	46	D
13. Osgood Road/Auto Mall Parkway	Signal	52	D	51	D
14. I-680 Southbound Ramps/Auto Mall Parkway	Signal	17	B	31	C
15. I-680 Northbound Ramps-Sabercat Road/Auto Mall Parkway-Durham Road	Signal	53	D	18	B
16. Warm Springs Boulevard-Osgood Road/South Grimmer Boulevard	Signal	44	D	48	D

Bold indicated intersection operating at LOS E or LOS F

1. The delay and LOS for side-street stop-control intersections represent the average intersection (worst movement or approach); for signalized intersections, the delay and LOS represent the intersection overall.
2. Delay and LOS calculated using the 2010 HCM methods unless noted.
3. Delay and LOS calculated using HCM 2000 in the AM and PM peak hours due to limitations in 2010 HCM
4. Delay and LOS calculated using HCM 2000 in the PM peak hour only due to limitations in 2010 HCM

Source: Fehr & Peers, 2019.



The calculated delay and LOS during the PM peak hour at intersections along Washington Boulevard and Auto Mall Parkway (intersections #6 thru #9 and #13 thru #15) do not account for the downstream freeway queues that spill back along these arterials. These queues are caused by the over-congested conditions along I-680 and spill back onto the on-ramps and the adjacent arterials. Although drivers along these arterials experience this delay, it is not accounted in the reported delay because it is not due to the traffic volumes, control, or configuration at the study intersections.

3.5 TRAFFIC FORECASTING METHODOLOGY

The traditional methodology of applying isolated project trip generation, distribution, and assignment procedures would not accurately reflect the Irvington BART Station's impact on traffic volumes because while the new station would attract new automobile trips to the station, it would also result in fewer regional automobile trips as motorists would shift from driving to taking BART. Therefore, the traffic volume forecasts were developed by primarily using the Alameda County Transportation Commission (CTC) Travel Demand Model. The following basic steps were used in developing traffic forecasts for this analysis:

Step 1: Develop and Validate Existing (2017) Volumes

The Alameda CTC Model released in May 2015 was used for this analysis. The Alameda CTC Model uses 2010 as the base year. The Model also provides forecasts for the years 2020 and 2040. A 2017 Model was developed to more accurately represent current baseline conditions and to be consistent with the existing traffic data collected for the project in 2017 and described in Section 3.3. The 2017 land use database was developed by interpolating between the 2010 and 2020 land use databases. The 2017 Model transportation network was developed by updating the 2010 Model network to reflect the changes in the network since 2010. In the project area, the primary change for the 2017 Model is the opening of the Warm Springs BART Station.

The 2017 Model was validated by comparing the 2017 AM and PM peak hour forecasts with the existing traffic volume data. As recommended by Alameda CTC, validation targets included in the Federal Highway Administration's (FHWA) *Travel Model Validation and Reasonableness Checking Manual Second Edition* (2010) were used to determine if the 2017 Model is validated. **Appendix E** contains the validation tests for the Model using screen-line, freeway, and arterial volumes for AM and PM peak hours. The 2017 Model meets the Alameda CTC's validation targets and has better validation to the 2017 traffic counts than the 2010 or the 2020 Model forecasts. Therefore, the 2017 Model results are appropriate to use.

Step 2: Develop 2040 No Project Traffic Forecasts

The Alameda CTC Model was also used for this analysis, which uses land use and socio-economic data consistent with Association of Bay Area Government (ABAG) *Projections 2013* (Consistent with the 2040 Regional Transportation Plan/Sustainable Communities Strategy). The land use database was modified to reflect more accurate land use projections within the study area, including land use changes surrounding the Warm Springs BART Station. **Appendix F** summarizes the land use changes in the study area.

The 2040 roadway and transit networks in the Model were also checked to ensure that they accurately reflect the expected networks in 2040. Major transportation changes assumed in the Model between 2017 and 2040 include BART extension to San Jose and full implementation of Express/HOT lanes in both directions of I-680 and I-880 in the vicinity of Fremont. Although the 2040 Model includes the Irvington BART Station, it was turned off to develop the 2040 No Project traffic volume forecasts.

The AM and PM peak-hour roadway segment volumes forecasted by the constrained Alameda CTC Model for 2017 and 2040 were used to develop 2040 turning movement forecasts at the study intersections using the "Furness" process, which adjusts existing turning movement volumes to reflect changes in roadway segment volumes forecasted by the Alameda CTC Model.¹ **Figure 2** in **Appendix B** presents the AM and PM peak hour traffic volumes at the study intersections.

Step 3: Develop 2040 BART Ridership and Access Mode Forecasts

As described in Chapter 2, the BART DRM was used to develop ridership by access mode forecasts for the proposed Station Site Plan. The DRM Model was used instead of the Alameda CTC Model because the Alameda CTC Model is not responsive to station-level characteristics.

Step 4: Develop 2040 Plus Project Forecasts

The 2040 Plus Project Model is the same as the 2040 No Project Model developed in Step 2, with the Irvington station added to the Model network. For the proposed Station Site Plan, the number of vehicle trips generated by the Irvington BART Station in the Alameda CTC Model after the final distribution step were adjusted to match the number of vehicle trips estimated in Step 3 using the BART DRM. The Alameda CTC Model was then run through final assignment. The final Model assignment for the Drive & Park and Passenger Pick-up/Drop-off trips to and from the station under the proposed Station Site Plan were

¹ Outlined in NCHRP-255, the industry-standard Furness technique is used to estimate projected (future) intersection turning movement volumes based on comparing existing traffic volume counts and the Model results. It uses mathematical formulae to balance roadway segment volumes approaching, and departing from, the intersection and thus balances turning volumes that make sense compared to the existing counts and Model results. This process improves the level of confidence in the forecasted future turning movement volumes.

adjusted to account for the location of the Irvington BART Station driveways, and location and amount of the parking supply.

Figure 3-2 and **Figure 3-3** show the approximate trip distribution for Drive & Park and Passenger Pick-up/Drop-off trips, respectively, for the Irvington BART Station. Overall, the Passenger Pick-up/Drop-off trips are more local to the vicinity of the station than the Drive & Park trips. As described in Section 2.3.3, it is estimated that about 20 percent of the Drive & Park trips would be from the Tri-Valley Area using the I-680 ramps at Washington Boulevard to access the station.

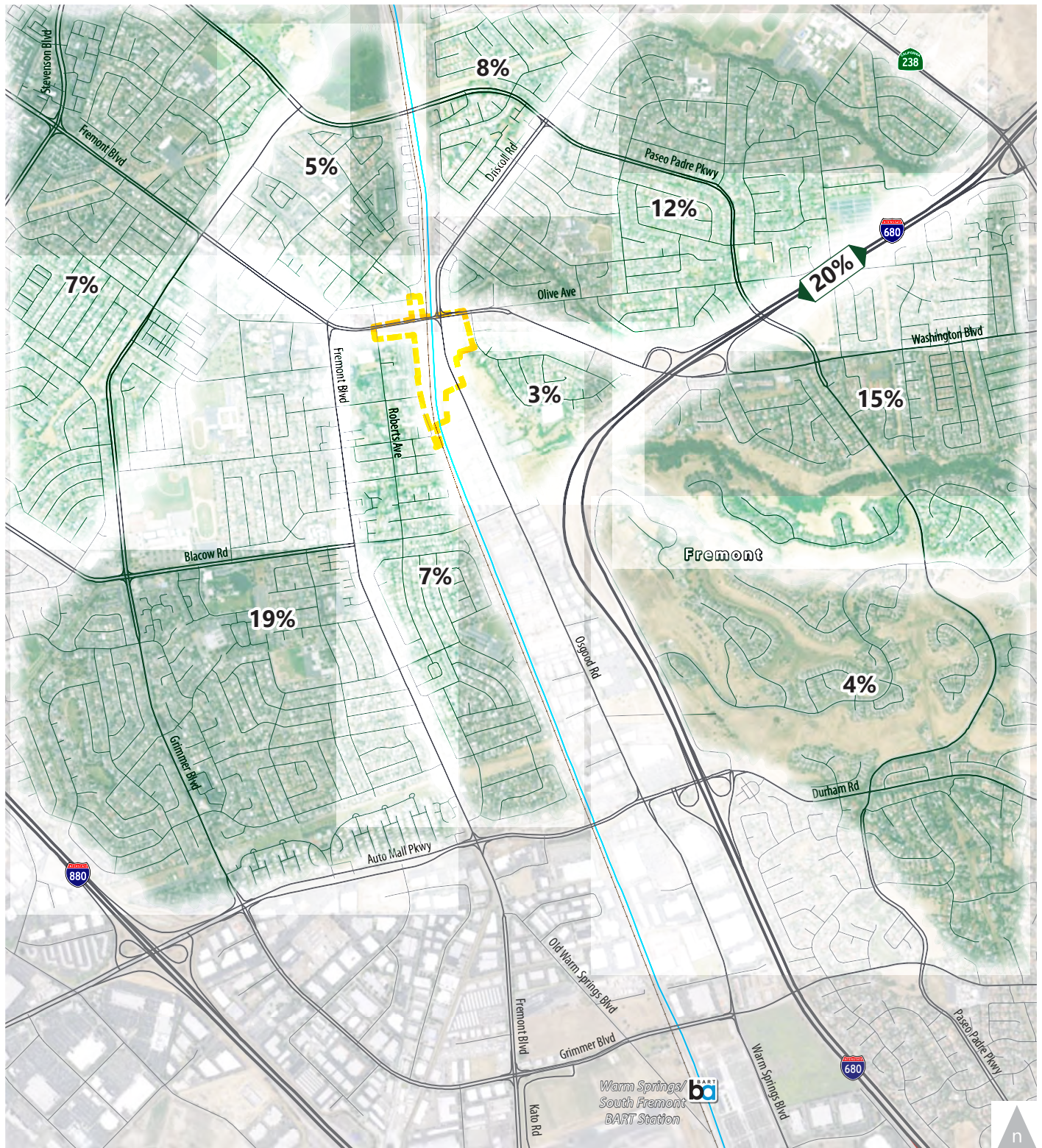
Similar to Step 2, the AM and PM peak-hour roadway segment volumes forecast by the Alameda CTC Model were used to develop turning movement forecasts at the study intersections using the Furness method. Thus, the Model accounts for the shift in traffic patterns and travel modes. **Figure 3** in **Appendix B** presents the AM and PM peak hour traffic volumes at the study intersections under 2040 Conditions for the Plus Project scenario.

3.6 2040 NO PROJECT CONDITIONS

Based on the volumes, intersection controls, and roadway configurations presented on **Figure 2** in **Appendix B**, Fehr & Peers calculated the AM and PM peak hour LOS at the study intersections under the 2040 No Project conditions. **Table 3-3** summarizes the 2040 No Project weekday AM and PM peak hour LOS at the study intersections.

In addition to the two study intersections identified under Existing Conditions, the following six intersections would also operate at LOS E or F under 2040 No Project conditions:

- The signalized Fremont Boulevard/Grimmer Boulevard intersection (#2) would operate at LOS E during the PM peak hour
- The signalized Fremont Boulevard-Union Street/Washington Boulevard/ Bay Street intersection (#3) would operate at LOS F during the AM peak hour
- The signalized Osgood Road-Driscoll Road/Washington Boulevard intersection (#5) would operate at LOS E during both AM and PM peak hours
- The signalized Fremont Boulevard/Auto Mall Parkway intersection (#12) would operate at LOS E during the AM peak hour and LOS F during the PM peak hour
- The signalized Osgood Road/Auto Mall Parkway intersection (#13) would operate at LOS F during the AM peak hour and LOS E during the PM peak hour
- The signalized Warm Springs Boulevard-Osgood Road/South Grimmer Boulevard (#16) would operate at LOS E during both AM and PM peak hours



LEGEND



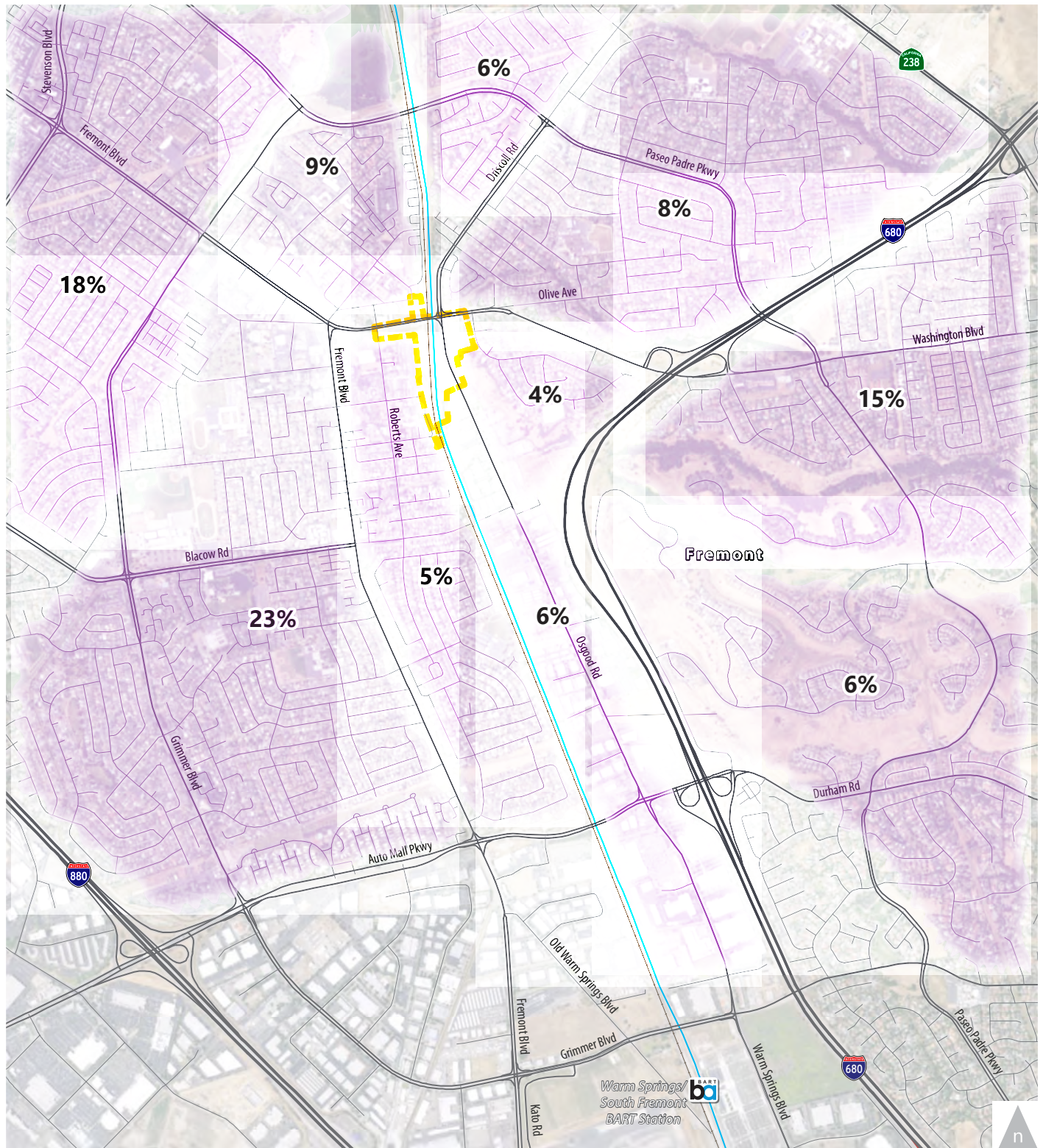
Station Site Plan Study Area



Park-and-Ride Project Trip Distribution

Figure 3-2

Park-and-Ride Trip Distribution



LEGEND



Station Site Plan Study Area



XX%

Passenger Loading Project Trip Distribution

Figure 3-3

Passenger Pick-up/Drop-off Trip Distribution



TABLE 3-3 - STUDY INTERSECTION 2040 CONDITIONS LOS SUMMARY

Intersection	Traffic Control	Peak Hour	2040 No Project		2040 Plus Project	
			Delay (Seconds) ¹	LOS ²	Delay (Seconds) ¹	LOS ²
1. Driscoll Road/Paseo Padre Parkway	Signal	AM PM	54 48	D D	53 47	D D
2. Fremont Boulevard/ Grimmer Boulevard	Signal	AM PM	39 70	D E	39 69	D E
3. Fremont Boulevard-Union Street/ Washington Boulevard/ Bay Street ³	Signal	AM PM	90 46	F D	98 51	F D
4. Roberts Avenue/ Washington Boulevard ⁴	Signal	AM PM	35 28	C C	53 55	D D
5. Osgood Road-Driscoll Road/ Washington Boulevard	Signal	AM PM	55 61	E E	56 62	E E
6. Olive Avenue/ Washington Boulevard	Side-Street Stop	AM PM	43(>120) 2(>120)	E (F) A (F)	57(>120) 3(>120)	F (F) A (F)
7. I-680 Southbound Ramps/Washington Boulevard	Signal	AM PM	40 12	D B	43 12	D B
8. I-680 Northbound Ramps/Washington Boulevard	Signal	AM PM	41 18	D B	43 17	D B
9. Paseo Padre Parkway/ Washington Boulevard	Signal	AM PM	37 38	C C	36 36	D D
10. Fremont Boulevard/ Blacow Road	Signal	AM PM	86 46	F D	90 47	F D
11. Osgood Road/ Blacow Road	Signal	AM PM	6 7	A A	5 7	A A
12. Fremont Boulevard/ Auto Mall Parkway	Signal	AM PM	76 81	E F	74 80	E E
13. Osgood Road/Auto Mall Parkway	Signal	AM PM	88 63	F E	88 63	F E
14. I-680 Southbound Ramps/Auto Mall Parkway	Signal	AM PM	20 26	C C	20 26	C C
15. I-680 Northbound Ramps-Sabercat Road/ Auto Mall Parkway-Durham Road	Signal	AM PM	44 17	D B	43 17	D B
16. Warm Springs Boulevard-Osgood Road/ South Grimmer Boulevard	Signal	AM PM	59 68	E E	59 67	E E
17. Osgood Road/North Station Entrance	Signal	AM PM	N/A	N/A	7 5	A C
18. Washington Boulevard/ Station Entrance	Side-Street Stop	AM PM	N/A	N/A	0 (20) 0 (20)	A (C) A (C)

Bold indicated intersection operating at LOS E or LOS F. **highlight** indicates significant impact.

- The delay and LOS for side-street stop-control intersections represent the average intersection (worst movement or approach); for signalized intersections, the delay and LOS represent the intersection overall.
- Delay and LOS calculated using the 2010 HCM methods unless noted.
- Delay and LOS calculated using HCM 2000 in the AM and PM peak hours due to limitations in 2010 HCM
- Delay and LOS calculated using HCM 2000 in the PM peak hour only due to limitations in 2010 HCM

Source: Fehr & Peers, 2019.



3.7 2040 PLUS PROJECT CONDITIONS

The traffic volumes for the project were forecasted as described in Section 3.5. This analysis assumes that all study intersections, except the following, would have the same configurations as current conditions. These changes are proposed as either part of the project (Station Site Plan) or the Station Area Plan to improve the pedestrian and bicycle environment in the vicinity of the station. Chapter 4 describes the benefit of these changes to pedestrians and bicyclists.

- Washington Boulevard/Roberts Avenue (#4):
 - o Stripe a left-turn lane on the southbound approach, which can be accommodated within the current right-of-way but would require prohibiting parking on both sides of the street
 - o Upgrade signal to provide protected north/south left-turn phasing
 - o Prohibit right-turn on red on the northbound Roberts Avenue approach
 - o Adjust signal timing parameters (i.e., adjust the allocation of green time for each intersection approach) and coordinate the signal timing changes with the adjacent intersections that are in the same signal coordination group
- Osgood Road-Driscoll Road/Washington Boulevard (#5):
 - o Eliminate one eastbound through lane to accommodate a separated path as part of the East Bay Greenway (EBGW) on the south side of Washington Boulevard, and remove the corresponding receiving lane on the east side of the intersection.
 - o Provide an overlap phase for the northbound Osgood Road right-turn movement
 - o Adjust signal timing parameters (i.e., adjust the allocation of green time for each intersection approach) and coordinate the signal timing changes with the adjacent intersections that are in the same signal coordination group
- Osgood Road/Blacow Road (#11) – Eliminate the slip lanes on the west side of the intersection.

In addition, the following intersections which provide automobile access for the Irvington BART Station are also included in the 2040 Plus Project condition:

- A new intersection on Osgood Road would provide access on the east side of the station. The intersection (#17) would be signalized with left-turn pockets and protected left-turn signal phasing, and crosswalks on all approaches.
- A right-in/right-out only intersection on eastbound Washington Boulevard just east of Roberts Avenue would provide access on the west side of the station (#18). The intersection would be controlled by a stop-sign on the northbound approach.

The 2040 Plus Project scenario assumes the same intersection configuration and signal timing parameters as Existing Conditions at all other study intersections.

Figure 3 in **Appendix B** presents the volumes, intersection controls, and roadway configurations for the 2040 Plus Project scenario.

Based on the volumes, intersection controls, and roadway configurations presented on **Figure 2** in **Appendix B**, Fehr & Peers calculated the AM and PM peak hour LOS at the study intersections under the 2040 Plus Project conditions. **Table 3-3** summarizes the weekday AM and PM peak hour LOS at the study intersections for the 2040 Plus Project scenario.

Eight study intersections under 2040 Plus Project conditions would operate at LOS E or F. The project would not cause a significant impact at the following five intersections because the intersections would operate at LOS E or F regardless of the project and the project would not increase the intersection delay by more than four seconds:

- Fremont Boulevard/ Grimmer Boulevard (#2)
- Osgood Road-Driscoll Road/ Washington Boulevard (#5)
- Fremont Boulevard/ Auto Mall Parkway (#12)
- Osgood Road/Auto Mall Parkway (#13)
- Warm Springs Boulevard-Osgood Road/South Grimmer Boulevard (#16)

In addition, the stop-controlled Olive Avenue approach at the Olive Avenue/Washington Boulevard intersection (#6) would operate at LOS F during both AM and PM peak hours regardless of the project. However, the intersection would not meet the peak hour signal warrant.

3.8 IMPACTS AND MITIGATIONS

As previously discussed in Section 2.3.2 of this report, the project would reduce VMT. Thus, consistent with the latest guidance provided by the Office of Planning and Research (OPR) in the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018)² and CEQA Guidelines Section 15064.3, this analysis identifies the project's impacts on transportation as less-than-significant. This report also presents an analysis of project impacts on intersection operations based on the City of Fremont's current thresholds for informational purposes.

² The OPR Technical Advisory states the following regarding the impacts of transit projects:

Transit and active transportation projects generally reduce VMT and therefore are presumed to cause a less-than-significant impact on transportation. This presumption may apply to all passenger rail projects, bus and bus rapid transit projects, and bicycle and pedestrian infrastructure projects. Streamlining transit and active transportation projects aligns with each of the three statutory goals contained in SB 743 by reducing GHG emissions, increasing multimodal transportation networks, and facilitating mixed use development.

Based on the City of Fremont's significance criteria for environmental documents, a significant impact is identified if the project would result in one of the following:

- Causes a signalized intersection to deteriorate from LOS D operations or better under No Project Conditions to LOS E or F operations under the Plus Project Conditions
- Increases the average delay by four seconds or more at a signalized intersection operating at LOS E or F regardless of the project.
- Increase total intersection volumes by five percent or more at an unsignalized intersection that meets the peak hour signal warrant under the Plus Project Conditions.

Based on the application of the above criteria, the project would result in a significant impact at two intersections. The significant impacts and mitigation measures are described below:

Impact 1: The project would cause a significant impact at the signalized Fremont Boulevard-Union Street/Washington Boulevard/Bay Street intersection (#3) because during the AM peak hour it would increase the average intersection delay by more than four seconds at an intersection that would operate at LOS E or F in 2040 regardless of the project.

Mitigation Measure 1: implementation of the following at the Fremont Boulevard-Union Street/Washington Boulevard/Bay Street intersection would reduce the impact to less than significant:

- Adjust signal timing parameters (i.e., adjust the allocation of green time for each intersection approach) and coordinate the signal timing changes with the adjacent intersections that are in the same signal coordination group

Impact 2: The project would cause a significant impact at the signalized Fremont Boulevard/Blacow Road intersection (#10) because during the AM peak hour the average intersection delay would increase by four seconds at an intersection that would operate at LOS E or F in 2040 regardless of the project.

Mitigation Measure 2: implementation of the following at the Fremont Boulevard/Blacow Road intersection would reduce the impact to less than significant:

- Adjust signal timing parameters (i.e., adjust the allocation of green time for each intersection approach) and coordinate the signal timing changes with the adjacent intersections that are in the same signal coordination group

Table 3-4 summarizes the weekday AM and PM peak hour LOS at the impacted study intersections for the project under 2040 conditions.

TABLE 3-4 - STUDY INTERSECTION 2040 PLUS PROJECT WITH MITIGATION LOS SUMMARY

Intersection	Traffic Control	Peak Hour	2040 No Project		2040 Plus Project		2040 Plus Project Mitigated	
			Delay (Seconds) ¹	LOS ²	Delay (Seconds) ¹	LOS ²	Delay (Seconds) ¹	LOS ²
3. Fremont Boulevard-Union Street/ Washington Boulevard/ Bay Street ³	Signal	AM PM	90 46	F D	98 51	F D	71 51	E D
10. Fremont Boulevard/ Blacow Road	Signal	AM PM	86 46	F D	90 47	F D	78 47	E D

Bold indicated intersection operating at LOS E or LOS F.

1. The delay and LOS for side-street stop-control intersections represent the average intersection (worst movement or approach); for signalized intersections, the delay and LOS represent the intersection overall.
2. Delay and LOS calculated using the 2010 HCM methods unless noted.
3. Delay and LOS calculated using HCM 2000 due to limitations in 2010 HCM

Source: Fehr & Peers, 2019.

4. ACTIVE ACCESS COMFORT EVALUATION

Pedestrian and bicyclist comfort is important to promote active access to the Irvington BART Station. Comfort depends on a variety of factors, and these factors differ for pedestrian and bicyclists. This chapter evaluates pedestrian and bicyclist comfort for a select number of corridors providing active access for the Irvington BART Station. The evaluation is based on the Streetscore+ methodology, which Fehr & Peers has developed to measure infrastructure quality based on attributes of the built environment that correspond to pedestrian and bicyclist perceptions of comfort. This chapter describes the Streetscore+ methodology, evaluates existing and proposed conditions on the key corridors and intersections in the station area, and quantifies the effects of the proposed pedestrian and bicycle infrastructure modifications on improving active access comfort.

4.1 STREETSCORE+ METHODOLOGY

Streetscore+ calculates comfort-based indices for active transportation to more accurately understand the impacts of design decisions on stress tolerance for people who walk and bike. Comfort for both of these users is based on a variety of factors, including pedestrian and bicycling infrastructure and the characteristics of the adjacent street. The Streetscore+ methodology compiles those variables to provide a score for each segment and intersection.

For pedestrians, Streetscore+ is calculated based on best practice guidance documentation, including the NACTO *Urban Streets Guide* and safety research. For bicyclists, Streetscore+ incorporates the Level of Traffic Stress methodology developed by Mekuria, Furth, and Nixon in the *Low Stress Bicycling and Network Connectivity* report (2012), which assesses bicyclist comfort based on roadway characteristics. For measurements of bicyclist stress, Streetscore+ enhances that methodology by including cycle track and bicycle boulevard comfort assessments consistent with the National Association of City Transportation Officials' (NACTO's) *Urban Bikeway Design Guide, 2nd Edition*.

Variables concerning street characteristics and pedestrian and bicycle infrastructure are assigned scores of 1 (lowest stress, highest comfort) through 4 (highest stress, lowest comfort). The overall score of the segment is equivalent to the worst-performing individual variable. If one variable scores a 4, for example, the segment as a whole will score a 4, regardless of the other variables. This weakest link approach accounts for the important role of intersections and gaps in the pedestrian and bicyclist environments.

The interpretation of the 1-4 scale is as follows:

- **Streetscore+ 1**

- o Pedestrians: Highly comfortable, pedestrian-friendly, and easily navigable for pedestrians of all ages and abilities, including seniors or school-aged children walking unaccompanied to school. These streets provide an ideal pedestrian-friendly environment.
- o Bicyclists: The lowest level of traffic stress and the design goal for a network that truly accommodates people of all ages and abilities. This level of traffic stress would allow children trained in traffic safety to bicycle to school by themselves as well as people “interested but concerned” about bicycling.

- **Streetscore+ 2**

- o Pedestrians: Generally comfortable for many pedestrians, but parents may not feel comfortable with children walking alone. Seniors may have concerns about the walking environment and take more caution. These streets may be part of a pedestrian-friendly environment where it intersects with a more auto-oriented roadway or other environmental constraints.
- o Bicyclists: The highest level of acceptable traffic stress that the mainstream adult population will tolerate while still feeling safe. This is the threshold for a “low traffic stress” bicycle network that truly accommodates people of all ages and abilities.

- **Streetscore+ 3**

- o Pedestrians: Walking is uncomfortable but possible. Minimum sidewalk and crossing facilities may be present, but barriers are present that make the walking experience uninviting and uncomfortable.
- o Bicyclists: This level of traffic stress accommodates a much smaller segment of population—“enthused and confident”—who are excited and more familiar with biking and will therefore accept a higher level of traffic stress.

- **Streetscore+ 4**

- o Pedestrians: There are barriers that prevent walking and is very uncomfortable or even impossible. Streets have limited or no accommodation for pedestrians and are inhospitable and possibly unsafe environment for pedestrians.
- o Bicyclists: This is a very high level of traffic stress that will be tolerated only by a very small percentage of the population—those characterized as “strong and fearless.” These roadways have high speed limits, multiple travel lanes, limited or non-existent bike lanes and signage, and large distances to cross at intersections.

Pedestrian Streetscore+ link criteria are presented in **Table 4-1**. Bicyclist Streetscore+ criteria vary depending on the type of bicycling infrastructure present, based on prevailing speed, number of travel

lanes, presence of on-street parking, bicycle lane presence and width, buffer specifications, and other factors.

TABLE 4-1 – STREETSCORE+ CRITERIA SIDEWALKS IN URBANIZED AREAS

Criteria	Streetscore+ 1	Streetscore+ 2	Streetscore+ 3	Streetscore+ 4
Usable Sidewalk Width	>=8 feet	7 to 6 feet	<6 feet	No Sidewalk
Sidewalk Quality	Even, Smooth Surface			Cracks, Failing Pavement
Sidewalk Accessibility	Driveway Curb Cuts Out of the Sidewalk Zone		Frequent Driveway Curb Cuts into the Sidewalk Zone	
Landscape Buffer and Street Trees	Yes, Continuous	Yes, Discontinuous ¹	No Landscaping	
# of Lanes	2-3	4-5	6+	
Prevailing Speed	<=25 mph	26- 30 mph	31-35 mph	>=36 mph
Lighting	Pedestrian-Scale	Roadway Lighting		No Lighting ²
Heavy Vehicle	<=5%	5-8% with no buffer OR >8% with buffer		>8% with no buffer
Crosswalk Frequency ³	Crosswalks Spaced 400 feet or Less		Crosswalks Spaced > 400 feet	

1. Discontinuous is defined as not having a consistent effect on street life. Regularly spaced street trees may still feel like a "continuous" buffer and should receive a score of 1.
2. No lighting also includes ineffective roadway lighting.
3. In urbanized areas where pedestrians are expected, crosswalk frequency should be considered where there is demand based on land use and densities. As a general rule of thumb, consider marking a crosswalk if 20 pedestrians in a given hour may cross at that location.

Source: Fehr & Peers, 2018.

4.2 EXISTING CONDITIONS

Table 4-2 presents the Streetscore+ comfort analysis for pedestrians and bicyclists on three key street segments in the study area. These study segments are shown on **Figure 4-1**. The variables that must be addressed to improve the score are listed as "limiting factors." With the exception of bicycling on the narrow, more residential streets to the northwest of the station area and on Roberts Avenue, the studied street segments are currently unpleasant for both pedestrians and bicyclists, and present barriers to comfortable navigation.

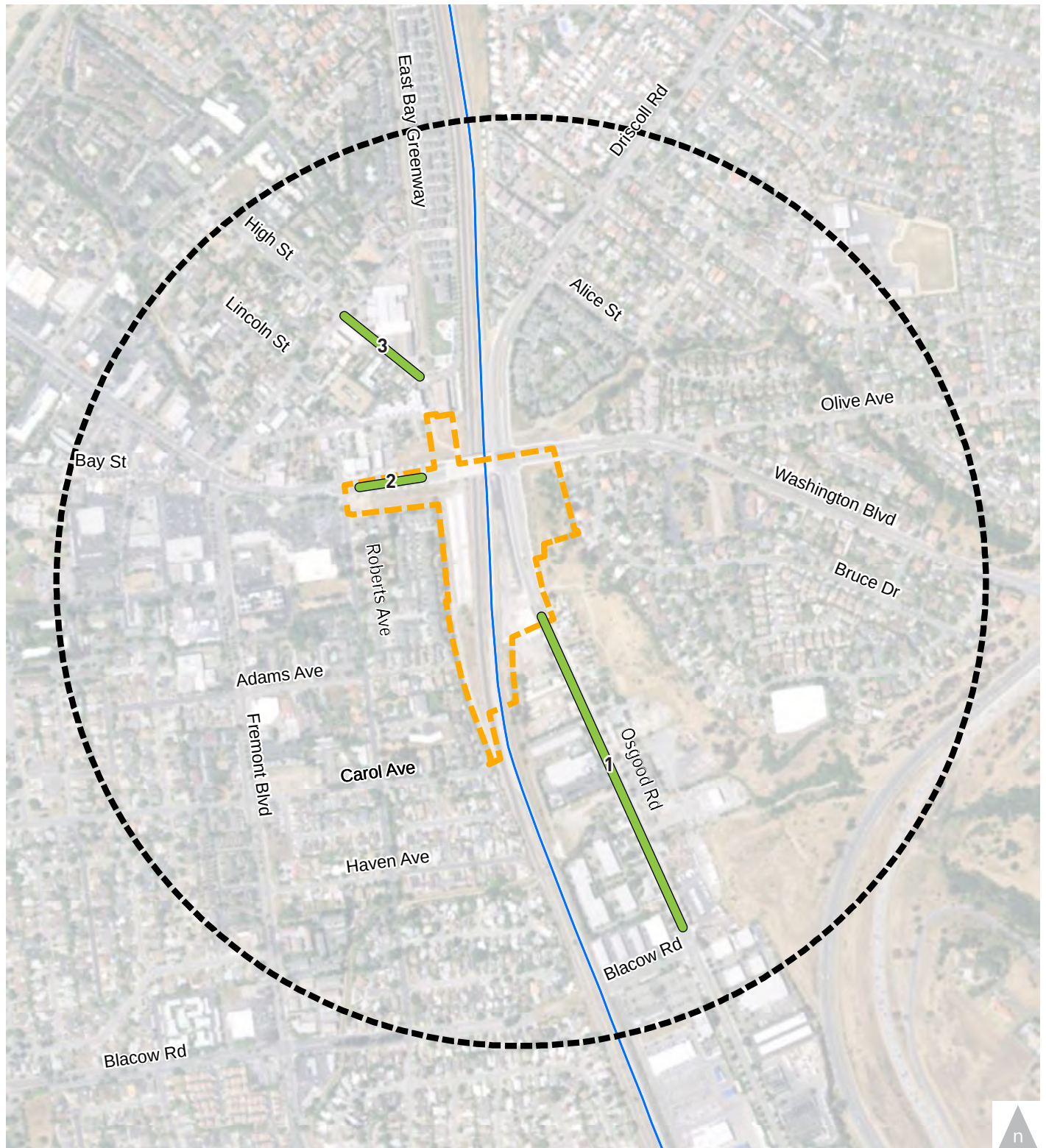


TABLE 4-2 – EXISTING CONDITIONS STREETSCORE+ SEGMENT SUMMARY

#	Segment	Streetscore+		Limiting Factors
		Ped	Bike	
1	Osgood Road, south of the BART Entrance	4	4	Pedestrian: vehicle speed. Bicycle: vehicle speed.
2	Washington Boulevard, at the BART Entrance	4	3	Pedestrian: number of adjacent vehicle travel lanes. Bicycle: vehicle speed, number of adjacent vehicle travel lanes.
3	Main Street/High Street, at the BART Entrance	4	1	Pedestrian: sidewalk gaps. Bicycle: none.

Source: Fehr & Peers, 2019.

Osgood Road (segment 1) presents a very stressful environment for both bicyclists and pedestrians due to the high posted speed limit of 40 mph. On Washington Boulevard (segments 2), the combination of a relatively high posted speed limit of 35 mph and a large number of travel lanes (six at the BART entrance) make bicycling in an Class II bike lane a stressful and unpleasant experience for most bicyclists. This segment also has a low pedestrian score due to the large number of travel lanes and long distance between crosswalks. Main and High Streets to the northwest of the station (segment 3) are relatively narrow and friendly to bicyclists but have some sidewalk discontinuities that force pedestrians to walk in the street instead of on the sidewalk. These discontinuities negate what would otherwise be a pedestrian-friendly area with low speeds and moderate traffic.



LEGEND

- Station Site Plan Study Area # Streetscore+ Study Segment
- 1/2-Mile Radius/TOD Overlay BART Tracks



Figure 4-1

4.3 PROPOSED CONDITIONS

The consultant team developed recommended changes to the street design and infrastructure along the study segments with the goal of improving pedestrian and bicycle comfort. In developing these recommendations, the team assumed that the City could complete sidewalk gaps on High and Main Streets. **Section 4.3.1** identifies additional potential changes that would improve pedestrian and bicyclist conditions further.

Table 4-3 identifies the proposed changes for the three study segments and the resulting Streetscore+. The traffic operations analysis presented in Chapter 3 of this report accounts for these proposed changes. Overall, these proposed changes would result in the following improvements:

- The pedestrian Streetscore+ would improve for two of the three segments.
- The bicycle Streetscore+ would improve for two of the three segments. One of the segments (segment 3) has an existing bicycle Streetscore+ of 1.

TABLE 4-3 – PROPOSED CONDITIONS STREETSCORE+ SEGMENT SUMMARY

#	Street	Existing Streetscore+		Proposed Changes	Proposed Streetscore+		Limiting Factors under Proposed Conditions
		Ped	Bike		Ped	Bike	
1	Osgood Road, south of the BART Entrance	4	4	Reduce vehicle speeds to 35 mph after narrowing lanes. Implement EBGW and add consistent landscaping adjacent to sidewalks.	3	2*	Pedestrian: Adjacent vehicle speed, crosswalk spacing. Bicycle: Lack of furnished buffer zone, adjacent vehicle speed.
2	Washington Boulevard, at the BART Entrance	4	3	Remove one through vehicle lane to implement EBGW. Add pedestrian-scale lighting.	4	2	Pedestrian: number of adjacent vehicle travel lanes. Bicycle: Lack of furnished buffer zone, adjacent vehicle speed.
3	Main Street/High Street, at the BART Entrance	4	1	Complete sidewalk.	2	1	Pedestrian: Sidewalk width, lack of landscaped buffer, lack of pedestrian-scale lighting. Bicycle: none.

*Assumes completion of the East Bay Greenway south of the station site.
Source: Fehr & Peers, 2019.



APPENDIX A: TIME OF DAY RIDERSHIP AND ACCESS MODE FORECASTS



Boardings

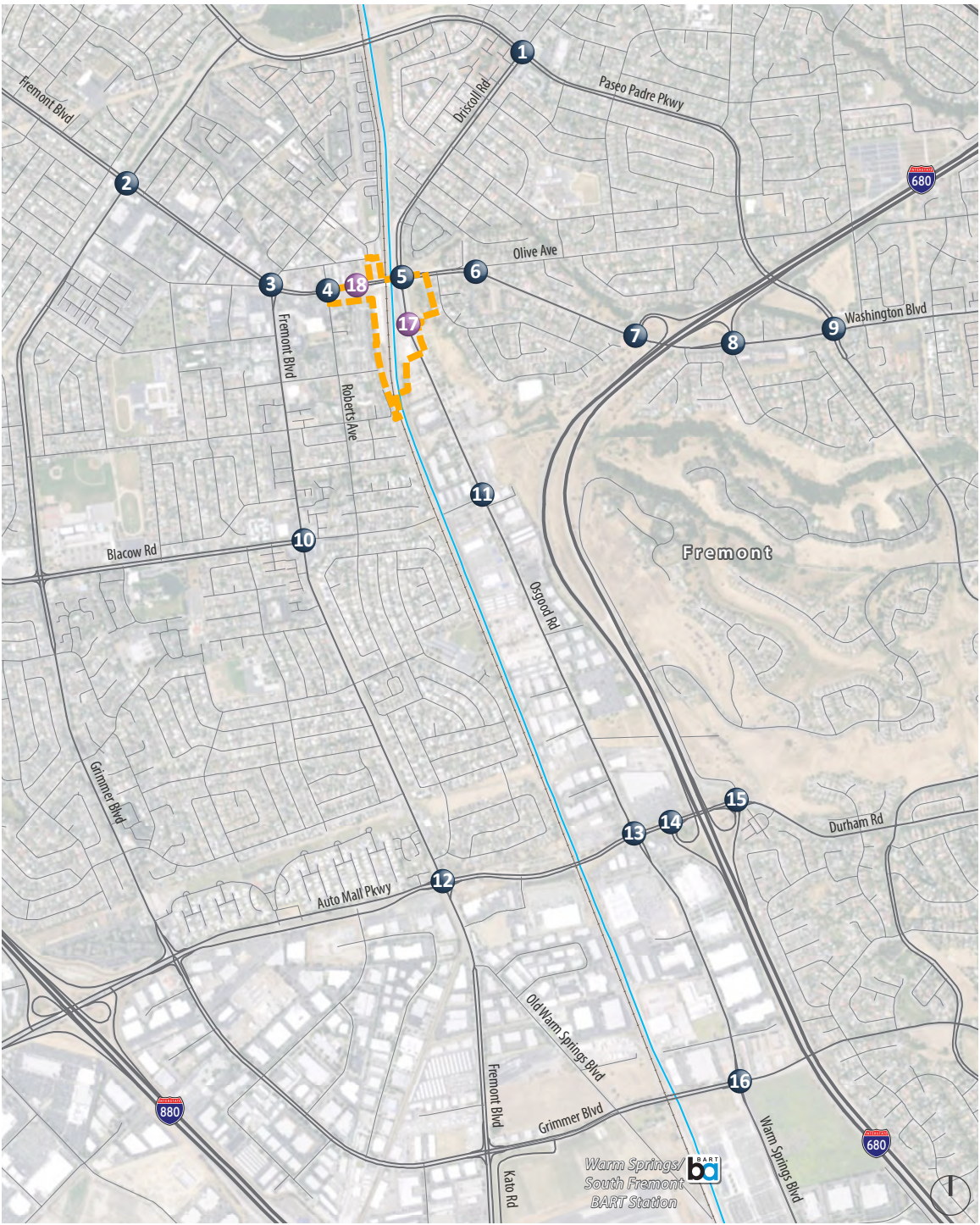
Time Period	Walk/Bike	Transit	Passenger Loading	PNR	Total
Early AM (3:30 AM – 6:29 AM)	60	0	30	190	280
AM Pre (6:30 AM – 7:29 AM)	130	70	90	110	400
AM Peak (7:30 AM – 8:29 AM)	300	150	190	20	660
AM Post (8:30 AM – 9:29 AM)	200	90	110	20	420
Midday (9:30 AM – 3:59 PM)	610	240	230	0	1,080
PM Pre (4:00 PM – 4:59 PM)	60	30	40	60	190
PM Peak (5:00 PM – 5:59 PM)	80	20	40	60	200
PM Post (6:00 PM – 6:59 PM)	50	20	30	50	150
Eve (7:00 PM – 1:59 AM)	110	20	130	40	300
Total	1,600	640	890	550	3,680
Mode Percent of Total	43%	17%	24%	15%	100%

Alightings

Time Period	Walk/Bike	Transit	Passenger Loading	PNR	Total
Early AM (3:30 AM – 6:59 AM)	30	30	30	10	100
AM Pre (7:00 AM – 7:59 AM)	50	60	30	10	150
AM Peak (8:00 AM – 8:59 AM)	80	70	30	10	190
AM Post (9:00 AM – 9:59 AM)	50	40	30	10	130
Midday (10:00 AM – 4:29 PM)	480	220	210	130	1,040
PM Pre (4:30 PM – 5:29 PM)	200	70	130	100	500
PM Peak (5:30 PM – 6:29 PM)	240	70	170	140	620
PM Post (6:30 PM – 7:29 PM)	170	40	100	50	360
Eve (7:30 PM – 1:59 AM)	300	60	180	70	610
Total	1,600	660	910	530	3,700
Mode Percent of Total	43%	18%	25%	14%	100%

APPENDIX B: VOLUME FIGURES



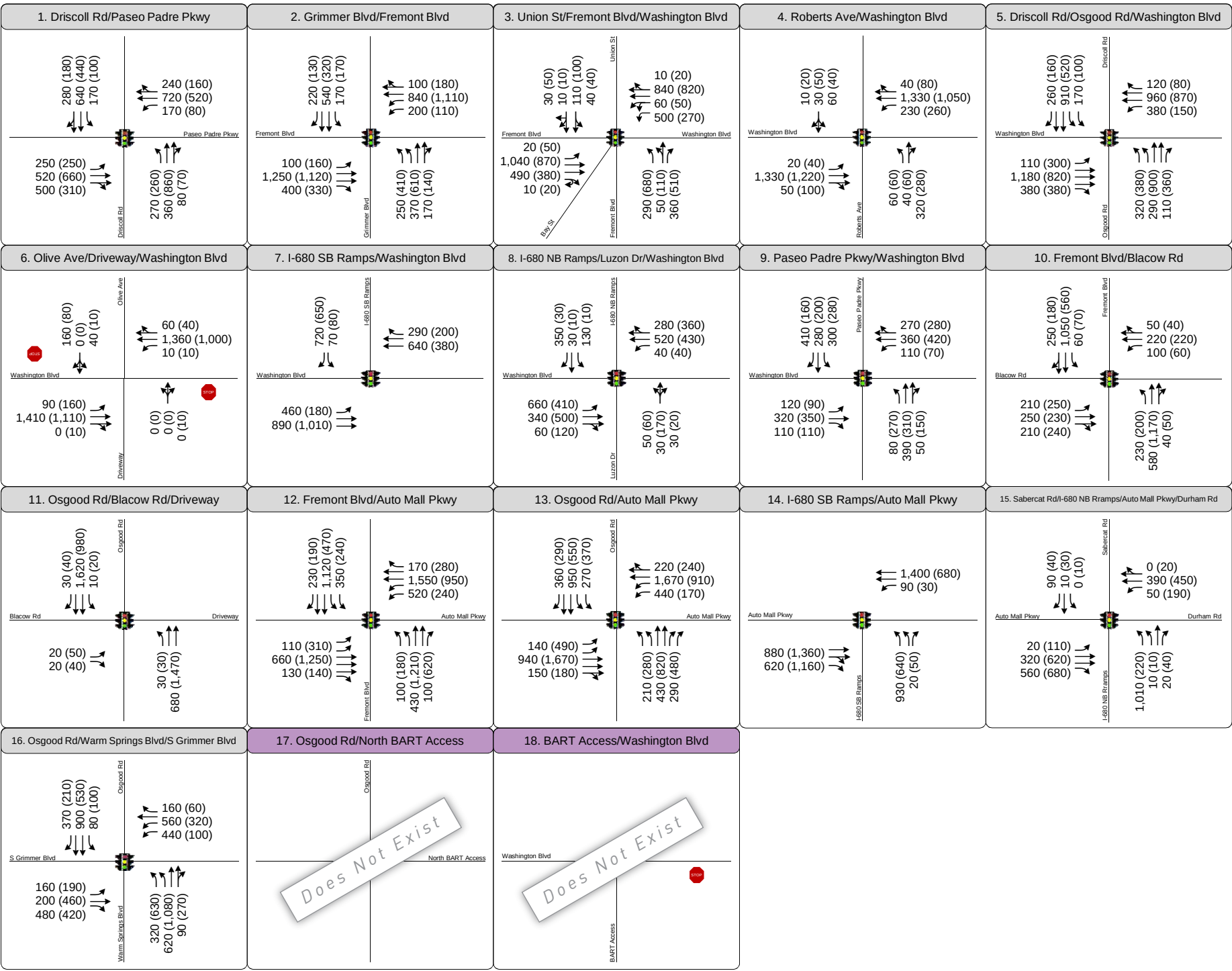
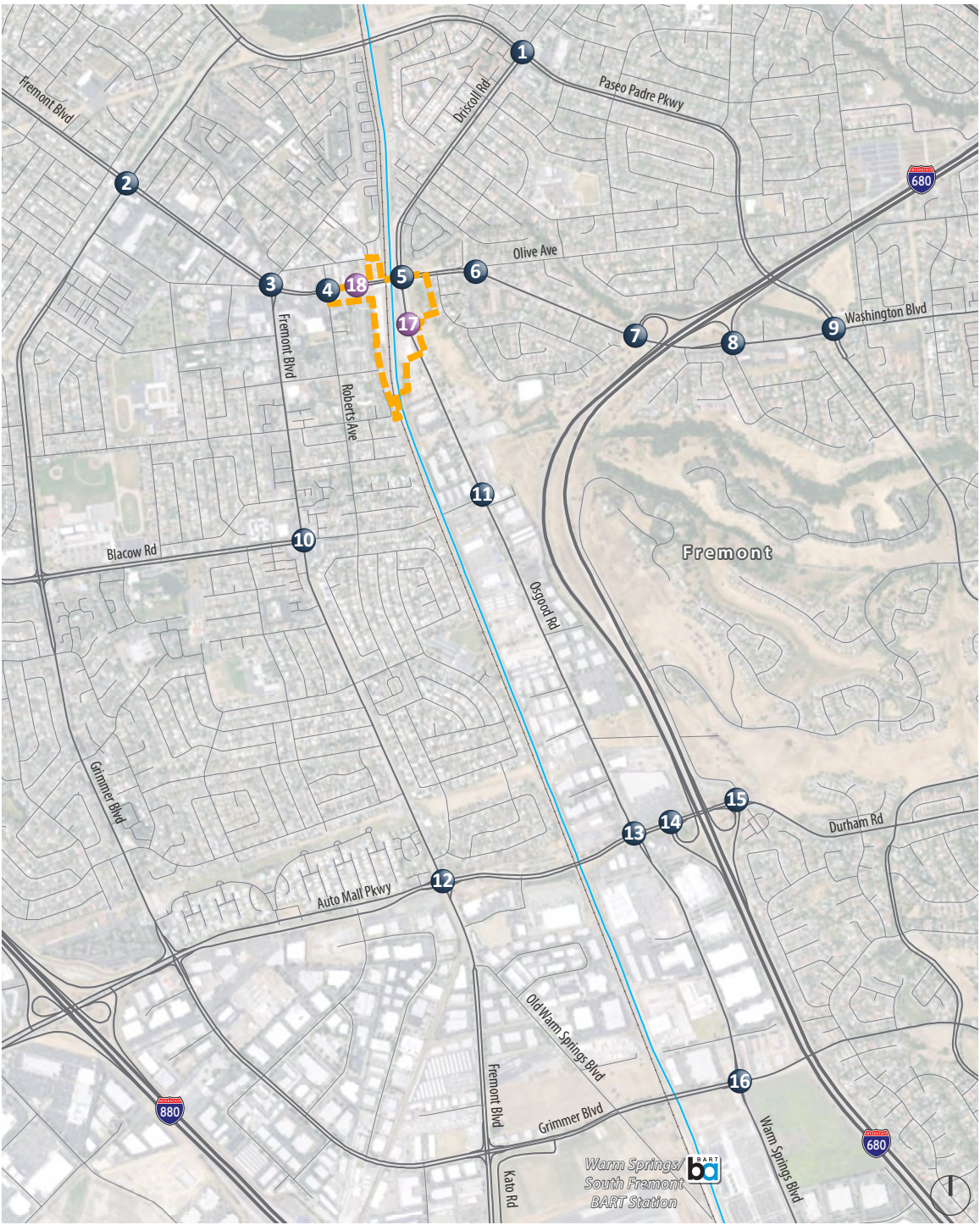


1. Driscoll Rd/Paseo Padre Pkwy 222 (112) 608 (250) 157 (69) 156 (204) 516 (528) 371 (200) 216 (144) 641 (479) 158 (65) 196 (214) 259 (794) 70 (55)	2. Grimmer Blvd/Fremont Blvd 206 (115) 400 (271) 133 (119) 84 (141) 1,227 (888) 372 (318) 232 (390) 321 (519) 113 (103)	3. Union St/Fremont Blvd/Washington Blvd 24 (42) 4 (0) 90 (73) 33 (35) 15 (39) 1,005 (690) 405 (243) 5 (0) 6 (11) 783 (773) 49 (35) 321 (203) 210 (483) 26 (90) 243 (346)	4. Roberts Ave/Washington Blvd 6 (20) 25 (42) 54 (31) 12 (26) 1,202 (911) 30 (68) 37 (75) 1,098 (942) 202 (250) 49 (56) 32 (59) 305 (264)	5. Driscoll Rd/Osgood Rd/Washington Blvd 230 (147) 770 (238) 154 (90) 96 (247) 1,091 (717) 329 (220) 113 (65) 903 (820) 354 (101) 153 (315) 99 (840) 40 (345)
6. Olive Ave/Driveway/Washington Blvd 144 (61) 0 (0) 24 (10) 64 (137) 1,284 (1,009) 0 (1) 56 (32) 1,264 (887) 4 (8) 0 (0) 0 (0) 0 (2)	7. I-680 SB Ramps/Washington Blvd 633 (555) 47 (52) 273 (137) 602 (350) 370 (154) 844 (943)	8. I-680 NB Ramps/Luzon Dr/Washington Blvd 297 (15) 11 (5) 109 (4) 602 (371) 326 (467) 50 (91) 191 (344) 502 (378) 29 (34) 44 (50) 27 (156) 27 (11)	9. Paseo Padre Pkwy/Washington Blvd 359 (138) 268 (132) 281 (223) 114 (79) 296 (334) 91 (99) 256 (266) 326 (392) 108 (60) 52 (262) 329 (285) 44 (138)	10. Fremont Blvd/Blacow Rd 159 (164) 851 (326) 45 (51) 161 (195) 232 (211) 169 (185) 44 (28) 175 (195) 87 (43) 132 (193) 426 (851) 36 (50)
11. Osgood Rd/Blacow Rd/Driveway 21 (32) 1,406 (512) 2 (8) 13 (38) 5 (26) 14 (20) 249 (1,402)	12. Fremont Blvd/Auto Mall Pkwy 200 (139) 945 (247) 320 (175) 90 (275) 628 (1,119) 99 (75) 105 (231) 1,189 (806) 353 (152) 70 (132) 288 (902) 73 (480)	13. Osgood Rd/Auto Mall Pkwy 303 (229) 801 (252) 220 (227) 115 (456) 870 (1,382) 140 (132) 123 (223) 1,269 (747) 263 (139) 71 (222) 127 (777) 90 (333)	14. I-680 SB Ramps/Auto Mall Pkwy 1,099 (640) 58 (26) 628 (1,176) 535 (719) 651 (499) 8 (40)	15. Sabercat Rd/I-680 NB Ramps/Auto Mall Pkwy/Durham Rd 70 (36) 5 (24) 0 (1) 15 (96) 250 (474) 369 (668) 0 (12) 342 (436) 39 (186) 735 (194) 1 (5) 17 (29)
16. Osgood Rd/Warm Springs Blvd/S Grimmer Blvd 309 (131) 607 (273) 44 (50) 97 (149) 154 (343) 428 (345) 42 (31) 386 (181) 238 (48) 184 (516) 142 (874) 36 (204)	17. Osgood Rd/North BART Access Does Not Exist	18. BART Access/Washington Blvd Does Not Exist		

XX (YY) AM (PM) Peak Hour Traffic Volumes
 Signalized Intersection
 Stop Sign
 Station Site Plan Study Area
 Study Intersection
 Future Study Intersection

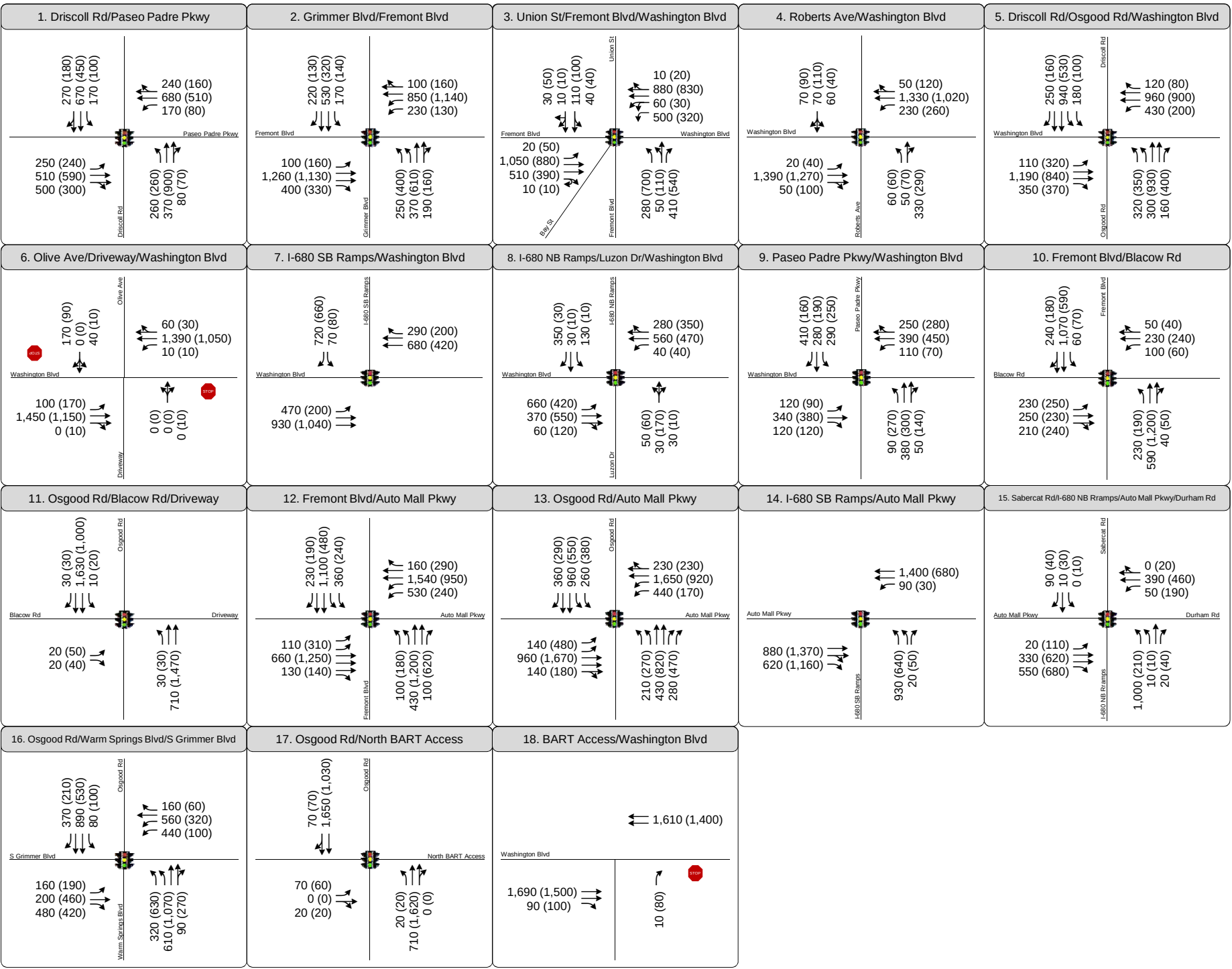
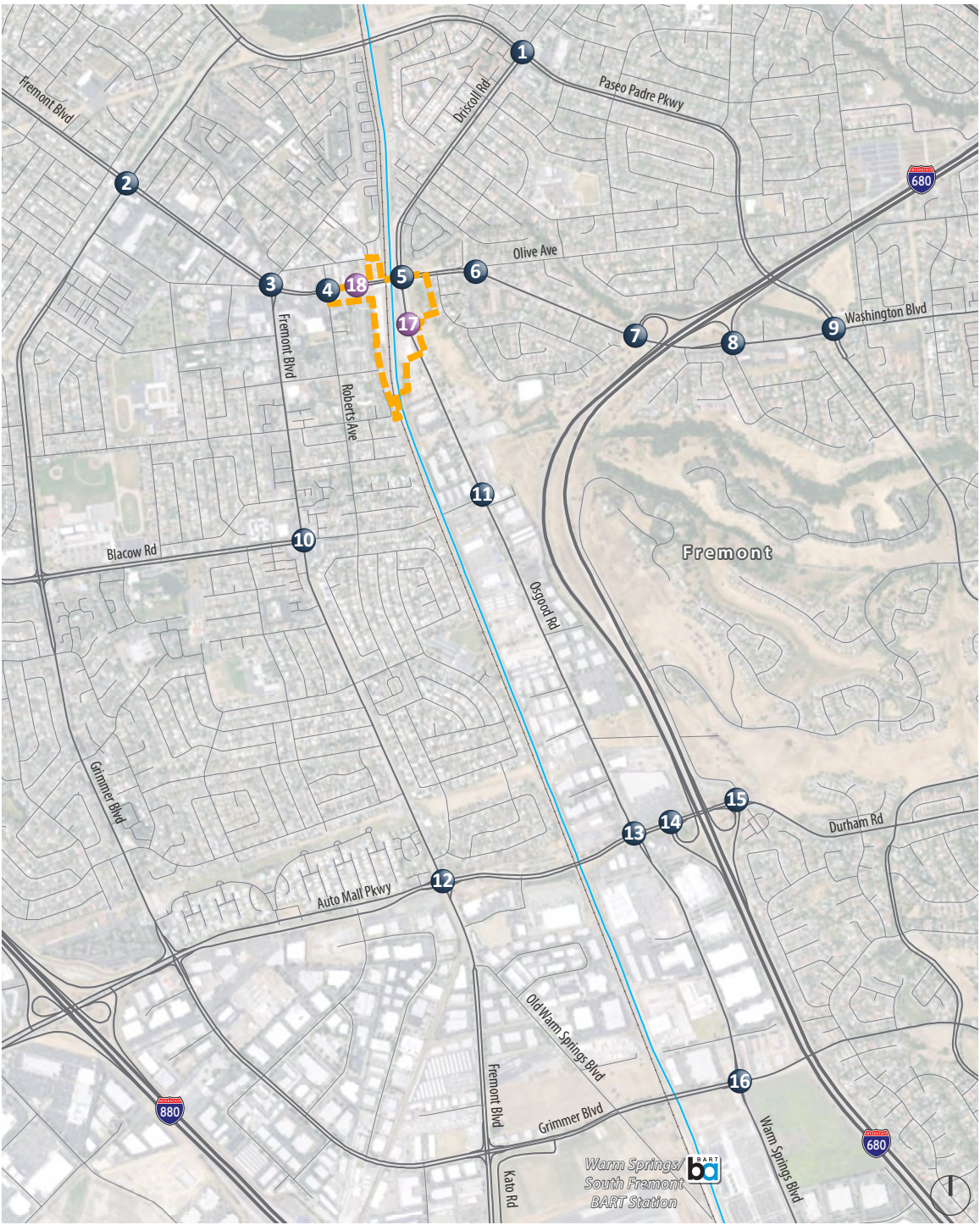


Figure 1
 Existing Peak Hour
 Intersection Traffic Volumes, Lane Configurations and Traffic Controls
 July 2019



XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign
 Station Site Plan Study Area Study Intersection Future Study Intersection





XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign

Station Site Plan Study Area

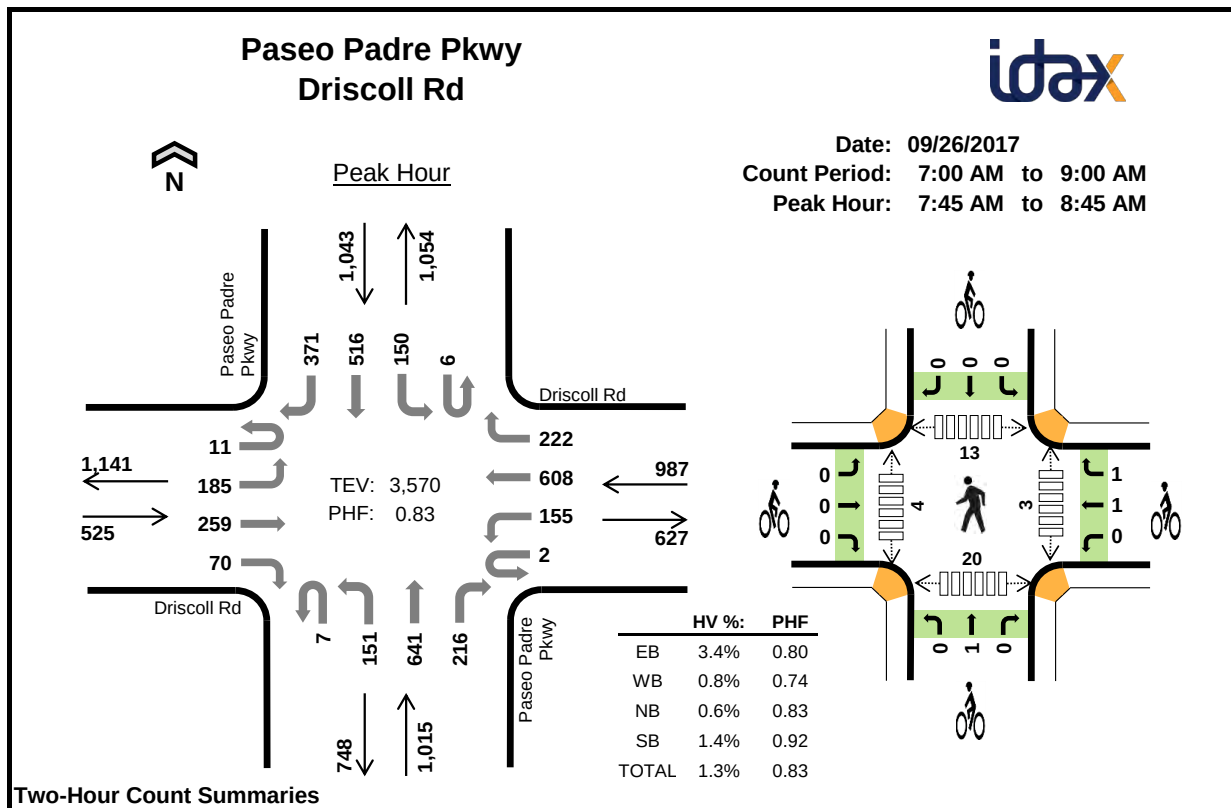
Study Intersection

Future Study Intersection



APPENDIX C: 2017 INTERSECTION COUNT DATA





Interval Start		Driscoll Rd				Driscoll Rd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	15	39	1	1	7	85	24	0	9	50	20	0	27	72	35	385	0
7:15 AM		1	26	25	5	0	10	112	36	0	11	74	10	0	30	93	50	483	0
7:30 AM		2	27	54	22	0	5	112	40	0	18	115	22	0	42	168	39	666	0
7:45 AM		0	38	82	19	1	46	149	58	1	37	173	87	3	49	161	70	974	2,508
8:00 AM		3	42	94	26	0	67	201	66	3	36	155	110	0	43	133	102	1,081	3,204
8:15 AM		4	60	59	19	0	22	113	53	2	45	165	12	2	29	108	103	796	3,517
8:30 AM		4	45	24	6	1	20	145	45	1	33	148	7	1	29	114	96	719	3,570
8:45 AM		0	39	32	3	0	6	129	25	0	11	106	4	2	29	100	71	557	3,153
Count Total		14	292	409	101	3	183	1,046	347	7	200	986	272	8	278	949	566	5,661	0
Peak Hour	All	11	185	259	70	2	155	608	222	7	151	641	216	6	150	516	371	3,570	0
	HV	0	8	6	4	0	1	5	2	0	1	5	0	0	1	10	4	47	0
	HV%	0%	4%	2%	6%	0%	1%	1%	1%	0%	1%	1%	0%	0%	1%	2%	1%	1%	0

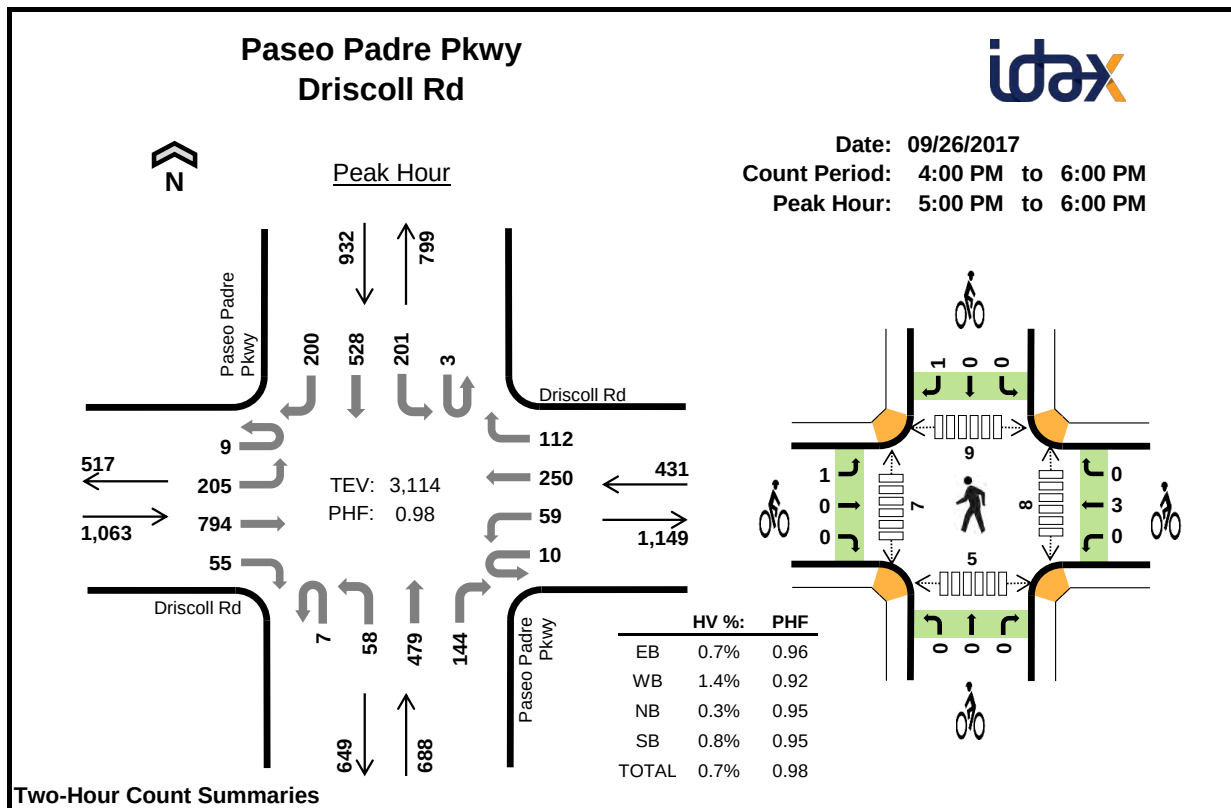
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	1	7	8	0	2	1	0	3	1	1	0	1	3
7:15 AM	2	2	1	1	6	0	1	0	2	3	1	0	1	4	6
7:30 AM	1	1	4	3	9	0	2	0	0	2	1	1	1	10	13
7:45 AM	4	0	0	4	8	0	1	0	0	1	1	4	3	14	22
8:00 AM	9	1	3	3	16	0	0	1	0	1	2	0	2	4	8
8:15 AM	3	5	2	3	13	0	0	0	0	0	0	0	2	0	2
8:30 AM	2	2	1	5	10	0	1	0	0	1	0	0	6	2	8
8:45 AM	0	3	2	4	9	0	0	0	0	0	5	0	0	4	9
Count Total	21	14	14	30	79	0	7	2	2	11	11	6	15	39	71
Peak Hour	18	8	6	15	47	0	2	1	0	3	3	4	13	20	40

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Driscoll Rd				Driscoll Rd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	6	0	8	0
7:15 AM	0	1	0	1	0	0	1	1	0	0	1	0	0	1	0	0	6	0
7:30 AM	0	0	1	0	0	1	0	0	0	1	1	2	0	0	3	0	9	0
7:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	1	1	2	8	31
8:00 AM	0	2	5	2	0	1	0	0	0	1	2	0	0	0	1	2	16	39
8:15 AM	0	2	1	0	0	0	3	2	0	0	2	0	0	0	3	0	13	46
8:30 AM	0	2	0	0	0	0	2	0	0	0	1	0	0	0	5	0	10	47
8:45 AM	0	0	0	0	0	0	3	0	0	1	1	0	0	1	3	0	9	48
Count Total	0	9	7	5	0	2	9	3	0	3	9	2	0	4	22	4	79	0
Peak Hour	0	8	6	4	0	1	5	2	0	1	5	0	0	1	10	4	47	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Driscoll Rd			Driscoll Rd			Paseo Padre Pkwy			Paseo Padre Pkwy			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	0	0	0	2	0	0	0	1	0	0	0	3	0				
7:15 AM	0	0	0	0	1	0	0	0	0	0	1	1	3	0				
7:30 AM	0	0	0	0	1	1	0	0	0	0	0	0	2	0				
7:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	9				
8:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	7				
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4				
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	3				
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2				
Count Total	0	0	0	0	5	2	0	1	1	0	1	1	11	0				
Peak Hour	0	0	0	0	1	1	0	1	0	0	0	0	3	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Driscoll Rd				Driscoll Rd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
	4:00 PM	1	51	165	9	2	7	47	19	3	8	107	28	0	57	113	45	662	0
	4:15 PM	2	25	141	11	2	12	57	19	3	18	96	37	0	49	131	54	657	0
	4:30 PM	1	41	195	9	0	13	58	25	1	10	104	36	0	51	111	52	707	0
	4:45 PM	2	48	184	12	0	15	53	28	2	13	107	30	0	49	106	44	693	2,719
	5:00 PM	3	44	197	11	4	11	52	31	1	11	119	30	0	51	127	50	742	2,799
	5:15 PM	1	50	194	14	2	20	62	23	2	19	123	37	0	46	136	62	791	2,933
	5:30 PM	2	61	205	10	2	13	69	25	3	12	120	41	1	47	140	43	794	3,020
	5:45 PM	3	50	198	20	2	15	67	33	1	16	117	36	2	57	125	45	787	3,114
Count Total		15	370	1,479	96	14	106	465	203	16	107	893	275	3	407	989	395	5,833	0
Peak Hour	All	9	205	794	55	10	59	250	112	7	58	479	144	3	201	528	200	3,114	0
	HV	0	0	7	0	0	0	4	2	0	0	2	0	0	2	1	4	22	0
	HV%	0%	0%	1%	0%	0%	0%	2%	2%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0

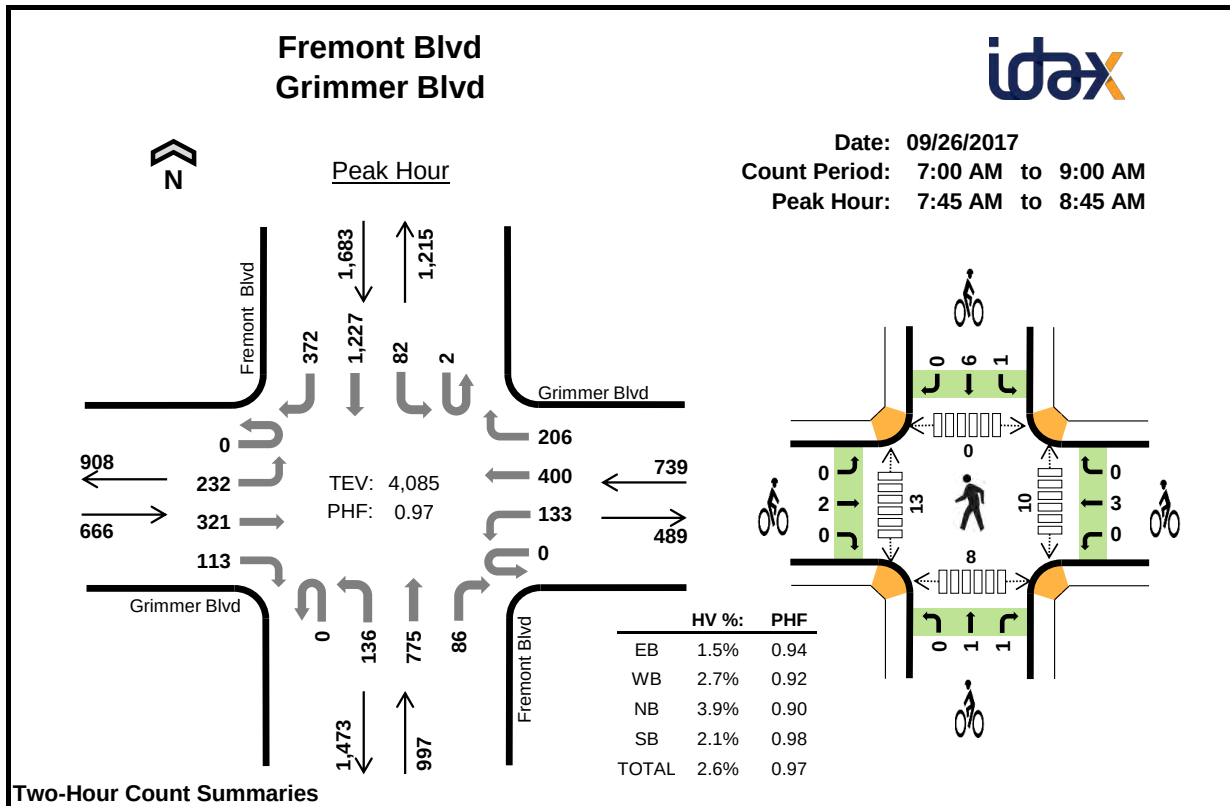
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	7	1	1	0	9	0	0	0	0	0	2	2	3	6	13
4:15 PM	3	4	2	5	14	0	0	0	0	0	0	0	1	4	5
4:30 PM	1	0	1	4	6	0	0	0	0	0	2	1	2	1	6
4:45 PM	5	1	1	2	9	0	0	0	0	0	2	0	0	0	2
5:00 PM	5	2	0	4	11	0	1	0	0	1	0	0	0	0	0
5:15 PM	0	0	1	1	2	0	0	0	0	0	3	1	4	2	10
5:30 PM	2	1	0	1	4	0	0	0	1	1	1	0	2	1	4
5:45 PM	0	3	1	1	5	1	2	0	0	3	4	6	3	2	15
Count Total	23	12	7	18	60	1	3	0	1	5	14	10	15	16	55
Peak Hour	7	6	2	7	22	1	3	0	1	5	8	7	9	5	29

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Driscoll Rd				Driscoll Rd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	5	0	0	0	1	0	0	0	1	0	0	0	0	0	9	0
4:15 PM	0	0	2	1	0	1	3	0	0	0	1	1	0	0	5	0	14	0
4:30 PM	0	0	1	0	0	0	0	0	0	1	0	0	0	1	3	0	6	0
4:45 PM	0	0	5	0	0	0	1	0	0	0	1	0	0	0	1	1	9	38
5:00 PM	0	0	5	0	0	0	2	0	0	0	0	0	0	1	0	3	11	40
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	28
5:30 PM	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	1	4	26
5:45 PM	0	0	0	0	0	0	2	1	0	0	1	0	0	1	0	0	5	22
Count Total	0	2	20	1	0	1	9	2	0	1	5	1	0	3	10	5	60	0
Peak Hour	0	0	7	0	0	0	4	2	0	0	2	0	0	2	1	4	22	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Driscoll Rd			Driscoll Rd			Paseo Padre Pkwy			Paseo Padre Pkwy			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
5:45 PM	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	5
Count Total	1	0	0	0	0	3	0	0	0	0	0	0	0	0	1	5	0
Peak Hour	1	0	0	0	0	3	0	0	0	0	0	0	0	0	1	5	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

**Two-Hour Count Summaries**

Interval Start		Grimmer Blvd				Grimmer Blvd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	21	42	9	0	8	41	26	0	6	135	11	0	12	166	52	529	0
7:15 AM		0	31	46	16	0	33	90	37	0	16	122	7	1	12	208	69	688	0
7:30 AM		0	48	71	29	0	23	89	63	0	30	219	12	0	13	285	95	977	0
7:45 AM		0	56	88	34	0	35	111	49	0	43	217	17	0	19	286	100	1,055	3,249
8:00 AM		0	64	75	32	0	31	112	57	0	44	176	27	0	28	303	90	1,039	3,759
8:15 AM		0	57	73	21	0	33	86	61	0	27	180	22	0	15	317	96	988	4,059
8:30 AM		0	55	85	26	0	34	91	39	0	22	202	20	2	20	321	86	1,003	4,085
8:45 AM		1	43	67	20	0	40	89	49	0	22	202	28	0	8	330	86	985	4,015
Count Total		1	375	547	187	0	237	709	381	0	210	1,453	144	3	127	2,216	674	7,264	0
Peak Hour	All	0	232	321	113	0	133	400	206	0	136	775	86	2	82	1,227	372	4,085	0
	HV	0	3	6	1	0	2	13	5	0	5	29	5	0	1	32	3	105	0
	HV%	-	1%	2%	1%	-	2%	3%	2%	-	4%	4%	6%	0%	1%	3%	1%	3%	0

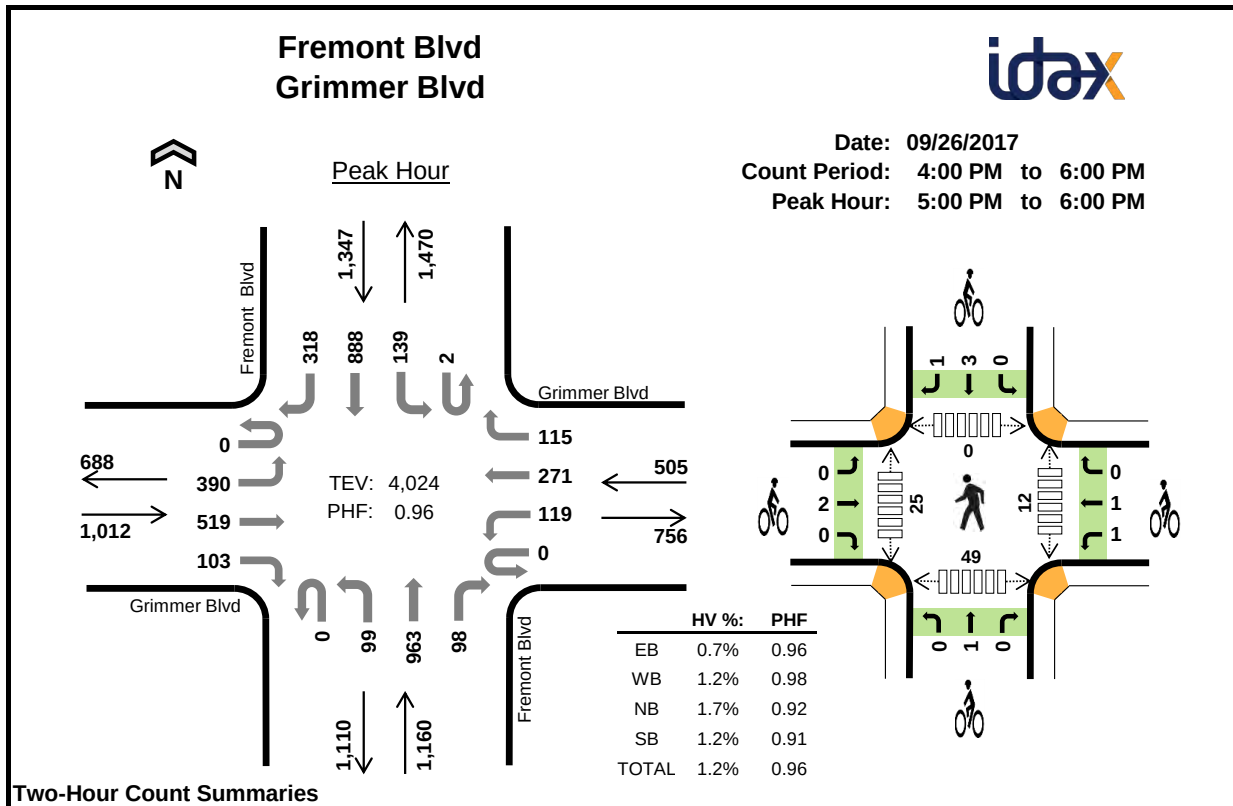
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	11	1	6	8	26	0	1	1	4	6	1	4	0	3	8
7:15 AM	3	4	6	7	20	0	3	0	2	5	2	3	0	2	7
7:30 AM	5	3	14	6	28	0	1	0	2	3	1	2	0	5	8
7:45 AM	3	3	8	8	22	1	2	0	2	5	2	1	0	3	6
8:00 AM	5	4	12	9	30	1	0	2	1	4	2	5	0	3	10
8:15 AM	0	6	8	12	26	0	0	0	0	0	3	4	0	1	8
8:30 AM	2	7	11	7	27	0	1	0	4	5	3	3	0	1	7
8:45 AM	5	3	10	10	28	1	0	0	1	2	2	10	0	4	16
Count Total	34	31	75	67	207	3	8	3	16	30	16	32	0	22	70
Peak Hour	10	20	39	36	105	2	3	2	7	14	10	13	0	8	31

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Grimmer Blvd				Grimmer Blvd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	10	0	0	1	0	0	0	1	5	0	0	1	7	0	26	0
7:15 AM	0	0	3	0	0	2	1	1	0	1	5	0	0	0	6	1	20	0
7:30 AM	0	3	1	1	0	1	2	0	0	0	13	1	0	0	5	1	28	0
7:45 AM	0	2	1	0	0	0	2	1	0	1	5	2	0	1	7	0	22	96
8:00 AM	0	1	3	1	0	0	3	1	0	2	10	0	0	0	7	2	30	100
8:15 AM	0	0	0	0	0	1	4	1	0	0	6	2	0	0	11	1	26	106
8:30 AM	0	0	2	0	0	1	4	2	0	2	8	1	0	0	7	0	27	105
8:45 AM	0	0	4	1	0	0	0	3	0	0	6	4	0	0	8	2	28	111
Count Total	0	7	24	3	0	6	16	9	0	7	58	10	0	2	58	7	207	0
Peak Hour	0	3	6	1	0	2	13	5	0	5	29	5	0	1	32	3	105	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Grimmer Blvd			Grimmer Blvd			Fremont Blvd			Fremont Blvd			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	0	0	1	0	0	0	1	0	0	4	0	6	0			
7:15 AM	0	0	0	1	2	0	0	0	0	0	1	1	5	0			
7:30 AM	0	0	0	0	1	0	0	0	0	0	2	0	3	0			
7:45 AM	0	1	0	0	2	0	0	0	0	0	2	0	5	19			
8:00 AM	0	1	0	0	0	0	0	1	1	0	1	0	4	17			
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	12			
8:30 AM	0	0	0	0	1	0	0	0	0	1	3	0	5	14			
8:45 AM	0	0	1	0	0	0	0	0	0	0	1	0	2	11			
Count Total	0	2	1	2	6	0	0	2	1	1	14	1	30	0			
Peak Hour	0	2	0	0	3	0	0	1	1	1	6	0	14	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Grimmer Blvd				Grimmer Blvd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		1	102	117	13	0	23	52	23	0	18	179	12	1	30	179	65	815	0
4:15 PM		1	90	102	23	0	23	58	18	0	26	224	9	0	35	158	61	828	0
4:30 PM		0	76	113	26	0	21	59	21	0	25	200	24	0	40	188	67	860	0
4:45 PM		0	88	122	20	0	28	52	22	0	32	213	30	1	30	212	65	915	3,418
5:00 PM		0	106	133	25	0	30	74	25	0	25	223	25	0	33	196	72	967	3,570
5:15 PM		0	98	120	25	0	29	64	30	0	22	256	26	0	35	241	96	1,042	3,784
5:30 PM		0	86	133	30	0	34	67	26	0	20	224	23	1	35	218	71	968	3,892
5:45 PM		0	100	133	23	0	26	66	34	0	32	260	24	1	36	233	79	1,047	4,024
Count Total		2	746	973	185	0	214	492	199	0	200	1,779	173	4	274	1,625	576	7,442	0
Peak Hour	All	0	390	519	103	0	119	271	115	0	99	963	98	2	139	888	318	4,024	0
	HV	0	3	2	2	0	1	3	2	0	0	20	0	0	1	15	0	49	0
	HV%	-	1%	0%	2%	-	1%	1%	2%	-	0%	2%	0%	0%	1%	2%	0%	1%	0

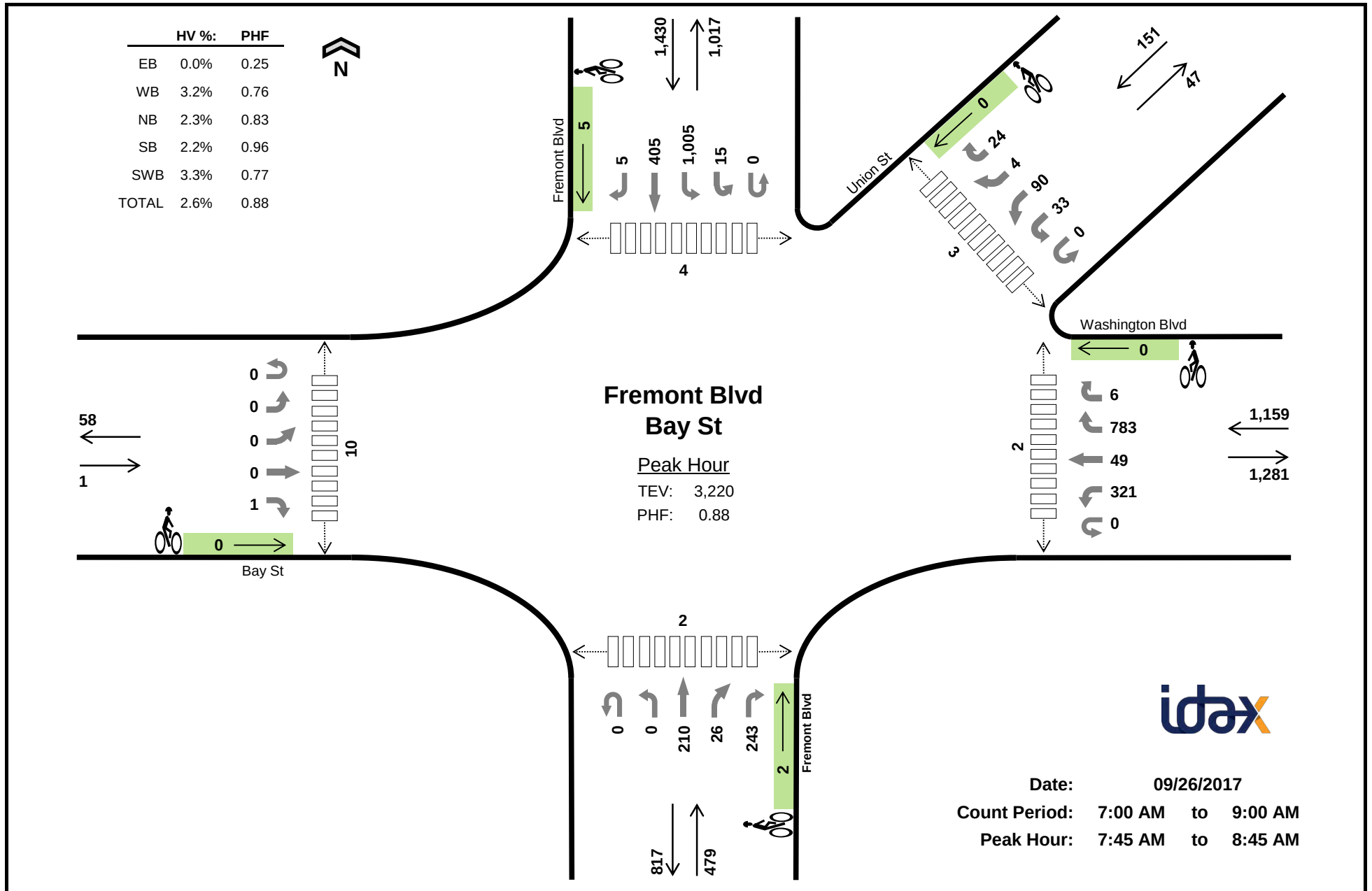
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	5	3	6	3	17	1	0	2	0	3	0	4	0	4	8
4:15 PM	1	5	8	4	18	0	1	2	3	6	5	3	0	5	13
4:30 PM	1	4	4	3	12	0	0	1	2	3	1	3	0	3	7
4:45 PM	3	2	6	4	15	1	0	1	1	3	2	8	0	3	13
5:00 PM	2	1	5	4	12	1	0	0	2	3	5	3	0	17	25
5:15 PM	1	2	4	5	12	0	0	0	0	0	2	9	0	21	32
5:30 PM	3	3	8	4	18	1	2	1	1	5	3	4	0	6	13
5:45 PM	1	0	3	3	7	0	0	0	1	1	2	9	0	5	16
Count Total	17	20	44	30	111	4	3	7	10	24	20	43	0	64	127
Peak Hour	7	6	20	16	49	2	2	1	4	9	12	25	0	49	86

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Grimmer Blvd				Grimmer Blvd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	3	0	0	0	2	1	0	1	5	0	0	1	2	0	17	0
4:15 PM	0	0	1	0	0	1	3	1	0	0	8	0	0	1	1	2	18	0
4:30 PM	0	1	0	0	0	0	4	0	0	1	3	0	0	0	2	1	12	0
4:45 PM	0	1	2	0	0	0	2	0	0	0	5	1	0	0	4	0	15	62
5:00 PM	0	0	1	1	0	0	1	0	0	0	5	0	0	1	3	0	12	57
5:15 PM	0	1	0	0	0	1	1	0	0	0	4	0	0	0	5	0	12	51
5:30 PM	0	1	1	1	0	0	1	2	0	0	8	0	0	0	4	0	18	57
5:45 PM	0	1	0	0	0	0	0	0	0	0	3	0	0	0	3	0	7	49
Count Total	0	7	8	2	0	2	14	4	0	2	41	1	0	3	24	3	111	0
Peak Hour	0	3	2	2	0	1	3	2	0	0	20	0	0	1	15	0	49	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Grimmer Blvd			Grimmer Blvd			Fremont Blvd			Fremont Blvd			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
4:00 PM	1	0	0	0	0	0	0	1	1	0	0	0	3	0			
4:15 PM	0	0	0	0	1	0	0	2	0	0	3	0	6	0			
4:30 PM	0	0	0	0	0	0	0	1	0	0	2	0	3	0			
4:45 PM	0	1	0	0	0	0	0	1	0	0	1	0	3	15			
5:00 PM	0	1	0	0	0	0	0	0	0	0	1	1	3	15			
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	9			
5:30 PM	0	1	0	1	1	0	0	1	0	0	1	0	5	11			
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	9			
Count Total	1	3	0	1	2	0	0	6	1	0	9	1	24	0			
Peak Hour	0	2	0	1	1	0	0	1	0	0	3	1	9	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Two-Hour Count Summaries

Interval Start		Bay St					Washington Blvd					Fremont Blvd					Fremont Blvd					Union St					15-min Total	Rolling One Hour
		Eastbound					Westbound					Northbound					Southbound					Southwestbound						
		UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR		
	7:00 AM	0	0	0	0	0	0	29	3	107	2	0	0	31	3	16	0	0	124	38	0	0	1	11	0	7	372	0
	7:15 AM	0	0	0	0	0	0	53	10	110	3	0	0	26	4	31	0	1	200	58	2	0	5	22	3	4	532	0
	7:30 AM	0	0	0	0	0	0	67	13	149	2	0	0	42	4	48	0	3	210	85	1	0	4	18	0	7	653	0
	7:45 AM	0	0	0	0	0	0	109	16	256	2	0	0	50	5	73	0	2	280	86	0	0	4	23	2	5	913	2,470
	8:00 AM	0	0	0	0	0	0	75	16	165	2	0	0	56	3	86	0	3	253	95	3	0	13	23	0	3	796	2,894
	8:15 AM	0	0	0	0	1	0	55	9	158	0	0	0	47	9	51	0	4	231	100	1	0	6	30	0	13	715	3,077
	8:30 AM	0	0	0	0	0	0	82	8	204	2	0	0	57	9	33	0	6	241	124	1	0	10	14	2	3	796	3,220
	8:45 AM	0	0	0	0	0	0	57	7	175	2	0	0	47	16	31	0	6	252	119	2	0	14	26	0	9	763	3,070
Count Total		0	0	0	0	1	0	527	82	1,324	15	0	0	356	53	369	0	25	1,791	705	10	0	57	167	7	51	5,540	0
Peak Hour	All	0	0	0	0	1	0	321	49	783	6	0	0	210	26	243	0	15	1,005	405	5	0	33	90	4	24	3,220	0
	HV	0	0	0	0	0	0	4	1	32	0	0	0	9	1	1	0	3	22	7	0	0	2	0	0	3	85	0
	HV%	-	-	-	-	0%	-	1%	2%	4%	0%	-	-	4%	4%	0%	-	20%	2%	2%	0%	-	6%	0%	0%	13%	3%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

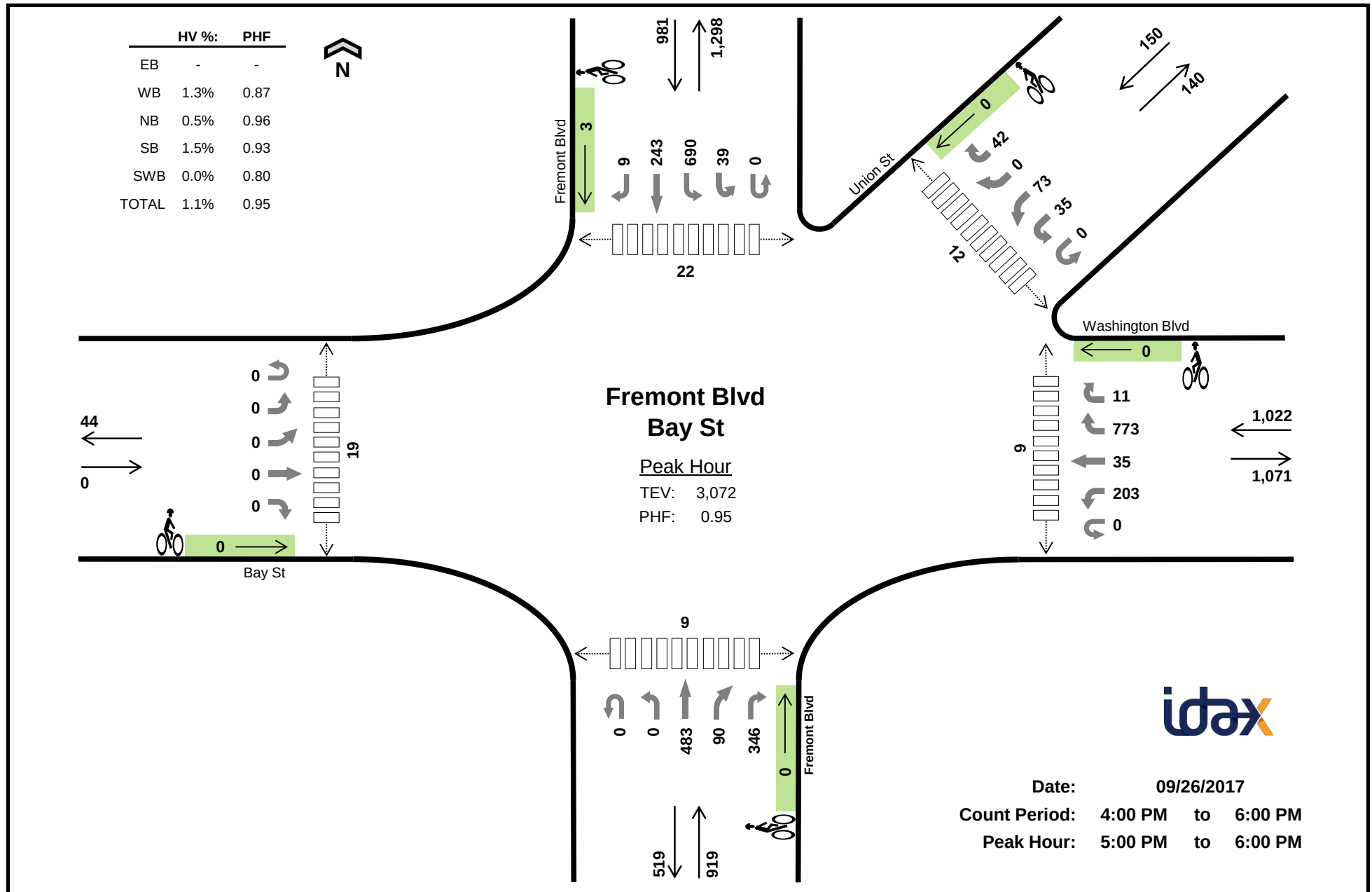
Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	SWB	Total	EB	WB	NB	SB	SWB	Total	East	West	North	South	Northeast	Total
7:00 AM	0	5	3	7	1	16	0	2	0	3	0	5	4	3	4	4	0	15
7:15 AM	0	6	5	8	0	19	0	0	0	2	0	2	0	6	1	1	2	10
7:30 AM	0	2	8	10	1	21	0	0	0	0	0	0	1	2	1	1	0	5
7:45 AM	0	6	4	7	0	17	0	0	1	2	0	3	2	5	1	1	0	9
8:00 AM	0	9	3	6	3	21	0	0	0	2	0	2	0	0	0	0	0	0
8:15 AM	0	10	2	11	1	24	0	0	1	0	0	1	0	2	2	0	0	4
8:30 AM	0	12	2	8	1	23	0	0	0	1	0	1	0	3	1	1	3	8
8:45 AM	0	9	3	8	1	21	0	0	1	1	1	3	0	4	4	6	2	16
Count Total	0	59	30	65	8	162	0	2	3	11	1	17	7	25	14	14	7	67
Peak Hr	0	37	11	32	5	85	0	0	2	5	0	7	2	10	4	2	3	21

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Bay St Eastbound					Washington Blvd Westbound					Fremont Blvd Northbound					Fremont Blvd Southbound					Union St Southwestbound					15-min Total	Rolling One Hour
	UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR		
7:00 AM	0	0	0	0	0	0	1	0	4	0	0	0	2	0	1	0	0	4	3	0	0	0	0	0	1	16	0
7:15 AM	0	0	0	0	0	0	1	0	4	1	0	0	3	1	1	0	0	6	2	0	0	0	0	0	0	19	0
7:30 AM	0	0	0	0	0	0	0	0	2	0	0	0	6	0	2	0	0	7	3	0	0	0	0	0	1	21	0
7:45 AM	0	0	0	0	0	0	0	0	6	0	0	0	2	1	1	0	0	5	2	0	0	0	0	0	0	17	73
8:00 AM	0	0	0	0	0	0	0	0	9	0	0	0	3	0	0	0	0	6	0	0	0	2	0	0	1	21	78
8:15 AM	0	0	0	0	0	0	3	0	7	0	0	0	2	0	0	0	2	6	3	0	0	0	0	0	1	24	83
8:30 AM	0	0	0	0	0	0	1	1	10	0	0	0	2	0	0	0	1	5	2	0	0	0	0	0	1	23	85
8:45 AM	0	0	0	0	0	0	0	0	9	0	0	0	1	0	2	0	0	5	3	0	0	0	0	0	1	21	89
Count Total	0	0	0	0	0	0	6	1	51	1	0	0	21	2	7	0	3	44	18	0	0	2	0	0	6	162	0
Peak Hour	0	0	0	0	0	0	4	1	32	0	0	0	9	1	1	0	3	22	7	0	0	2	0	0	3	85	0

Two-Hour Count Summaries - Bikes

Interval Start	Bay St Eastbound					Washington Blvd Westbound					Fremont Blvd Northbound					Fremont Blvd Southbound					Union St Southwestbound					15-min Total	Rolling One Hour
	UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR		
7:00 AM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	5	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3	10
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	7
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	6
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	7
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	3	7
Count Total	0	0	0	0	0	0	0	0	2	0	0	0	2	1	0	0	0	3	8	0	0	0	1	0	0	17	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	3	0	0	0	0	0	0	7	0



Two-Hour Count Summaries

Interval Start	Bay St					Washington Blvd					Fremont Blvd					Fremont Blvd					Union St					15-min Total	Rolling One Hour
	Eastbound					Westbound					Northbound					Southbound					Southwestbound						
	UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR		
4:00 PM	0	0	0	0	0	0	33	4	143	2	0	0	79	15	70	0	4	138	57	5	0	8	11	2	8	579	0
4:15 PM	0	0	0	0	0	0	32	9	163	5	0	0	97	22	86	0	10	119	48	4	0	7	13	0	9	624	0
4:30 PM	0	0	0	0	0	0	46	5	167	4	0	0	94	17	114	0	9	147	59	4	0	13	13	0	6	698	0
4:45 PM	0	0	0	0	0	0	44	9	158	4	0	1	94	20	124	0	12	159	62	1	0	8	15	0	10	721	2,622
5:00 PM	0	0	0	0	0	0	51	7	185	6	0	0	107	26	87	0	4	163	61	3	0	7	8	0	15	730	2,773
5:15 PM	0	0	0	0	0	0	38	10	174	2	0	0	127	24	88	0	9	170	83	2	0	6	23	0	9	765	2,914
5:30 PM	0	0	0	0	0	0	59	11	224	0	0	0	120	16	85	0	9	198	49	4	0	10	18	0	7	810	3,026
5:45 PM	0	0	0	0	0	0	55	7	190	3	0	0	129	24	86	0	17	159	50	0	0	12	24	0	11	767	3,072
Count Total		0	0	0	0	0	358	62	1,404	26	0	1	847	164	740	0	74	1,253	469	23	0	71	125	2	75	5,694	0
Peak Hour	All	0	0	0	0	0	203	35	773	11	0	0	483	90	346	0	39	690	243	9	0	35	73	0	42	3,072	0
	HV	0	0	0	0	0	0	1	12	0	0	0	5	0	0	0	0	12	3	0	0	0	0	0	0	33	0
	HV%	-	-	-	-	-	-	0%	3%	2%	0%	-	-	1%	0%	0%	-	0%	2%	1%	0%	-	0%	0%	-	0%	1%

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	SWB	Total	EB	WB	NB	SB	SWB	Total	East	West	North	South	Northeast	Total
4:00 PM	0	3	2	1	0	6	0	0	0	0	2	2	1	2	9	4	2	18
4:15 PM	0	8	2	2	0	12	0	0	0	2	0	2	2	3	5	4	1	15
4:30 PM	0	5	1	2	2	10	0	1	0	1	0	2	0	4	8	3	6	21
4:45 PM	0	5	2	5	0	12	0	0	4	1	0	5	0	1	5	4	2	12
5:00 PM	0	1	2	2	0	5	0	0	0	0	0	0	1	5	3	2	2	13
5:15 PM	0	6	1	5	0	12	0	0	0	0	0	0	4	5	7	2	7	25
5:30 PM	0	5	2	3	0	10	0	0	0	2	0	2	2	4	4	3	2	15
5:45 PM	0	1	0	5	0	6	0	0	0	1	0	1	2	5	8	2	1	18
Count Total	0	34	12	25	2	73	0	1	4	7	2	14	12	29	49	24	23	137
Peak Hr	0	13	5	15	0	33	0	0	0	3	0	3	9	19	22	9	12	71

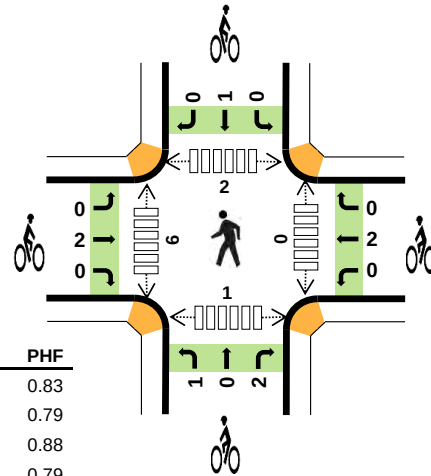
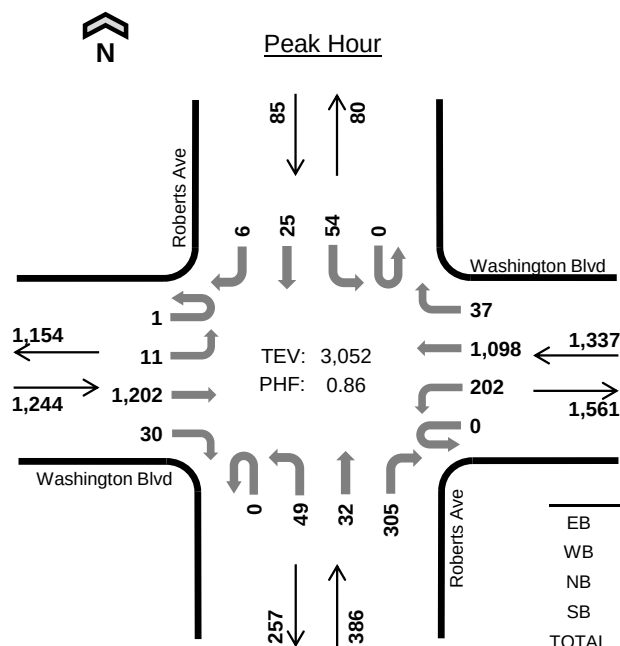
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Bay St					Washington Blvd					Fremont Blvd					Fremont Blvd					Union St					15-min Total	Rolling One Hour	
	Eastbound					Westbound					Northbound					Southbound					Southwestbound							
	UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR			
4:00 PM	0	0	0	0	0	0	1	0	2	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	6	0	
4:15 PM	0	0	0	0	0	0	0	0	7	1	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	12	0	
4:30 PM	0	0	0	0	0	0	0	0	4	1	0	0	0	1	0	0	0	2	0	0	0	0	1	1	0	0	10	0
4:45 PM	0	0	0	0	0	0	0	0	4	1	0	0	2	0	0	0	0	3	2	0	0	0	0	0	0	12	40	
5:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	5	39	
5:15 PM	0	0	0	0	0	0	0	1	5	0	0	0	1	0	0	0	0	4	1	0	0	0	0	0	0	12	39	
5:30 PM	0	0	0	0	0	0	0	0	5	0	0	0	2	0	0	0	0	3	0	0	0	0	0	0	0	10	39	
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	6	33	
Count Total	0	0	0	0	0	0	1	1	29	3	0	0	9	1	2	0	0	18	7	0	0	1	1	0	0	73	0	
Peak Hour	0	0	0	0	0	0	0	1	12	0	0	0	5	0	0	0	0	12	3	0	0	0	0	0	0	33	0	

Two-Hour Count Summaries - Bikes

Interval Start	Bay St					Washington Blvd					Fremont Blvd					Fremont Blvd					Union St					15-min Total	Rolling One Hour
	Eastbound					Westbound					Northbound					Southbound					Southwestbound						
	UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0
4:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	5	11
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	7
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	3
Count Total	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	4	3	0	0	0	2	0	0	14	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3	0

Roberts Ave Washington Blvd



Two-Hour Count Summaries

Interval Start		Washington Blvd				Washington Blvd				Roberts Ave				Roberts Ave				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	135	2	0	10	151	1	0	5	4	41	0	12	3	0	364	0
7:15 AM		0	2	199	7	0	27	174	6	0	2	3	51	0	12	4	0	487	0
7:30 AM		0	2	282	6	0	28	263	5	0	9	2	51	0	14	4	0	666	0
7:45 AM		1	4	318	6	0	58	356	7	0	13	4	93	0	18	5	0	883	2,400
8:00 AM		0	3	364	8	0	50	253	9	0	13	8	72	0	17	4	1	802	2,838
8:15 AM		0	3	279	6	0	58	242	8	0	10	9	68	0	8	3	2	696	3,047
8:30 AM		0	1	241	10	0	36	247	13	0	13	11	72	0	11	13	3	671	3,052
8:45 AM		0	7	309	6	0	30	249	20	0	9	11	72	0	17	5	3	738	2,907
Count Total		1	22	2,127	51	0	297	1,935	69	0	74	52	520	0	109	41	9	5,307	0
Peak Hour	All	1	11	1,202	30	0	202	1,098	37	0	49	32	305	0	54	25	6	3,052	0
	HV	0	0	22	1	0	3	34	2	0	2	2	5	0	0	2	0	73	0
	HV%	0%	0%	2%	3%	-	1%	3%	5%	-	4%	6%	2%	-	0%	8%	0%	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	3	7	0	0	10	1	1	0	0	2	3	3	1	0	7
7:15 AM	5	8	2	1	16	0	0	0	1	1	2	0	0	0	2
7:30 AM	7	9	2	0	18	0	1	2	0	3	1	1	0	1	3
7:45 AM	3	9	3	0	15	0	1	0	0	1	0	2	0	0	2
8:00 AM	10	10	1	0	21	2	1	3	0	6	0	2	0	0	2
8:15 AM	6	11	2	0	19	0	0	0	1	1	0	1	0	0	1
8:30 AM	4	9	3	2	18	0	0	0	0	0	0	1	2	1	4
8:45 AM	8	6	2	1	17	1	0	0	0	1	0	1	0	1	2
Count Total	46	69	15	4	134	4	4	5	2	15	6	11	3	3	23
Peak Hour	23	39	9	2	73	2	2	3	1	8	0	6	2	1	9

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Washington Blvd				Washington Blvd				Roberts Ave				Roberts Ave				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	3	0	0	1	6	0	0	0	0	0	0	0	0	0	10	0
7:15 AM	0	1	3	1	0	1	6	1	0	0	1	1	0	0	1	0	16	0
7:30 AM	0	0	6	1	0	1	8	0	0	0	1	1	0	0	0	0	18	0
7:45 AM	0	0	3	0	0	1	7	1	0	0	1	2	0	0	0	0	15	59
8:00 AM	0	0	10	0	0	1	8	1	0	0	1	0	0	0	0	0	21	70
8:15 AM	0	0	5	1	0	0	11	0	0	0	0	2	0	0	0	0	19	73
8:30 AM	0	0	4	0	0	1	8	0	0	2	0	1	0	0	2	0	18	73
8:45 AM	0	0	7	1	0	1	4	1	0	1	0	1	0	1	0	0	17	75
Count Total	0	1	41	4	0	7	58	4	0	3	4	8	0	1	3	0	134	0
Peak Hour	0	0	22	1	0	3	34	2	0	2	2	5	0	0	2	0	73	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Washington Blvd			Washington Blvd			Roberts Ave			Roberts Ave			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	2	0			
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0			
7:30 AM	0	0	0	0	1	0	0	2	0	0	0	0	3	0			
7:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	7			
8:00 AM	0	2	0	0	1	0	1	0	2	0	0	0	6	11			
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	11			
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	8			
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	8			
Count Total	0	4	0	0	4	0	1	2	2	0	2	0	15	0			
Peak Hour	0	2	0	0	2	0	1	0	2	0	1	0	8	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Roberts Ave Washington Blvd

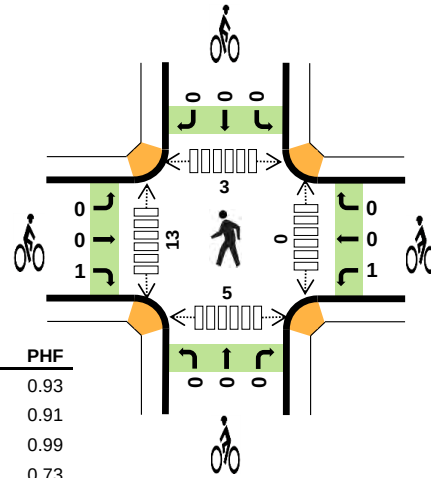
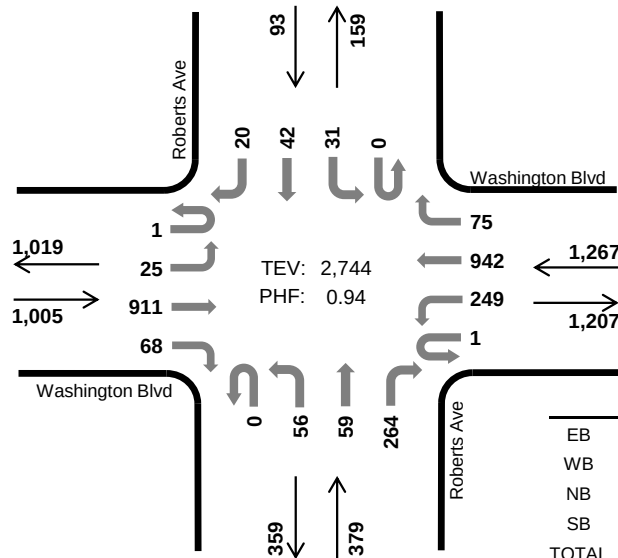


Peak Hour

Date: 09/26/2017

Count Period: 4:00 PM to 6:00 PM

Peak Hour: 5:00 PM to 6:00 PM



Two-Hour Count Summaries

Interval Start		Washington Blvd				Washington Blvd				Roberts Ave				Roberts Ave				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	4	182	13	0	49	168	12	0	7	6	50	0	11	8	1	511	0
4:15 PM		0	4	191	8	0	39	178	11	0	18	6	52	0	6	6	1	520	0
4:30 PM		0	1	229	9	0	47	194	10	0	15	5	58	0	8	7	2	585	0
4:45 PM		0	2	276	9	2	52	213	9	0	15	5	59	0	9	2	3	656	2,272
5:00 PM		0	7	204	14	1	61	203	20	0	12	16	67	0	8	9	3	625	2,386
5:15 PM		0	7	245	18	0	51	225	14	0	14	11	71	0	6	10	4	676	2,542
5:30 PM		1	2	246	15	0	68	260	21	0	18	20	55	0	5	12	4	727	2,684
5:45 PM		0	9	216	21	0	69	254	20	0	12	12	71	0	12	11	9	716	2,744
Count Total		1	36	1,789	107	3	436	1,695	117	0	111	81	483	0	65	65	27	5,016	0
Peak Hour	All	1	25	911	68	1	249	942	75	0	56	59	264	0	31	42	20	2,744	0
	HV	0	0	13	1	0	1	13	0	0	0	0	0	0	0	0	0	28	0
	HV%	0%	0%	1%	1%	0%	0%	1%	0%	-	0%	0%	0%	-	0%	0%	0%	1%	0

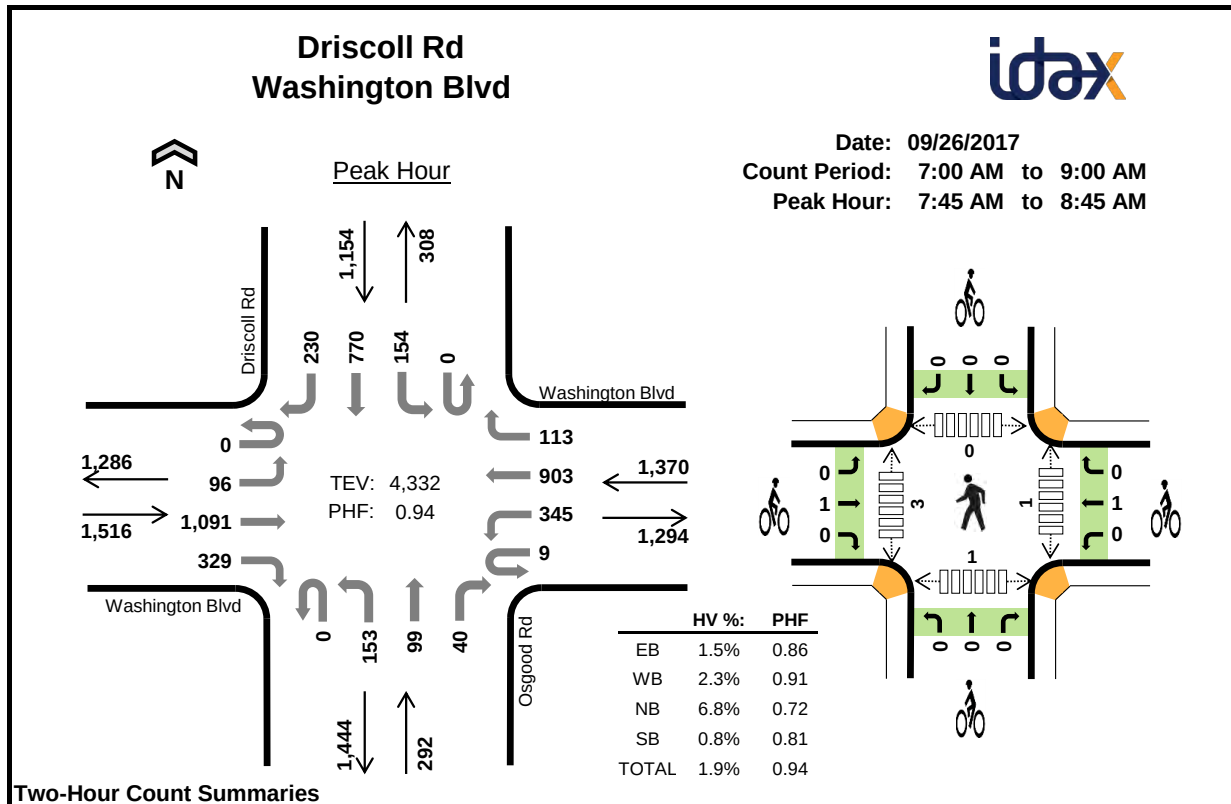
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	3	0	1	6	0	0	1	0	1	1	2	1	0	4
4:15 PM	2	6	2	0	10	0	0	0	0	0	0	3	0	0	3
4:30 PM	3	2	1	0	6	0	0	0	0	0	0	3	0	1	4
4:45 PM	4	4	1	0	9	0	0	0	0	0	1	1	0	2	4
5:00 PM	3	3	0	0	6	0	1	0	0	1	0	2	0	1	3
5:15 PM	4	5	0	0	9	0	0	0	0	0	0	4	0	2	6
5:30 PM	3	5	0	0	8	0	0	0	0	0	0	0	0	2	2
5:45 PM	4	1	0	0	5	1	0	0	0	1	0	7	3	0	10
Count Total	25	29	4	1	59	1	1	1	0	3	2	22	4	8	36
Peak Hour	14	14	0	0	28	1	1	0	0	2	0	13	3	5	21

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Washington Blvd				Washington Blvd				Roberts Ave				Roberts Ave				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	1	0	6	0
4:15 PM	0	0	2	0	0	0	6	0	0	2	0	0	0	0	0	0	0	10	0
4:30 PM	0	0	2	1	0	0	2	0	0	1	0	0	0	0	0	0	0	6	0
4:45 PM	0	0	4	0	0	0	4	0	0	0	0	1	0	0	0	0	0	9	31
5:00 PM	0	0	3	0	0	1	2	0	0	0	0	0	0	0	0	0	0	6	31
5:15 PM	0	0	3	1	0	0	5	0	0	0	0	0	0	0	0	0	0	9	30
5:30 PM	0	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0	0	8	32
5:45 PM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	28
Count Total	0	0	23	2	0	1	28	0	0	3	0	1	0	0	0	1	0	59	0
Peak Hour	0	0	13	1	0	1	13	0	0	0	0	0	0	0	0	0	0	28	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Washington Blvd			Washington Blvd			Roberts Ave			Roberts Ave			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0		
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
5:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1		
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
5:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2		
Count Total	0	0	1	1	0	0	1	0	0	0	0	0	0	3	0		
Peak Hour	0	0	1	1	0	0	0	0	0	0	0	0	0	2	0		

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Washington Blvd				Washington Blvd				Osgood Rd				Driscoll Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	9	140	35	2	35	117	17	0	19	20	9	0	18	104	24	549	0
7:15 AM		0	17	180	57	0	38	142	17	0	26	16	9	0	18	121	41	682	0
7:30 AM		0	27	286	47	0	54	221	13	0	44	14	5	0	22	99	45	877	0
7:45 AM		0	22	282	107	0	85	257	24	0	62	30	9	0	48	169	38	1,133	3,241
8:00 AM		0	39	305	95	2	103	235	38	0	40	26	9	0	35	171	51	1,149	3,841
8:15 AM		0	22	264	57	4	77	189	25	0	20	22	10	0	44	243	70	1,047	4,206
8:30 AM		0	13	240	70	3	80	222	26	0	31	21	12	0	27	187	71	1,003	4,332
8:45 AM		0	28	284	71	1	63	197	17	0	30	21	9	0	27	182	57	987	4,186
Count Total		0	177	1,981	539	12	535	1,580	177	0	272	170	72	0	239	1,276	397	7,427	0
Peak Hour	All	0	96	1,091	329	9	345	903	113	0	153	99	40	0	154	770	230	4,332	0
	HV	0	2	16	4	0	3	24	4	0	6	9	5	0	2	3	4	82	0
	HV%	-	2%	1%	1%	0%	1%	3%	4%	-	4%	9%	13%	-	1%	0%	2%	2%	0

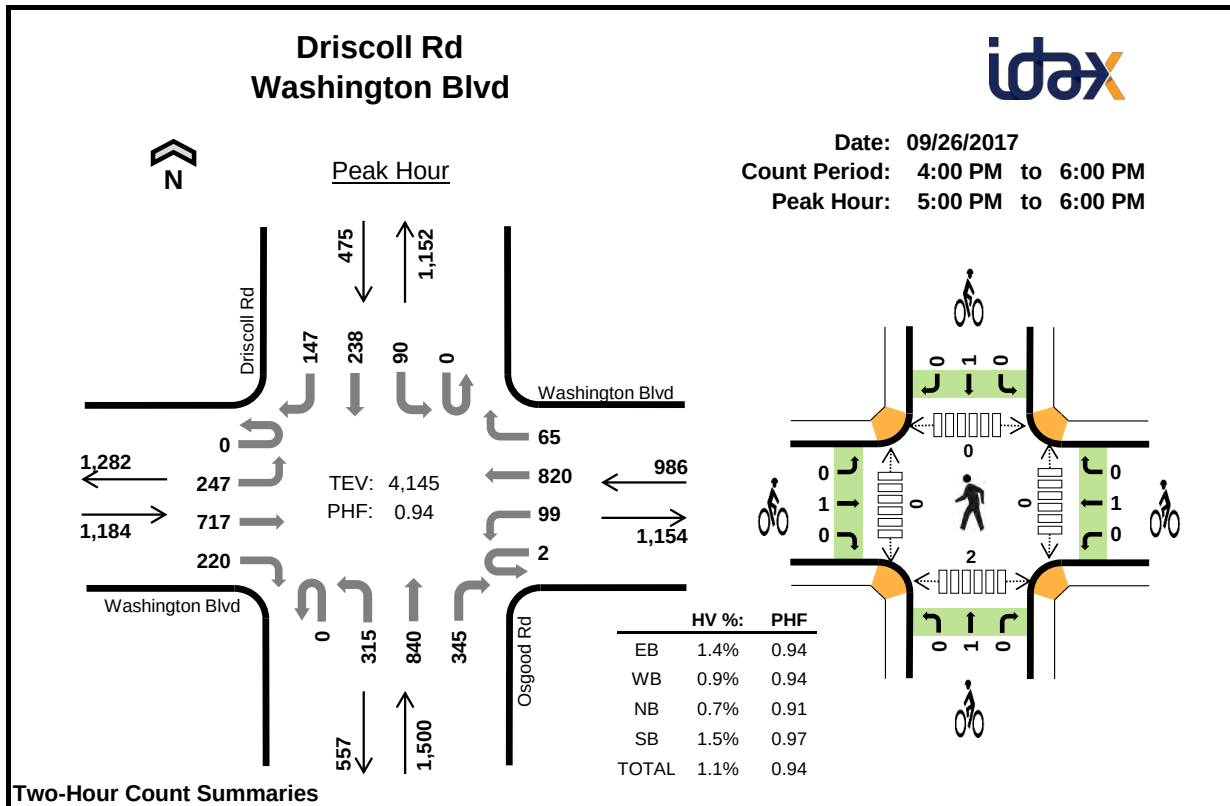
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	3	6	7	0	16	1	0	0	0	1	0	0	0	1	1
7:15 AM	5	5	5	3	18	1	0	0	3	4	0	0	0	0	0
7:30 AM	8	7	5	1	21	0	0	0	0	0	0	0	0	0	0
7:45 AM	3	4	5	1	13	0	1	0	0	1	1	0	0	0	1
8:00 AM	12	11	7	2	32	1	0	0	0	1	0	1	0	0	1
8:15 AM	5	9	4	5	23	0	0	0	0	0	0	1	0	0	1
8:30 AM	2	7	4	1	14	0	0	0	0	0	0	1	0	1	2
8:45 AM	9	1	3	3	16	2	0	0	0	2	3	0	0	2	5
Count Total	47	50	40	16	153	5	1	0	3	9	4	3	0	4	11
Peak Hour	22	31	20	9	82	1	1	0	0	2	1	3	0	1	5

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Washington Blvd				Washington Blvd				Osgood Rd				Driscoll Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	2	1	0	1	5	0	0	2	2	3	0	0	0	0	16	0
7:15 AM	0	0	4	1	0	0	3	2	0	1	1	3	0	1	0	2	18	0
7:30 AM	0	1	4	3	0	0	6	1	0	5	0	0	0	0	0	1	21	0
7:45 AM	0	0	2	1	0	1	3	0	0	1	3	1	0	1	0	0	13	68
8:00 AM	0	2	8	2	0	0	8	3	0	2	4	1	0	1	0	1	32	84
8:15 AM	0	0	4	1	0	2	6	1	0	2	1	1	0	0	2	3	23	89
8:30 AM	0	0	2	0	0	0	7	0	0	1	1	2	0	0	1	0	14	82
8:45 AM	0	0	7	2	0	0	1	0	0	2	0	1	0	0	1	2	16	85
Count Total	0	3	33	11	0	4	39	7	0	16	12	12	0	3	4	9	153	0
Peak Hour	0	2	16	4	0	3	24	4	0	6	9	5	0	2	3	4	82	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Washington Blvd			Washington Blvd			Osgood Rd			Driscoll Rd			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0			
7:15 AM	0	1	0	0	0	0	0	0	0	0	3	0	4	0			
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	6			
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	6			
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2			
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2			
8:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	2	3			
Count Total	0	5	0	0	1	0	0	0	0	0	3	0	9	0			
Peak Hour	0	1	0	0	1	0	0	0	0	0	0	0	2	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

**Two-Hour Count Summaries**

Interval Start		Washington Blvd				Washington Blvd				Osgood Rd				Driscoll Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	55	150	56	0	14	145	5	0	63	160	78	0	13	58	33	830	0
4:15 PM		0	40	162	41	1	9	147	4	0	47	140	90	0	20	81	31	813	0
4:30 PM		1	78	183	49	0	17	162	15	0	69	177	77	0	21	45	30	924	0
4:45 PM		0	68	207	60	1	21	195	19	0	56	187	71	0	13	71	38	1,007	3,574
5:00 PM		0	62	161	50	0	24	174	17	0	78	208	71	0	24	61	30	960	3,704
5:15 PM		0	54	200	62	1	25	216	11	0	86	217	110	0	25	61	37	1,105	3,996
5:30 PM		0	49	193	54	0	26	218	19	0	86	199	89	0	27	58	32	1,050	4,122
5:45 PM		0	82	163	54	1	24	212	18	0	65	216	75	0	14	58	48	1,030	4,145
Count Total		1	488	1,419	426	4	160	1,469	108	0	550	1,504	661	0	157	493	279	7,719	0
Peak Hour	All	0	247	717	220	2	99	820	65	0	315	840	345	0	90	238	147	4,145	0
	HV	0	1	10	6	0	2	7	0	0	2	6	3	0	2	4	1	44	0
	HV%	-	0%	1%	3%	0%	2%	1%	0%	-	1%	1%	1%	-	2%	2%	1%	1%	0

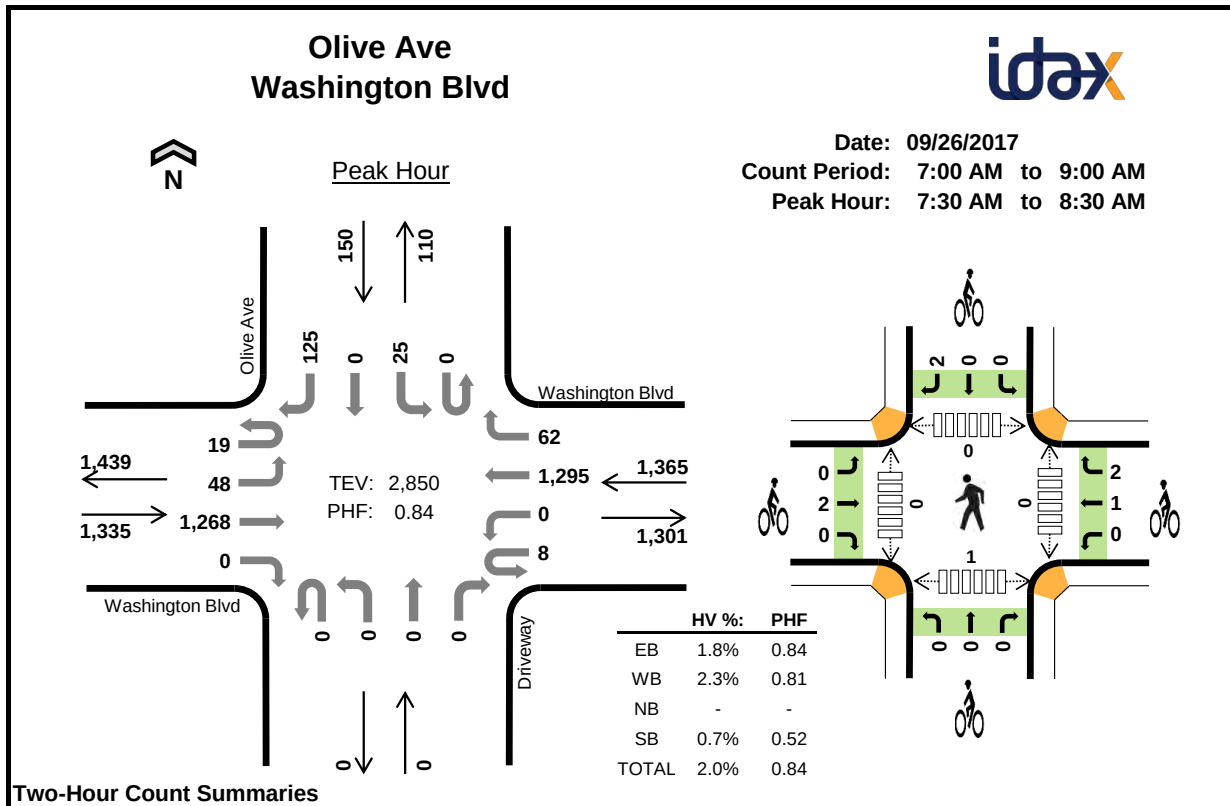
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	3	0	5	9	0	0	0	2	2	1	0	0	1	2
4:15 PM	2	3	5	2	12	1	0	0	0	1	0	0	1	0	1
4:30 PM	2	0	4	1	7	0	0	1	0	1	0	2	1	0	3
4:45 PM	3	4	6	2	15	0	0	2	0	2	1	0	0	1	2
5:00 PM	3	0	5	4	12	0	0	0	0	0	0	0	0	0	0
5:15 PM	5	5	1	0	11	0	0	0	1	1	0	0	0	0	0
5:30 PM	4	2	3	1	10	0	1	0	0	1	0	0	0	1	1
5:45 PM	5	2	2	2	11	1	0	1	0	2	0	0	0	1	1
Count Total	25	19	26	17	87	2	1	4	3	10	2	2	2	4	10
Peak Hour	17	9	11	7	44	1	1	1	1	4	0	0	0	2	2

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Washington Blvd				Washington Blvd				Osgood Rd				Driscoll Rd				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	3	2	9	0
4:15 PM	0	0	2	0	0	0	3	0	0	3	1	1	0	0	0	2	0	12	0
4:30 PM	0	0	1	1	0	0	0	0	0	1	2	1	0	0	0	1	0	7	0
4:45 PM	0	0	3	0	0	1	2	1	0	2	4	0	0	0	0	1	1	15	43
5:00 PM	0	0	2	1	0	0	0	0	0	0	3	2	0	1	2	1	1	12	46
5:15 PM	0	0	3	2	0	0	5	0	0	0	0	1	0	0	0	0	0	11	45
5:30 PM	0	0	3	1	0	1	1	0	0	2	1	0	0	1	0	0	0	10	48
5:45 PM	0	1	2	2	0	1	1	0	0	0	2	0	0	0	0	2	0	11	44
Count Total	0	1	17	7	0	4	14	1	0	8	13	5	0	2	11	4		87	0
Peak Hour	0	1	10	6	0	2	7	0	0	2	6	3	0	2	4	1		44	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Washington Blvd			Washington Blvd			Osgood Rd			Driscoll Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0				
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0				
4:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	2	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
5:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0				
5:45 PM	0	1	0	0	0	0	0	1	0	0	0	0	2	0				
Count Total	0	2	0	0	1	0	0	4	0	0	3	0	10	0				
Peak Hour	0	1	0	0	1	0	0	1	0	0	1	0	4	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Washington Blvd				Washington Blvd				Driveway				Olive Ave				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		4	5	181	0	1	0	170	2	0	0	0	0	0	1	0	9	373	0
7:15 AM		1	9	209	1	0	0	183	4	0	0	0	1	0	0	0	19	427	0
7:30 AM		4	5	267	0	4	0	310	7	0	0	0	0	0	2	0	14	613	0
7:45 AM		13	16	370	0	4	0	409	10	0	0	0	0	0	5	0	24	851	2,264
8:00 AM		0	18	296	0	0	0	319	36	0	0	0	0	0	3	0	30	702	2,593
8:15 AM		2	9	335	0	0	0	257	9	0	0	0	0	0	15	0	57	684	2,850
8:30 AM		1	5	283	0	0	0	279	1	0	0	0	0	0	1	0	33	603	2,840
8:45 AM		1	10	310	0	0	0	262	3	0	0	0	0	0	3	0	15	604	2,593
Count Total		26	77	2,251	1	9	0	2,189	72	0	0	0	1	0	30	0	201	4,857	0
Peak Hour	All	19	48	1,268	0	8	0	1,295	62	0	0	0	0	0	25	0	125	2,850	0
	HV	0	1	23	0	0	0	32	0	0	0	0	0	0	0	0	1	57	0
	HV%	0%	2%	2%	-	0%	-	2%	0%	-	-	-	-	-	0%	-	1%	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	3	5	0	0	8	1	0	0	0	1	0	0	0	0	0
7:15 AM	10	5	1	2	18	0	0	0	0	0	0	0	1	0	1
7:30 AM	6	6	0	1	13	1	0	0	1	2	0	0	0	1	1
7:45 AM	4	5	0	0	9	0	3	0	0	3	0	0	0	0	0
8:00 AM	9	11	0	0	20	0	0	0	1	1	0	0	0	0	0
8:15 AM	5	10	0	0	15	1	0	0	0	1	0	0	0	0	0
8:30 AM	5	7	0	0	12	0	0	0	0	0	0	0	0	0	0
8:45 AM	7	1	0	0	8	1	1	0	0	2	0	0	0	0	0
Count Total	49	50	1	3	103	4	4	0	2	10	0	0	1	1	2
Peak Hour	24	32	0	1	57	2	3	0	2	7	0	0	0	1	1

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Washington Blvd				Washington Blvd				Driveway				Olive Ave				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0	8	0
7:15 AM	0	1	8	1	0	0	4	1	0	0	0	1	0	0	0	2	18	0
7:30 AM	0	0	6	0	0	0	6	0	0	0	0	0	0	0	0	1	13	0
7:45 AM	0	1	3	0	0	0	5	0	0	0	0	0	0	0	0	0	9	48
8:00 AM	0	0	9	0	0	0	11	0	0	0	0	0	0	0	0	0	20	60
8:15 AM	0	0	5	0	0	0	10	0	0	0	0	0	0	0	0	0	15	57
8:30 AM	0	0	5	0	0	0	7	0	0	0	0	0	0	0	0	0	12	56
8:45 AM	0	0	7	0	0	0	1	0	0	0	0	0	0	0	0	0	8	55
Count Total	0	2	46	1	0	0	49	1	0	0	0	1	0	0	0	3	103	0
Peak Hour	0	1	23	0	0	0	32	0	0	0	0	0	0	0	0	1	57	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Washington Blvd			Washington Blvd			Driveway			Olive Ave			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0			
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	1	2	0			
7:45 AM	0	0	0	0	1	2	0	0	0	0	0	0	3	6			
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	1	6			
8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	7			
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	5			
8:45 AM	1	0	0	0	0	1	0	0	0	0	0	0	2	4			
Count Total	1	3	0	0	1	3	0	0	0	0	0	2	10	0			
Peak Hour	0	2	0	0	1	2	0	0	0	0	0	2	7	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Olive Ave Washington Blvd

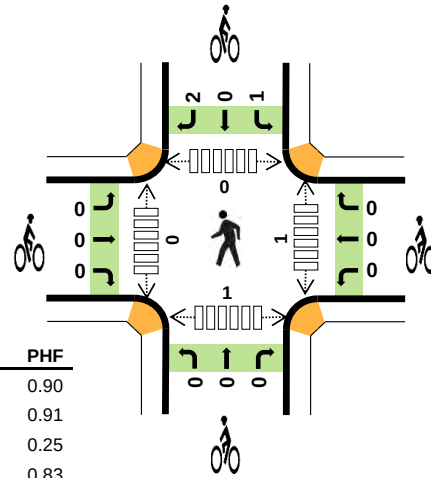
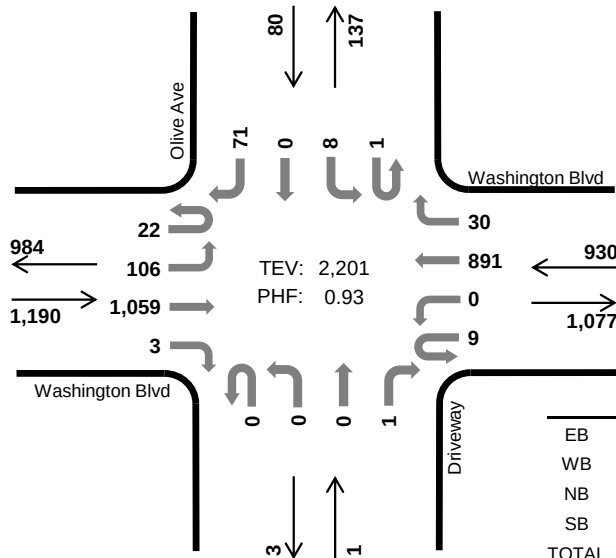


Peak Hour

Date: 09/26/2017

Count Period: 4:00 PM to 6:00 PM

Peak Hour: 4:45 PM to 5:45 PM



	HV %	PHF
EB	1.1%	0.90
WB	1.0%	0.91
NB	0.0%	0.25
SB	5.0%	0.83
TOTAL	1.2%	0.93

Two-Hour Count Summaries

Interval Start		Washington Blvd				Washington Blvd				Driveway				Olive Ave				15-min Total	Rolling One Hour	
		Eastbound				Westbound				Northbound				Southbound						
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM		2	8	211	0	2	0	156	3	0	0	0	0	0	2	0	0	10	394	0
4:15 PM		4	13	262	0	1	2	150	3	0	0	0	2	0	0	0	13	450	0	
4:30 PM		7	17	235	0	2	0	168	8	0	0	0	0	0	4	0	16	457	0	
4:45 PM		7	21	277	2	4	0	234	2	0	0	0	0	0	1	0	20	568	1,869	
5:00 PM		2	24	224	0	2	0	186	3	0	0	0	1	0	3	0	15	460	1,935	
5:15 PM		8	23	301	0	3	0	228	13	0	0	0	0	1	1	0	15	593	2,078	
5:30 PM		5	38	257	1	0	0	243	12	0	0	0	0	0	3	0	21	580	2,201	
5:45 PM		4	33	227	0	3	0	230	4	0	0	0	1	0	3	0	10	515	2,148	
Count Total		39	177	1,994	3	17	2	1,595	48	0	0	0	4	1	17	0	120	4,017	0	
Peak Hour	All	22	106	1,059	3	9	0	891	30	0	0	0	1	1	8	0	71	2,201	0	
	HV	1	0	12	0	0	0	9	0	0	0	0	0	0	0	0	4	26	0	
	HV%	5%	0%	1%	0%	0%	-	1%	0%	-	-	-	0%	0%	0%	-	6%	1%	0	

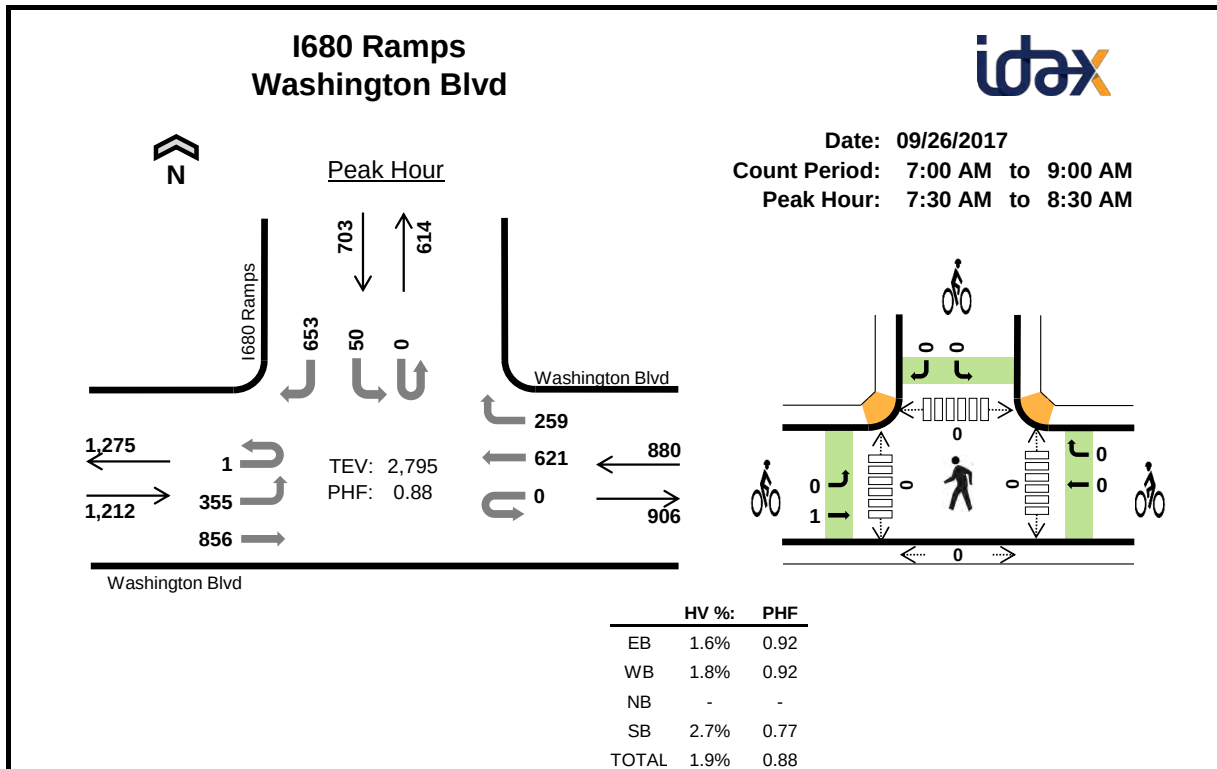
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	3	0	0	4	0	0	0	0	0	0	0	0	0	0
4:15 PM	3	4	0	0	7	0	0	0	0	0	0	0	1	0	1
4:30 PM	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0
4:45 PM	3	2	0	2	7	0	0	0	0	0	0	0	0	0	0
5:00 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0
5:15 PM	5	5	0	1	11	0	0	0	2	2	1	0	0	1	2
5:30 PM	3	2	0	1	6	0	0	0	1	1	0	0	0	0	0
5:45 PM	2	1	0	0	3	0	0	0	0	0	2	0	0	0	2
Count Total	21	18	0	4	43	0	0	0	3	3	3	0	1	1	5
Peak Hour	13	9	0	4	26	0	0	0	3	3	1	0	0	1	2

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Washington Blvd				Washington Blvd				Driveway				Olive Ave				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	0
4:15 PM	0	0	3	0	0	0	4	0	0	0	0	0	0	0	0	0	7	0
4:30 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0
4:45 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	2	7	21
5:00 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19
5:15 PM	1	0	4	0	0	0	5	0	0	0	0	0	0	0	0	1	11	23
5:30 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	1	6	26
5:45 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3	22
Count Total	1	0	20	0	0	0	18	0	0	0	0	0	0	0	0	4	43	0
Peak Hour	1	0	12	0	0	0	9	0	0	0	0	0	0	0	0	4	26	0

Two-Hour Count Summaries - Bikes																
Interval Start	Washington Blvd			Washington Blvd			Driveway			Olive Ave			15-min Total	Rolling One Hour		
	Eastbound			Westbound			Northbound			Southbound						
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	2	2		
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	3		
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3		
Count Total	0	0	0	0	0	0	0	0	0	1	0	2	3	0		
Peak Hour	0	0	0	0	0	0	0	0	0	1	0	2	3	0		

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

**Two-Hour Count Summaries**

Interval Start		Washington Blvd				Washington Blvd				0				I680 Ramps				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	44	123	0	0	0	72	35	0	0	0	0	0	8	0	94	376	0
7:15 AM		1	54	168	0	0	0	82	42	0	0	0	0	0	13	0	116	476	0
7:30 AM		0	73	209	0	0	0	155	58	0	0	0	0	0	11	0	162	668	0
7:45 AM		1	83	244	0	0	0	178	62	0	0	0	0	0	16	0	212	796	2,316
8:00 AM		0	114	188	0	0	0	158	66	0	0	0	0	0	10	0	158	694	
8:15 AM		0	85	215	0	0	0	130	73	0	0	0	0	0	13	0	121	637	2,795
8:30 AM		0	87	197	0	0	0	136	72	0	0	0	0	0	8	0	142	642	2,769
8:45 AM		0	83	187	0	0	0	125	61	0	0	0	0	0	12	0	133	601	2,574
Count Total		2	623	1,531	0	0	0	1,036	469	0	0	0	0	0	91	0	1,138	4,890	0
Peak Hour	All	1	355	856	0	0	0	621	259	0	0	0	0	0	50	0	653	2,795	0
	HV	0	5	14	0	0	0	15	1	0	0	0	0	0	0	0	19	54	0
	HV%	0%	1%	2%	-	-	-	2%	0%	-	-	-	-	-	0%	-	3%	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	6	0	2	10	1	0	0	0	1	0	0	0	0	0
7:15 AM	9	3	0	3	15	0	0	0	0	0	0	0	0	0	0
7:30 AM	5	5	0	2	12	1	0	0	0	1	0	0	0	0	0
7:45 AM	2	1	0	4	7	0	0	0	0	0	0	0	0	0	0
8:00 AM	8	6	0	7	21	0	0	0	0	0	0	0	0	0	0
8:15 AM	4	4	0	6	14	0	0	0	0	0	0	0	0	0	0
8:30 AM	4	5	0	4	13	0	0	0	0	0	0	0	0	0	0
8:45 AM	6	1	0	0	7	0	0	0	0	0	0	0	0	0	0
Count Total	40	31	0	28	99	2	0	0	0	2	0	0	0	0	0
Peak Hr	19	16	0	19	54	1	0	0	0	1	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Washington Blvd				Washington Blvd				0				I680 Ramps				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM	0	0	2	0	0	0	5	1	0	0	0	0	0	0	0	0	2	10	0
7:15 AM	0	2	7	0	0	0	3	0	0	0	0	0	0	0	0	0	3	15	0
7:30 AM	0	2	3	0	0	0	4	1	0	0	0	0	0	0	0	0	2	12	0
7:45 AM	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	7	44
8:00 AM	0	2	6	0	0	0	6	0	0	0	0	0	0	0	0	0	7	21	55
8:15 AM	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	6	14	54
8:30 AM	0	2	2	0	0	0	5	0	0	0	0	0	0	0	0	0	4	13	55
8:45 AM	0	2	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7	55
Count Total	0	11	29	0	0	0	29	2	0	0	0	0	0	0	0	0	28	99	0
Peak Hour	0	5	14	0	0	0	15	1	0	0	0	0	0	0	0	0	19	54	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Washington Blvd			Washington Blvd			0			I680 Ramps			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0				
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0				
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2				
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Count Total	0	2	0	0	0	0	0	0	0	0	0	0	2	0				
Peak Hour	0	1	0	0	0	0	0	0	0	0	0	0	1	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Date: 09/26/2017

Diagram illustrating the traffic flow and volume at the Washington Blvd intersection during the Peak Hour.

Peak Hour

Northbound Traffic (from the top):

- Left Turn: 904
- Through: 1,097
- Right Turn: 0

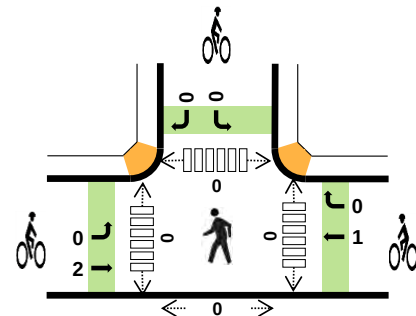
Southbound Traffic (from the bottom):

- Left Turn: 943
- Through: 154
- Right Turn: 1

Intersection and Ramps:

- Washington Blvd (Left Turn): 137
- Washington Blvd (Through): 349
- Washington Blvd (Right Turn): 487
- I-680 Ramps (Left Turn): 555
- I-680 Ramps (Through): 52
- I-680 Ramps (Right Turn): 0

TEV: 2,191
PHF: 0.92



Two-Hour Count Summaries

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	0	4	5	0	0	0	0	0	0	0	0	0	0
4:15 PM	3	1	0	3	7	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	1	0	2	4	0	0	0	0	0	0	0	0	0	0
4:45 PM	3	1	0	1	5	1	0	0	0	1	0	0	0	0	0
5:00 PM	2	1	0	0	3	0	1	0	0	1	0	0	0	0	0
5:15 PM	3	3	0	1	7	1	0	0	0	1	0	0	0	0	0
5:30 PM	3	1	0	2	6	0	0	0	0	0	0	0	0	0	0
5:45 PM	2	0	0	0	2	1	0	0	0	1	0	0	0	0	0
Count Total	18	8	0	13	39	3	1	0	0	4	0	0	0	0	0
Peak Hr	10	5	0	3	18	2	1	0	0	3	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Washington Blvd				Washington Blvd				0				I680 Ramps				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	0
4:15 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	3	7	0
4:30 PM	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	4	0
4:45 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5	21
5:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	19
5:15 PM	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	1	7	19
5:30 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	2	6	21
5:45 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	18
Count Total	0	2	16	0	0	0	7	1	0	0	0	0	0	0	1	0	12	39	0
Peak Hour	0	1	9	0	0	0	5	0	0	0	0	0	0	0	0	0	3	18	0

Two-Hour Count Summaries - Bikes																			
Interval Start	Washington Blvd			Washington Blvd			0			I680 Ramps			15-min Total	Rolling One Hour					
	Eastbound			Westbound			Northbound			Southbound									
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT							
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
5:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	2
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3
Count Total	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Peak Hour	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

I680 Ramps Washington Blvd

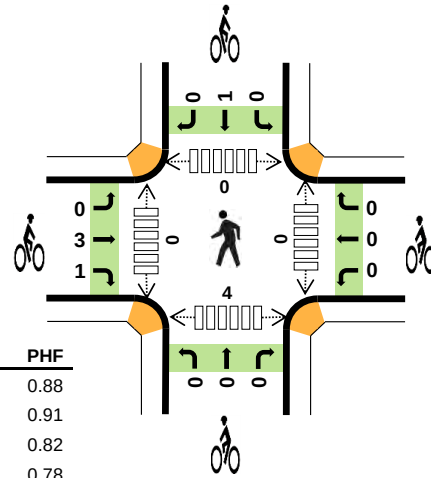
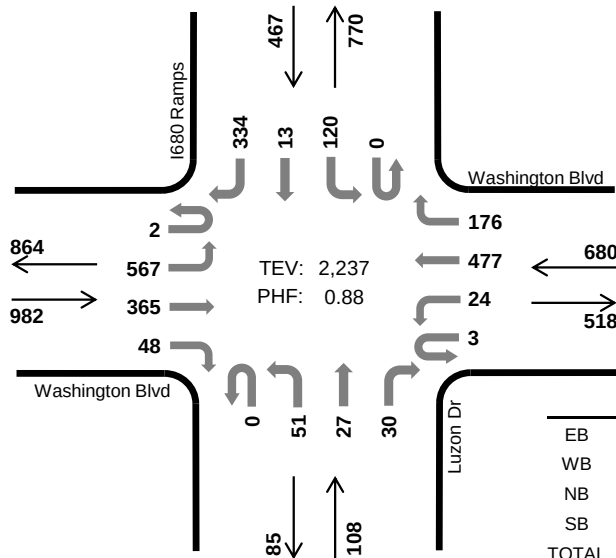


Peak Hour

Date: 09/26/2017

Count Period: 7:00 AM to 9:00 AM

Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	1.4%	0.88
WB	1.9%	0.91
NB	0.9%	0.82
SB	0.6%	0.78
TOTAL	1.4%	0.88

Two-Hour Count Summaries

Interval Start		Washington Blvd				Washington Blvd				Luzon Dr				I680 Ramps				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	89	24	8	0	1	52	26	0	8	13	2	0	21	6	47	297	0
7:15 AM		1	117	57	13	0	1	58	26	0	9	9	3	0	29	8	51	382	0
7:30 AM		1	120	103	10	0	1	97	40	0	15	6	8	0	30	5	94	530	0
7:45 AM		1	154	108	15	2	10	121	45	0	12	9	9	0	33	3	114	636	1,845
8:00 AM		0	143	77	12	1	5	126	45	0	16	9	8	0	30	2	69	543	2,091
8:15 AM		0	150	77	11	0	8	133	46	0	8	3	5	0	27	3	57	528	2,237
8:30 AM		0	154	64	12	0	3	122	55	0	8	6	5	0	19	3	57	508	2,215
8:45 AM		0	134	77	9	2	2	123	43	0	6	9	3	0	28	4	64	504	2,083
Count Total		3	1,061	587	90	5	31	832	326	0	82	64	43	0	217	34	553	3,928	0
Peak Hour	All	2	567	365	48	3	24	477	176	0	51	27	30	0	120	13	334	2,237	0
	HV	0	5	8	1	0	0	8	5	0	0	1	0	0	1	0	2	31	0
	HV%	0%	1%	2%	2%	0%	0%	2%	3%	-	0%	4%	0%	-	1%	0%	1%	1%	0

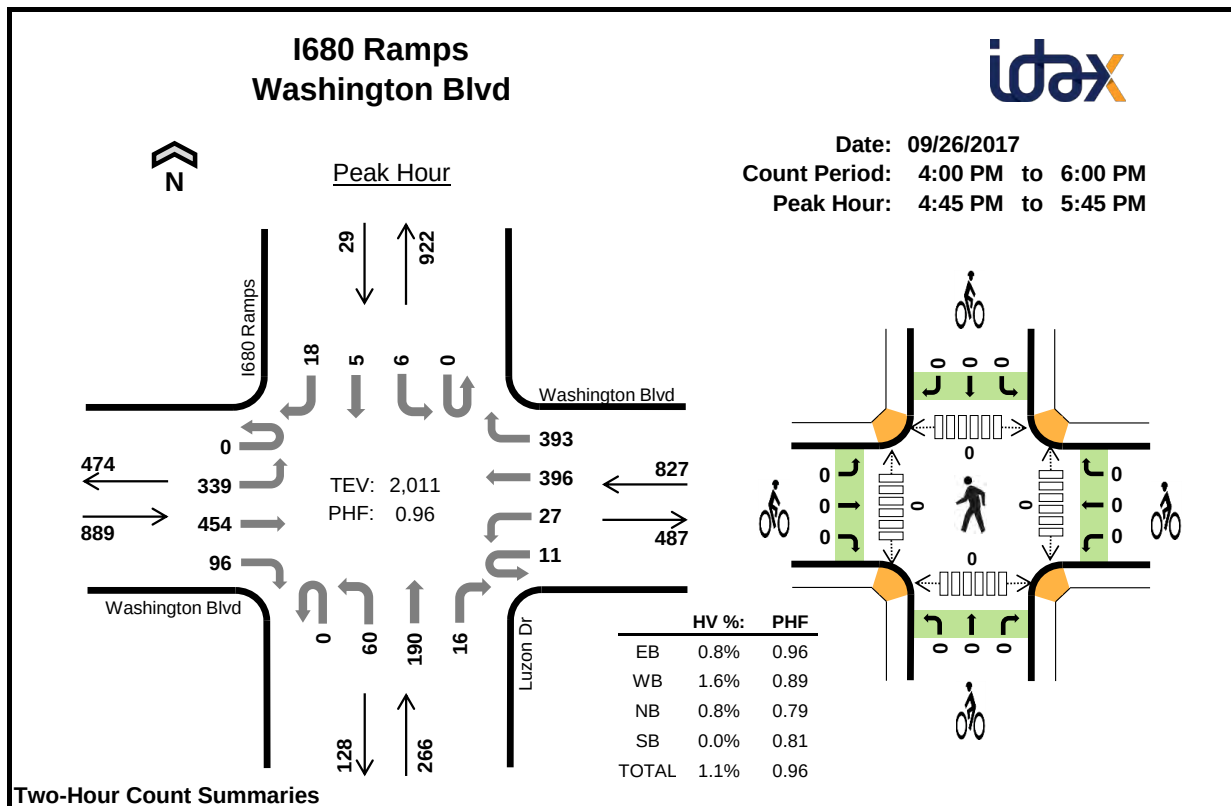
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	3	8	0	1	12	0	0	0	0	0	0	0	0	0	0
7:15 AM	6	2	1	8	17	1	0	0	0	1	0	0	0	0	0
7:30 AM	3	4	1	2	10	2	0	0	1	3	0	0	0	1	1
7:45 AM	1	1	0	0	2	1	0	0	0	1	0	0	0	2	2
8:00 AM	6	3	0	1	10	0	0	0	0	0	0	0	0	0	0
8:15 AM	4	5	0	0	9	1	0	0	0	1	0	0	0	1	1
8:30 AM	3	5	1	1	10	0	0	0	0	0	1	0	0	2	3
8:45 AM	4	2	0	0	6	0	0	0	0	0	0	0	0	1	1
Count Total	30	30	3	13	76	5	0	0	1	6	1	0	0	7	8
Peak Hour	14	13	1	3	31	4	0	0	1	5	0	0	0	4	4

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Washington Blvd				Washington Blvd				Luzon Dr				I680 Ramps				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	2	0	0	0	4	4	0	0	0	0	0	0	0	1	12	0
7:15 AM	0	1	5	0	0	0	0	2	0	0	1	0	0	5	0	3	17	0
7:30 AM	0	1	2	0	0	0	3	1	0	0	1	0	0	1	0	1	10	0
7:45 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	41
8:00 AM	0	4	2	0	0	0	3	0	0	0	0	0	0	0	0	1	10	39
8:15 AM	0	0	3	1	0	0	1	4	0	0	0	0	0	0	0	0	9	31
8:30 AM	0	1	2	0	0	0	3	2	0	0	1	0	0	0	0	1	10	31
8:45 AM	0	3	1	0	0	0	1	1	0	0	0	0	0	0	0	0	6	35
Count Total	0	11	18	1	0	0	16	14	0	0	3	0	0	6	0	7	76	0
Peak Hour	0	5	8	1	0	0	8	5	0	0	1	0	0	1	0	2	31	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Washington Blvd			Washington Blvd			Luzon Dr			I680 Ramps			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
7:30 AM	0	2	0	0	0	0	0	0	0	0	1	0	3	0	0	0	
7:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	5	0	0	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	
8:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	5	0	0	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Count Total	0	4	1	0	0	0	0	0	0	0	1	0	6	0	0	0	
Peak Hour	0	3	1	0	0	0	0	0	0	0	1	0	5	0	0	0	

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Two-Hour Count Summaries

Interval Start		Washington Blvd				Washington Blvd				Luzon Dr				I680 Ramps				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	82	93	20	3	6	82	78	0	20	60	3	0	1	3	3	454	0
4:15 PM		0	62	91	16	3	9	80	99	0	9	46	9	0	1	2	0	427	0
4:30 PM		0	66	111	28	2	4	85	100	0	15	55	5	0	1	3	2	477	0
4:45 PM		0	73	103	22	3	10	102	118	0	19	60	5	0	2	1	6	524	1,882
5:00 PM		0	100	109	23	2	5	89	95	0	11	51	2	0	2	1	3	493	1,921
5:15 PM		0	87	119	23	2	7	107	99	0	12	32	3	0	0	1	4	496	1,990
5:30 PM		0	79	123	28	4	5	98	81	0	18	47	6	0	2	2	5	498	2,011
5:45 PM		0	105	116	17	3	6	84	69	0	9	26	0	0	0	1	3	439	1,926
Count Total		0	654	865	177	22	52	727	739	0	113	377	33	0	9	14	26	3,808	0
Peak Hour	All	0	339	454	96	11	27	396	393	0	60	190	16	0	6	5	18	2,011	0
	HV	0	0	7	0	0	0	7	6	0	0	2	0	0	0	0	0	22	0
	HV%	-	0%	2%	0%	0%	0%	2%	2%	-	0%	1%	0%	-	0%	0%	0%	1%	0

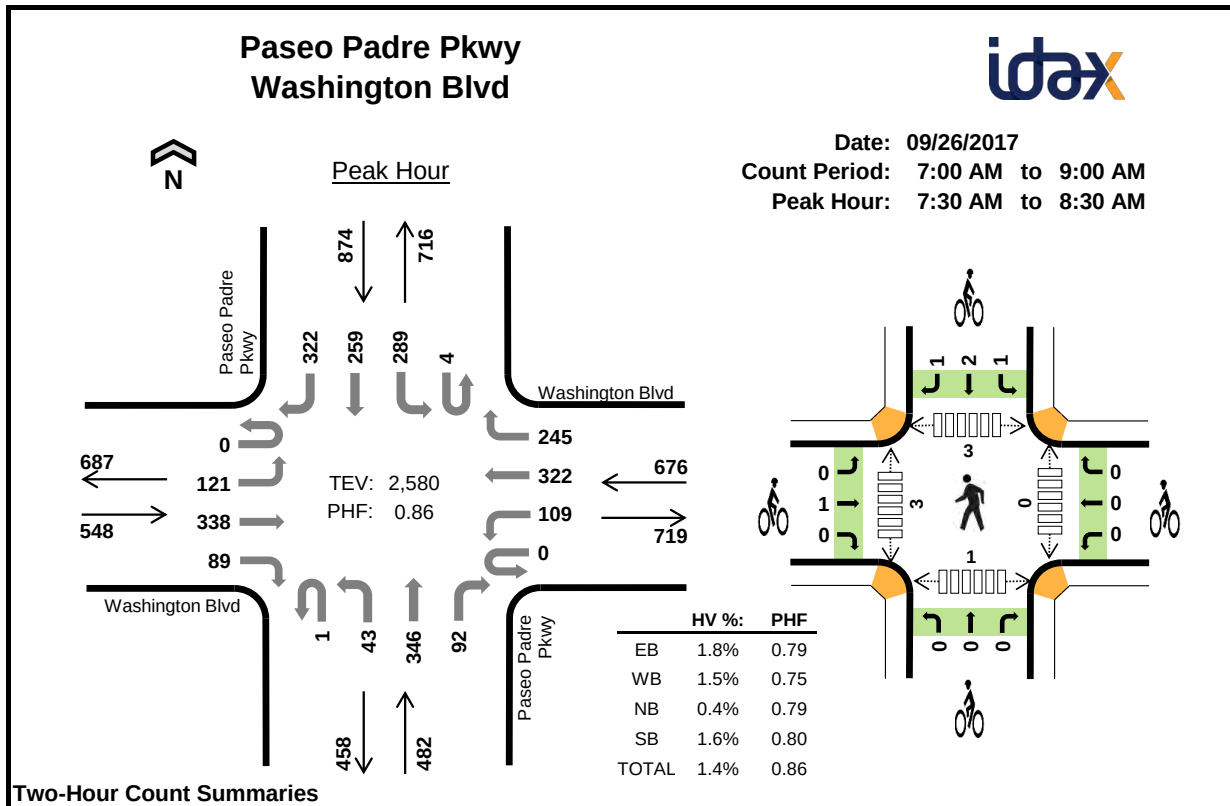
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	5	1	0	8	0	0	0	0	0	0	0	0	0	0
4:15 PM	4	2	0	0	6	0	0	0	0	0	0	0	0	0	0
4:30 PM	3	4	2	0	9	0	0	0	0	0	0	0	0	1	1
4:45 PM	2	7	0	0	9	0	0	0	0	0	0	0	0	0	0
5:00 PM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0
5:15 PM	2	3	1	0	6	0	0	0	0	0	0	0	0	0	0
5:30 PM	2	2	1	0	5	0	0	0	0	0	0	0	0	0	0
5:45 PM	2	1	0	0	3	0	0	0	0	0	1	1	0	1	3
Count Total	18	25	5	0	48	0	0	0	0	0	1	1	0	2	4
Peak Hour	7	13	2	0	22	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Washington Blvd				Washington Blvd				Luzon Dr				I680 Ramps				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	0	0	0	0	0	5	0	0	1	0	0	0	0	0	8	0
4:15 PM	0	3	1	0	0	0	1	1	0	0	0	0	0	0	0	0	6	0
4:30 PM	0	0	3	0	0	0	1	3	0	0	2	0	0	0	0	0	9	0
4:45 PM	0	0	2	0	0	0	3	4	0	0	0	0	0	0	0	0	9	32
5:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	26
5:15 PM	0	0	2	0	0	0	2	1	0	0	1	0	0	0	0	0	6	26
5:30 PM	0	0	2	0	0	0	1	1	0	0	1	0	0	0	0	0	5	22
5:45 PM	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	3	16
Count Total	0	6	12	0	0	0	9	16	0	0	5	0	0	0	0	0	48	0
Peak Hour	0	0	7	0	0	0	7	6	0	0	2	0	0	0	0	0	22	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Washington Blvd			Washington Blvd			Luzon Dr			I680 Ramps			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Washington Blvd				Washington Blvd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour	
		Eastbound				Westbound				Northbound				Southbound						
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM		0	16	20	8	0	6	36	19	0	6	22	4	2	22	17	43	221	0	
7:15 AM		0	19	39	13	1	2	35	19	1	8	13	8	0	30	20	43	251	0	
7:30 AM		0	26	95	18	0	22	74	38	0	11	46	55	2	59	34	51	531	0	
7:45 AM		0	35	114	24	0	54	92	79	0	10	117	17	0	68	66	73	749	1,752	
8:00 AM		0	44	58	25	0	17	85	77	0	12	130	10	0	79	74	95	706		2,237
8:15 AM		0	16	71	22	0	16	71	51	1	10	53	10	2	83	85	103	594		
8:30 AM		0	19	53	20	0	21	78	49	0	19	29	7	0	49	43	88	475		
8:45 AM		0	19	74	19	0	19	74	38	0	9	32	5	0	43	40	82	454	2,229	
Count Total		0	194	524	149	1	157	545	370	2	85	442	116	6	433	379	578	3,981	0	
Peak Hour	All	0	121	338	89	0	109	322	245	1	43	346	92	4	289	259	322	2,580	0	
	HV	0	2	6	2	0	0	6	4	0	0	2	0	0	6	2	6	36	0	
	HV%	-	2%	2%	2%	-	0%	2%	2%	0%	0%	1%	0%	0%	2%	1%	2%	1%	0	

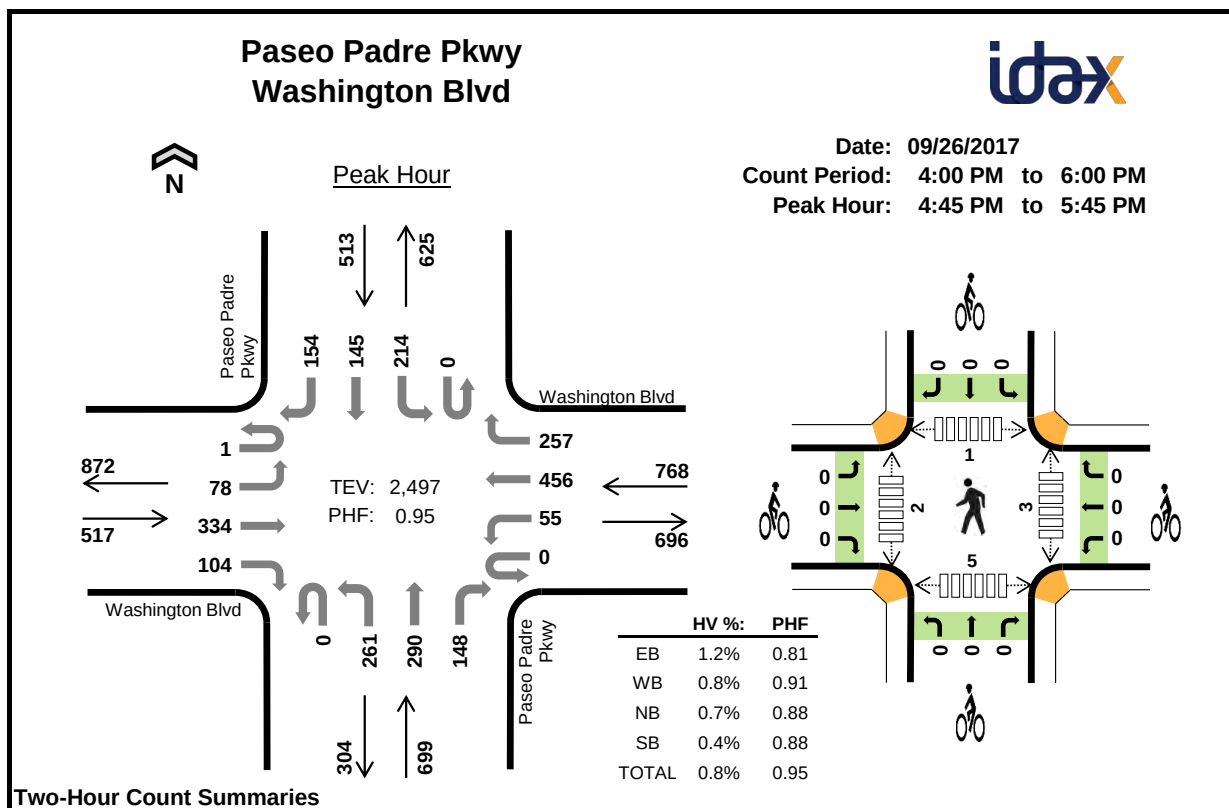
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	3	0	6	11	0	0	0	0	0	1	0	0	2	3
7:15 AM	6	1	0	1	8	0	0	0	0	0	0	1	1	0	2
7:30 AM	1	2	1	5	9	0	0	0	2	2	0	0	0	1	1
7:45 AM	2	1	0	0	3	0	0	0	2	2	0	1	1	0	2
8:00 AM	4	5	1	2	12	0	0	0	0	0	0	2	2	0	4
8:15 AM	3	2	0	7	12	1	0	0	0	1	0	0	0	0	0
8:30 AM	2	1	2	5	10	0	0	0	1	1	2	0	0	0	2
8:45 AM	1	1	0	2	4	0	0	0	0	0	0	0	2	0	2
Count Total	21	16	4	28	69	1	0	0	5	6	3	4	6	3	16
Peak Hour	10	10	2	14	36	1	0	0	4	5	0	3	3	1	7

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Washington Blvd				Washington Blvd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM	0	0	2	0	0	0	2	1	0	0	0	0	0	0	0	0	6	11	0
7:15 AM	0	2	3	1	0	1	0	0	0	0	0	0	0	0	1	0	0	8	0
7:30 AM	0	1	0	0	0	0	0	2	0	0	1	0	0	0	2	1	2	9	0
7:45 AM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	31
8:00 AM	0	1	2	1	0	0	5	0	0	0	1	0	0	0	1	0	1	12	32
8:15 AM	0	0	2	1	0	0	0	2	0	0	0	0	0	0	3	1	3	12	36
8:30 AM	0	0	1	1	0	0	1	0	0	1	0	1	0	0	2	1	2	10	37
8:45 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	4	38
Count Total	0	4	13	4	0	1	10	5	0	1	2	1	0	0	9	4	15	69	0
Peak Hour	0	2	6	2	0	0	6	4	0	0	2	0	0	0	6	2	6	36	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Washington Blvd			Washington Blvd			Paseo Padre Pkwy			Paseo Padre Pkwy			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Count Total	0	1	0	0	0	0	0	0	0	0	0	0	1	3	1	6	
Peak Hour	0	1	0	0	0	0	0	0	0	0	0	0	1	2	1	5	

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Washington Blvd				Washington Blvd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	19	66	15	0	14	93	59	0	76	52	22	0	43	41	23	523	0
4:15 PM		0	16	64	21	0	12	87	66	0	79	56	29	0	43	43	39	555	0
4:30 PM		0	23	58	19	0	6	108	44	0	75	72	31	1	37	24	40	538	0
4:45 PM		1	17	83	31	0	6	147	58	0	52	72	48	0	42	38	40	635	2,251
5:00 PM		0	15	78	20	0	8	106	82	0	58	66	32	0	60	28	27	580	2,308
5:15 PM		0	19	70	24	0	27	120	60	0	72	73	28	0	51	31	50	625	2,378
5:30 PM		0	27	103	29	0	14	83	57	0	79	79	40	0	61	48	37	657	2,497
5:45 PM		0	18	83	26	0	11	83	67	0	53	67	38	0	51	25	24	546	2,408
Count Total		1	154	605	185	0	98	827	493	0	544	537	268	1	388	278	280	4,659	0
Peak Hour	All	1	78	334	104	0	55	456	257	0	261	290	148	0	214	145	154	2,497	0
	HV	0	0	5	1	0	0	4	2	0	3	1	1	0	0	0	2	19	0
	HV%	0%	0%	1%	1%	-	0%	1%	1%	-	1%	0%	1%	-	0%	0%	1%	1%	0

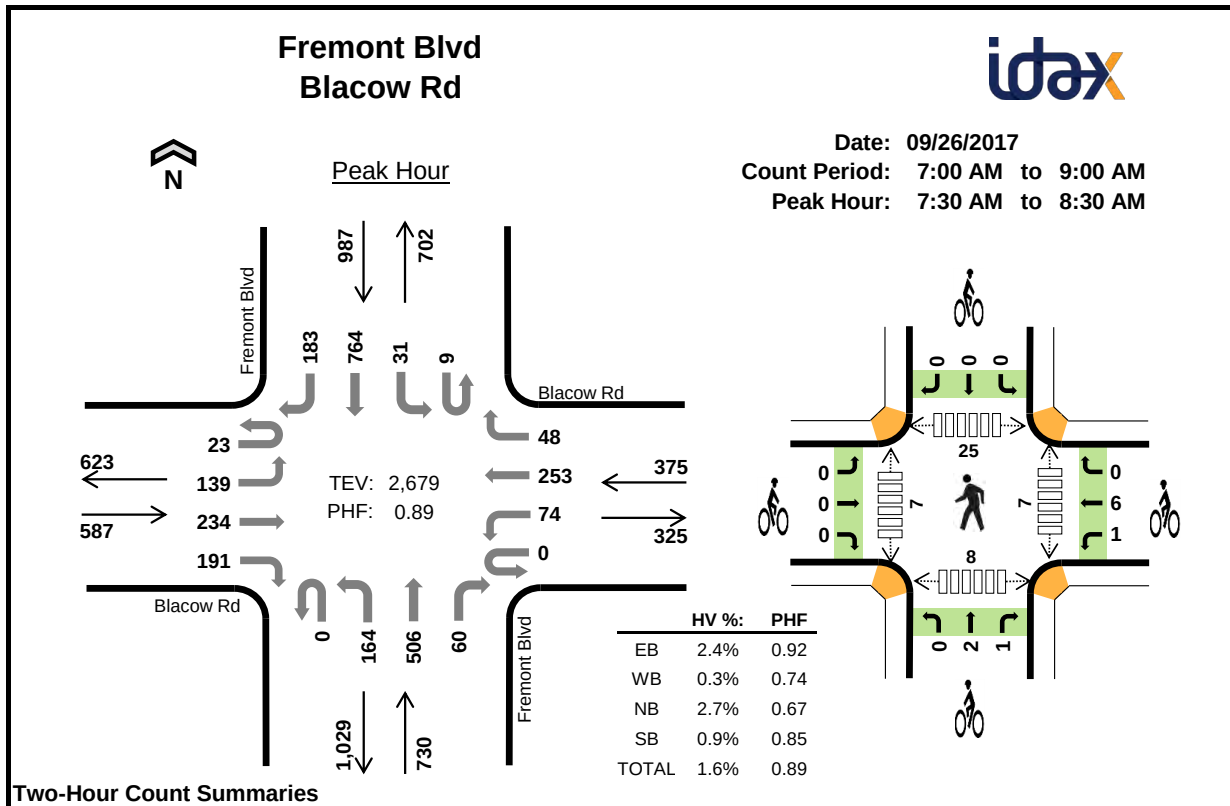
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	3	0	5	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	4	1	2	7	0	0	0	0	0	0	0	0	1	1
4:30 PM	1	1	2	2	6	0	1	0	0	1	0	1	1	0	2
4:45 PM	2	1	2	1	6	0	0	0	0	0	2	2	0	5	9
5:00 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0
5:15 PM	2	2	2	1	7	0	0	0	0	0	1	0	0	0	1
5:30 PM	2	1	1	0	4	0	0	0	0	0	0	0	1	0	1
5:45 PM	1	0	1	0	2	0	0	1	0	1	1	2	2	1	6
Count Total	8	13	12	6	39	0	1	1	0	2	4	5	4	7	20
Peak Hour	6	6	5	2	19	0	0	0	0	0	3	2	1	5	11

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Washington Blvd				Washington Blvd				Paseo Padre Pkwy				Paseo Padre Pkwy				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	0	0	0	1	1	0	0	3	0	0	0	0	0	0	0	5	0
4:15 PM	0	0	0	0	0	0	3	1	0	1	0	0	0	0	2	0	0	7	0
4:30 PM	0	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	2	6	0
4:45 PM	0	0	2	0	0	0	0	1	0	1	1	0	0	0	0	1	1	6	24
5:00 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	21
5:15 PM	0	0	1	1	0	0	2	0	0	1	0	1	0	0	0	1	1	7	21
5:30 PM	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	4	19
5:45 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	15
Count Total	0	0	7	1	0	1	9	3	0	8	3	1	0	2	0	4	4	39	0
Peak Hour	0	0	5	1	0	0	4	2	0	3	1	1	0	0	0	2	2	19	0

Two-Hour Count Summaries - Bikes																
Interval Start	Washington Blvd			Washington Blvd			Paseo Padre Pkwy			Paseo Padre Pkwy			15-min Total	Rolling One Hour		
	Eastbound			Westbound			Northbound			Southbound						
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Blacow Rd				Blacow Rd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		4	15	17	29	0	9	17	1	1	21	36	5	1	2	86	31	275	0
7:15 AM		0	23	32	36	0	14	24	5	0	40	56	7	2	3	117	33	392	0
7:30 AM		2	31	46	80	0	11	105	11	0	63	154	32	0	3	139	63	740	0
7:45 AM		5	34	74	40	0	22	62	14	0	49	203	20	2	12	175	43	755	2,162
8:00 AM		4	46	61	32	0	26	50	17	0	26	90	4	0	6	249	37	648	2,535
8:15 AM		12	28	53	39	0	15	36	6	0	26	59	4	7	10	201	40	536	2,679
8:30 AM		2	30	44	58	0	24	27	7	3	28	74	8	2	6	226	39	578	2,517
8:45 AM		13	31	44	42	1	18	38	6	2	16	56	1	2	3	208	33	514	2,276
Count Total		42	238	371	356	1	139	359	67	6	269	728	81	16	45	1,401	319	4,438	0
Peak Hour	All	23	139	234	191	0	74	253	48	0	164	506	60	9	31	764	183	2,679	0
	HV	0	8	2	4	0	1	0	0	0	2	17	1	0	0	7	2	44	0
	HV%	0%	6%	1%	2%	-	1%	0%	0%	-	1%	3%	2%	0%	0%	1%	1%	2%	0

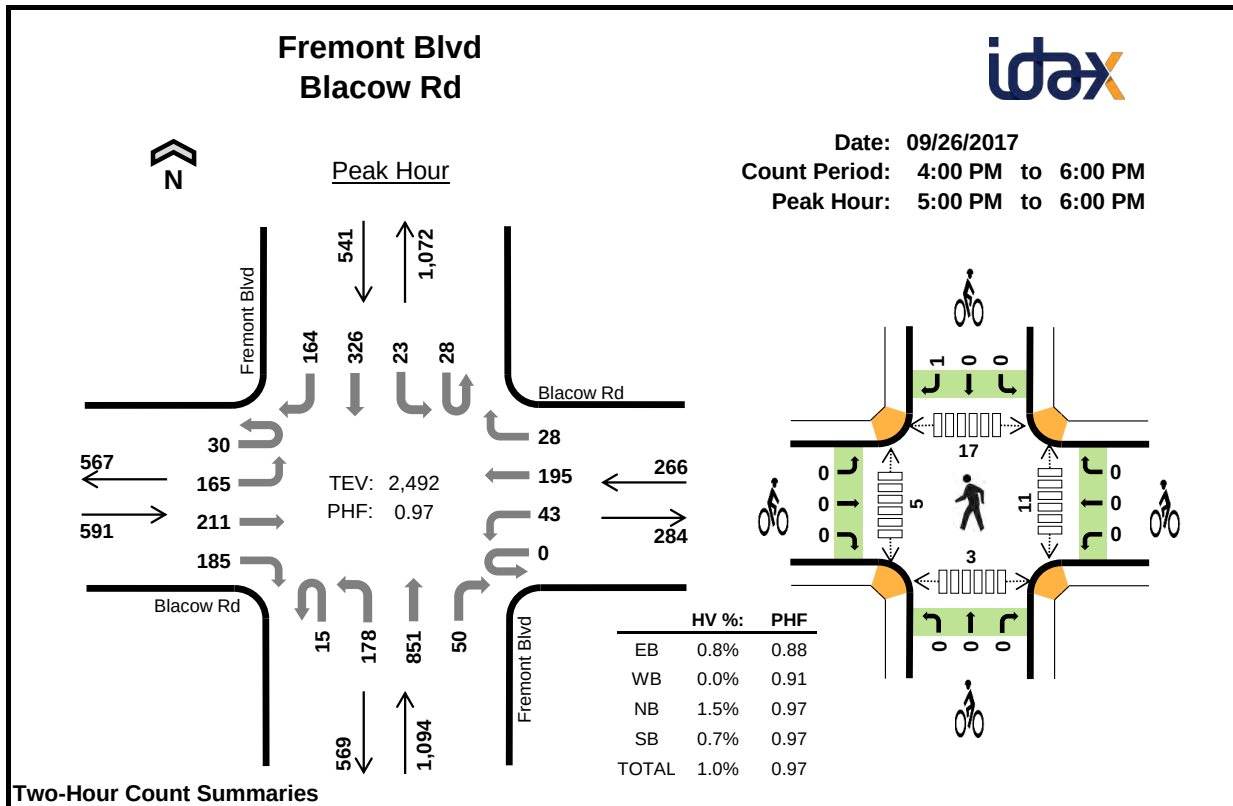
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	5	2	7	5	19	0	0	0	1	1	2	0	0	2	4
7:15 AM	0	1	2	5	8	0	0	0	0	0	2	5	6	1	14
7:30 AM	3	0	8	2	13	0	3	0	0	3	0	0	10	0	10
7:45 AM	1	0	7	2	10	0	4	0	0	4	4	5	14	6	29
8:00 AM	8	1	2	1	12	0	0	1	0	1	3	1	0	0	4
8:15 AM	2	0	3	4	9	0	0	2	0	2	0	1	1	2	4
8:30 AM	1	2	4	5	12	0	0	0	3	3	0	1	2	0	3
8:45 AM	0	3	0	5	8	0	0	0	3	3	1	1	2	2	6
Count Total	20	9	33	29	91	0	7	3	7	17	12	14	35	13	74
Peak Hour	14	1	20	9	44	0	7	3	0	10	7	7	25	8	47

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Blacow Rd				Blacow Rd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	3	0	2	0	0	2	0	1	2	4	0	0	0	4	1	19	0
7:15 AM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	5	0	8	0
7:30 AM	0	2	1	0	0	0	0	0	0	1	7	0	0	0	2	0	13	0
7:45 AM	0	0	1	0	0	0	0	0	0	1	6	0	0	0	2	0	10	50
8:00 AM	0	6	0	2	0	1	0	0	0	0	2	0	0	0	1	0	12	43
8:15 AM	0	0	0	2	0	0	0	0	0	0	2	1	0	0	2	2	9	44
8:30 AM	0	0	0	1	0	0	1	1	0	0	4	0	0	0	2	3	12	43
8:45 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	2	3	8	41
Count Total	0	11	2	7	0	4	4	1	1	5	26	1	0	0	20	9	91	0
Peak Hour	0	8	2	4	0	1	0	0	0	2	17	1	0	0	7	2	44	0

Two-Hour Count Summaries - Bikes																
Interval Start	Blacow Rd			Blacow Rd			Fremont Blvd			Fremont Blvd			15-min Total	Rolling One Hour		
	Eastbound			Westbound			Northbound			Southbound						
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0		
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:30 AM	0	0	0	1	2	0	0	0	0	0	0	0	3	0		
7:45 AM	0	0	0	0	4	0	0	0	0	0	0	0	4	8		
8:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	1	8		
8:15 AM	0	0	0	0	0	0	0	2	0	0	0	0	2	10		
8:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	3	10		
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	2	3	9		
Count Total	0	0	0	1	6	0	0	2	1	0	5	2	17	0		
Peak Hour	0	0	0	1	6	0	0	2	1	0	0	0	10	0		

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Blacow Rd				Blacow Rd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		7	34	45	22	0	14	20	2	5	36	170	12	6	5	54	20	452	0
4:15 PM		10	29	34	37	1	10	28	3	1	38	188	11	5	8	68	29	500	0
4:30 PM		5	32	50	18	0	12	42	9	0	45	236	14	5	10	83	24	585	0
4:45 PM		5	40	38	21	0	13	30	7	3	40	240	12	6	7	68	39	569	2,106
5:00 PM		4	37	57	36	0	15	45	6	3	49	215	13	5	5	80	43	613	2,267
5:15 PM		11	42	50	48	0	12	41	7	2	45	223	12	6	5	86	37	627	2,394
5:30 PM		7	37	48	47	0	4	55	8	7	48	205	7	8	8	89	35	613	2,422
5:45 PM		8	49	56	54	0	12	54	7	3	36	208	18	9	5	71	49	639	2,492
Count Total		57	300	378	283	1	92	315	49	24	337	1,685	99	50	53	599	276	4,598	0
Peak Hour	All	30	165	211	185	0	43	195	28	15	178	851	50	28	23	326	164	2,492	0
	HV	0	1	1	3	0	0	0	0	0	1	15	0	0	0	3	1	25	0
	HV%	0%	1%	0%	2%	-	0%	0%	0%	0%	1%	2%	0%	0%	0%	1%	1%	1%	0

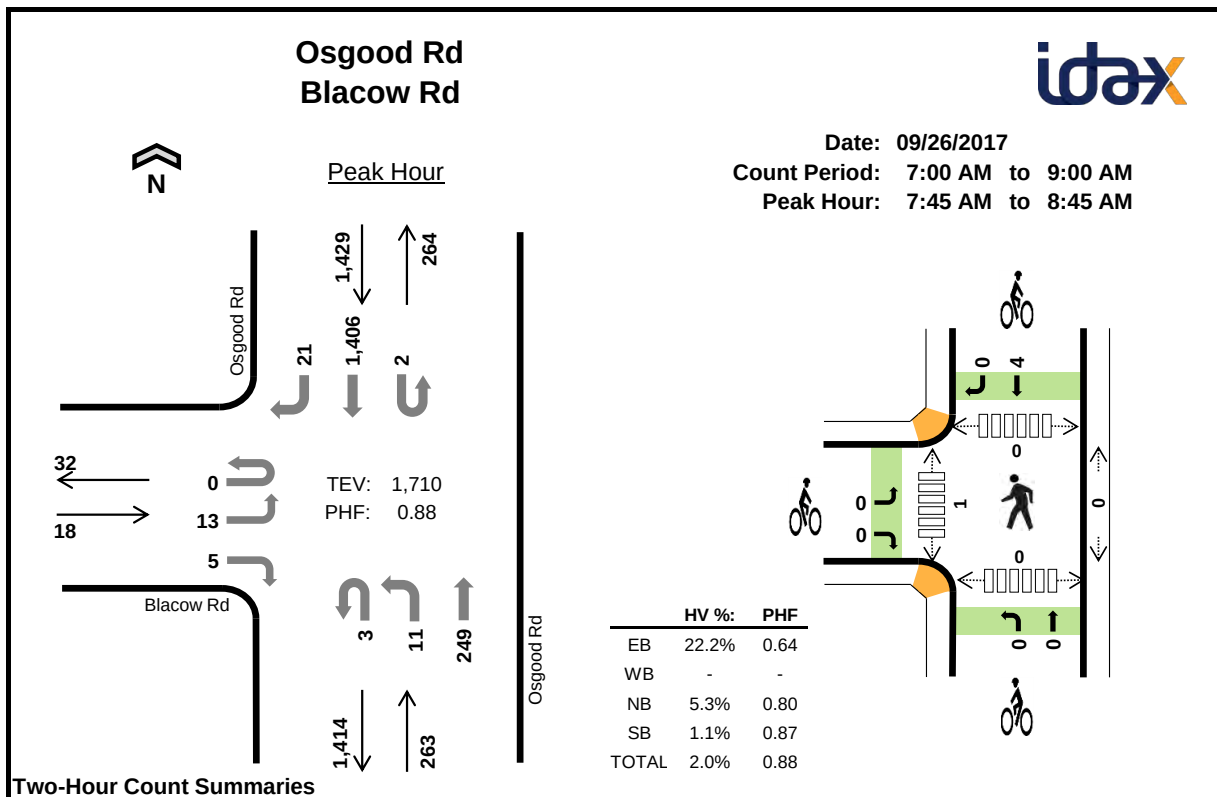
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	1	5	2	12	0	0	0	0	0	0	1	0	1	2
4:15 PM	1	0	2	2	5	0	0	3	0	3	2	2	3	0	7
4:30 PM	1	1	7	1	10	1	0	0	2	3	1	0	0	0	1
4:45 PM	1	1	3	2	7	0	0	0	0	0	1	1	0	5	7
5:00 PM	2	0	2	1	5	0	0	0	1	1	0	0	3	0	3
5:15 PM	1	0	3	1	5	0	0	0	0	0	6	4	6	2	18
5:30 PM	2	0	5	0	7	0	0	0	0	0	2	1	2	1	6
5:45 PM	0	0	6	2	8	0	0	0	0	0	3	0	6	0	9
Count Total	12	3	33	11	59	1	0	3	3	7	15	9	20	9	53
Peak Hour	5	0	16	4	25	0	0	0	1	1	11	5	17	3	36

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Blacow Rd				Blacow Rd				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	0	3	0	1	0	0	1	1	2	1	0	0	1	1	12	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	2	0	0	0	2	0	5	0
4:30 PM	0	1	0	0	0	1	0	0	0	3	3	1	0	0	1	0	10	0
4:45 PM	0	0	1	0	0	0	1	0	1	0	2	0	0	0	2	0	7	34
5:00 PM	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	1	5	27
5:15 PM	0	0	1	0	0	0	0	0	0	1	2	0	0	0	1	0	5	27
5:30 PM	0	1	0	1	0	0	0	0	0	0	5	0	0	0	0	0	7	24
5:45 PM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	2	0	8	25
Count Total	0	4	2	6	0	2	1	0	2	5	24	2	0	0	9	2	59	0
Peak Hour	0	1	1	3	0	0	0	0	0	1	15	0	0	0	3	1	25	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Blacow Rd			Blacow Rd			Fremont Blvd			Fremont Blvd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	3	0	0	0	0	3	0				
4:30 PM	0	0	1	0	0	0	0	0	0	0	2	0	3	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	7				
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
Count Total	0	0	1	0	0	0	0	3	0	0	2	1	7	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	1	1	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

**Two-Hour Count Summaries**

Interval Start		Blacow Rd				0				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	4	0	2	0	0	0	0	2	4	48	0	0	0	153	2	215	0
7:15 AM		0	9	0	1	0	0	0	0	0	2	39	0	0	0	209	4	264	0
7:30 AM		0	4	0	1	0	0	0	0	0	2	72	0	0	0	212	6	297	0
7:45 AM		0	2	0	1	0	0	0	0	1	3	78	0	2	0	330	5	422	1,198
8:00 AM		0	3	0	0	0	0	0	0	1	2	67	0	0	0	407	4	484	1,467
8:15 AM		0	3	0	2	0	0	0	0	1	0	50	0	0	0	357	6	419	1,622
8:30 AM		0	5	0	2	0	0	0	0	0	6	54	0	0	0	312	6	385	1,710
8:45 AM		0	3	0	2	0	0	0	0	1	3	69	0	0	0	321	5	404	1,692
Count Total		0	33	0	11	0	0	0	0	6	22	477	0	2	0	2,301	38	2,890	0
Peak Hour	All	0	13	0	5	0	0	0	0	3	11	249	0	2	0	1,406	21	1,710	0
	HV	0	4	0	0	0	0	0	0	0	1	13	0	0	0	13	3	34	0
	HV%	-	31%	-	0%	-	-	-	-	0%	9%	5%	-	0%	-	1%	14%	2%	0

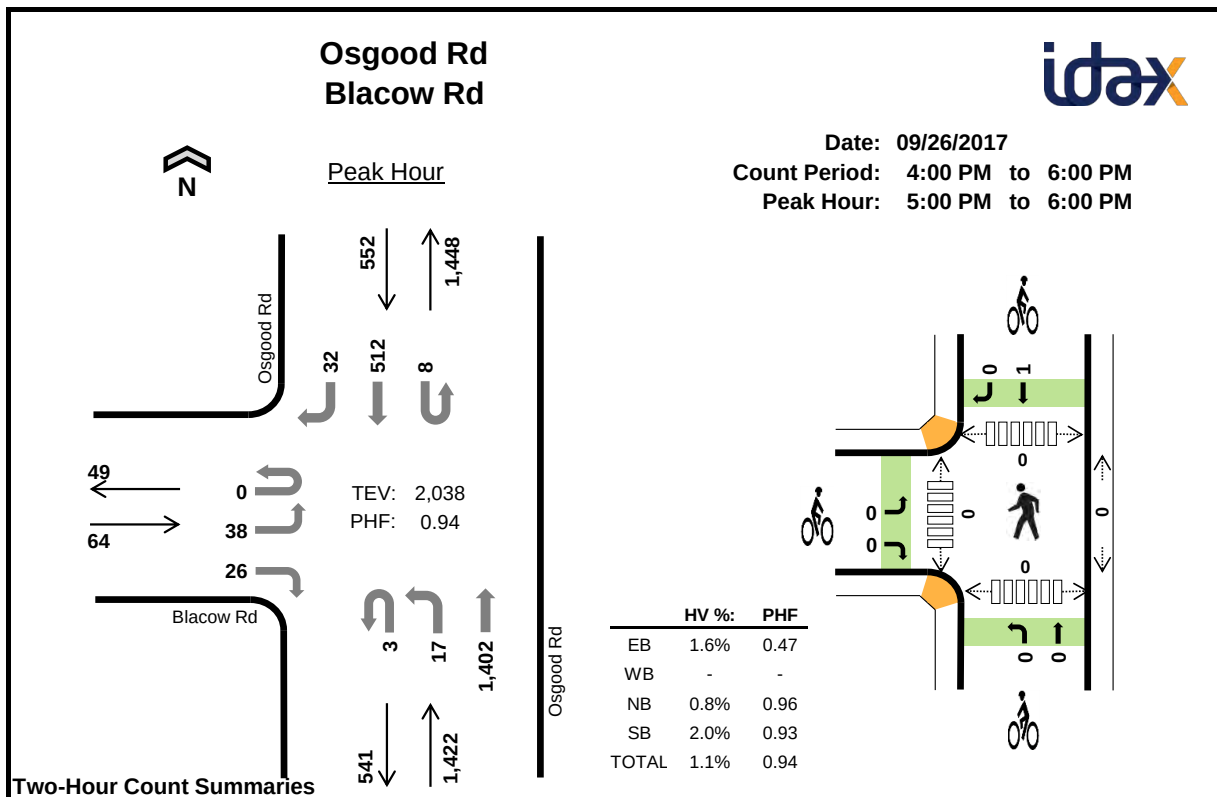
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	3	0	10	2	15	0	0	0	1	1	0	0	0	0	0
7:15 AM	2	0	4	5	11	0	0	0	1	1	0	0	0	0	0
7:30 AM	0	0	4	5	9	0	0	0	1	1	0	0	0	0	0
7:45 AM	0	0	3	4	7	0	0	0	1	1	0	0	0	0	0
8:00 AM	1	0	4	2	7	0	0	0	2	2	0	1	0	0	1
8:15 AM	1	0	3	4	8	0	0	0	1	1	0	0	0	0	0
8:30 AM	2	0	4	6	12	0	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	4	4	9	0	0	0	1	1	0	0	0	0	0
Count Total	10	0	36	32	78	0	0	0	8	8	0	1	0	0	1
Peak Hr	4	0	14	16	34	0	0	0	4	4	0	1	0	0	1

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Blacow Rd				0				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	3	0	0	0	0	0	0	0	2	8	0	0	0	2	0	15	0
7:15 AM	0	1	0	1	0	0	0	0	0	1	3	0	0	0	5	0	11	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	1	9	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	1	7	42
8:00 AM	0	1	0	0	0	0	0	0	0	0	4	0	0	0	2	0	7	34
8:15 AM	0	1	0	0	0	0	0	0	0	0	3	0	0	0	4	0	8	31
8:30 AM	0	2	0	0	0	0	0	0	0	1	3	0	0	0	4	2	12	34
8:45 AM	0	1	0	0	0	0	0	0	0	0	4	0	0	0	3	1	9	36
Count Total	0	9	0	1	0	0	0	0	0	4	32	0	0	0	27	5	78	0
Peak Hour	0	4	0	0	0	0	0	0	0	1	13	0	0	0	13	3	34	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Blacow Rd			0			Osgood Rd			Osgood Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	4				
8:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	5				
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	5				
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4				
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	4				
Count Total	0	0	0	0	0	0	0	0	0	0	8	0	8	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	4	0	4	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Blacow Rd				0				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
	4:00 PM	0	5	0	4	0	0	0	0	4	6	275	0	2	0	110	12	418	0
	4:15 PM	0	5	0	7	0	0	0	0	1	8	254	0	1	0	124	16	416	0
	4:30 PM	0	21	0	6	0	0	0	0	5	3	292	0	0	0	99	8	434	0
	4:45 PM	0	4	0	1	0	0	0	0	2	6	270	0	0	0	142	2	427	1,695
	5:00 PM	0	12	0	1	0	0	0	0	1	6	327	0	2	0	122	7	478	1,755
	5:15 PM	0	3	0	5	0	0	0	0	1	4	365	0	2	0	134	13	527	1,866
	5:30 PM	0	17	0	17	0	0	0	0	0	2	363	0	1	0	137	7	544	1,976
	5:45 PM	0	6	0	3	0	0	0	0	1	5	347	0	3	0	119	5	489	2,038
Count Total		0	73	0	44	0	0	0	0	15	40	2,493	0	11	0	987	70	3,733	0
Peak Hour	All	0	38	0	26	0	0	0	0	3	17	1,402	0	8	0	512	32	2,038	0
	HV	0	0	0	1	0	0	0	0	0	0	11	0	0	0	10	1	23	0
	HV%	-	0%	-	4%	-	-	-	-	0%	0%	1%	-	0%	-	2%	3%	1%	0

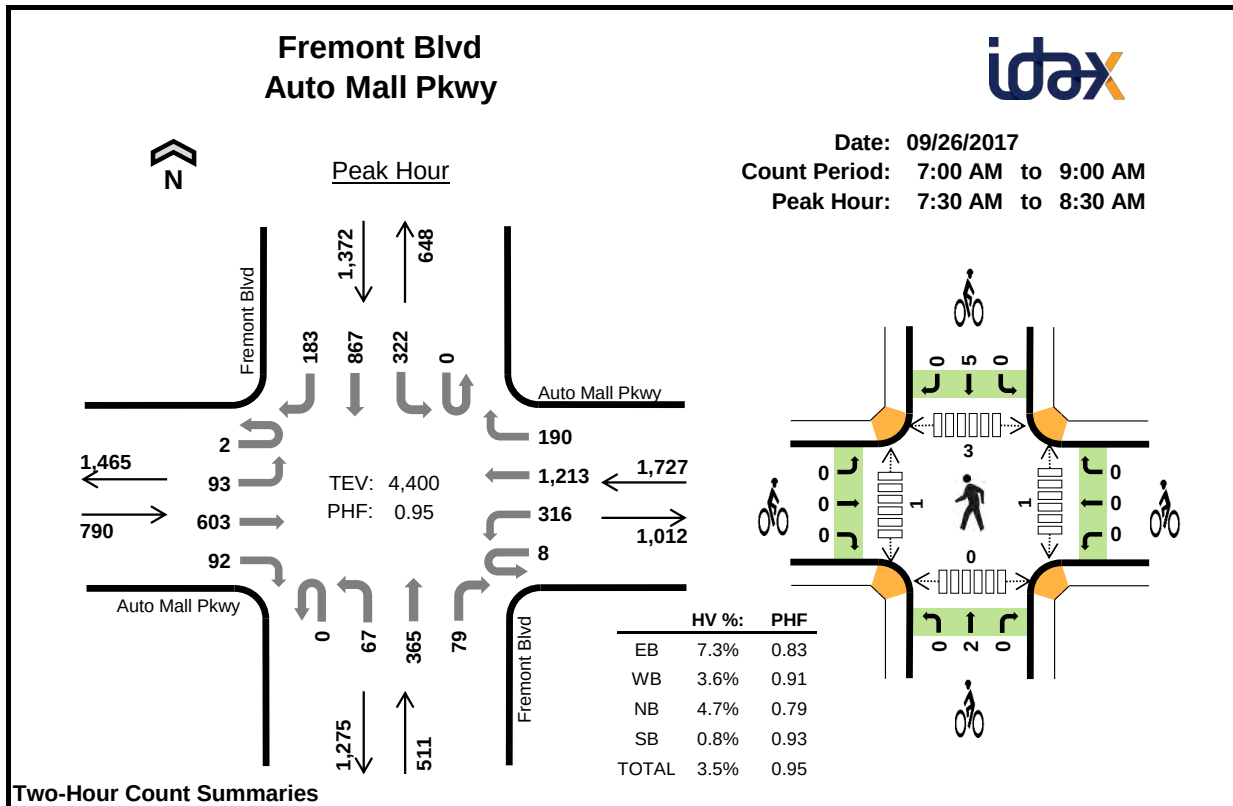
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	3	5	8	0	0	0	2	2	0	0	0	0	0
4:15 PM	0	0	5	3	8	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	7	4	11	0	0	1	0	1	0	0	0	0	0
4:45 PM	1	0	4	2	7	0	0	0	1	1	0	0	0	0	0
5:00 PM	0	0	3	4	7	0	0	0	0	0	0	0	0	0	0
5:15 PM	1	0	1	1	3	0	0	0	1	1	0	0	0	0	0
5:30 PM	0	0	4	1	5	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	3	5	8	0	0	0	0	0	0	0	0	0	0
Count Total	2	0	30	25	57	0	0	1	4	5	0	0	0	0	0
Peak Hr	1	0	11	11	23	0	0	0	1	1	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Blacow Rd				0				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	2	8	0
4:15 PM	0	0	0	0	0	0	0	0	0	1	4	0	0	0	2	1	8	0
4:30 PM	0	0	0	0	0	0	0	0	2	0	5	0	0	0	2	2	11	0
4:45 PM	0	1	0	0	0	0	0	0	0	1	3	0	0	0	2	0	7	34
5:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	7	33
5:15 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	3	28
5:30 PM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	5	22
5:45 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	1	8	23
Count Total	0	1	0	1	0	0	0	0	2	2	26	0	0	0	19	6	57	0
Peak Hour	0	0	0	1	0	0	0	0	0	0	11	0	0	0	10	1	23	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Blacow Rd			0			Osgood Rd			Osgood Rd			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
4:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2	0			
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0			
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	4			
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2			
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	3			
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2			
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
Count Total	0	0	0	0	0	0	0	1	0	0	4	0	5	0			
Peak Hour	0	0	0	0	0	0	0	0	0	0	1	0	1	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Auto Mall Pkwy				Auto Mall Pkwy				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		1	9	110	14	1	73	321	26	0	8	47	20	0	37	116	22	805	0
7:15 AM		0	13	101	16	3	91	306	36	0	12	91	23	0	45	155	61	953	0
7:30 AM		1	18	140	10	3	69	302	100	0	13	126	23	0	78	183	40	1,106	0
7:45 AM		0	21	147	31	2	68	324	57	0	8	132	14	0	90	212	53	1,159	4,023
8:00 AM		1	20	144	20	2	104	293	14	0	24	63	19	0	69	255	44	1,072	4,290
8:15 AM		0	34	172	31	1	75	294	19	0	22	44	23	0	85	217	46	1,063	4,400
8:30 AM		0	14	165	17	5	96	278	15	0	16	49	17	0	76	261	57	1,066	4,360
8:45 AM		0	13	207	42	6	95	344	25	0	14	35	15	0	74	222	44	1,136	4,337
Count Total		3	142	1,186	181	23	671	2,462	292	0	117	587	154	0	554	1,621	367	8,360	0
Peak Hour	All	2	93	603	92	8	316	1,213	190	0	67	365	79	0	322	867	183	4,400	0
	HV	0	4	46	8	0	13	49	0	0	10	4	10	0	2	5	4	155	0
	HV%	0%	4%	8%	9%	0%	4%	4%	0%	-	15%	1%	13%	-	1%	1%	2%	4%	0

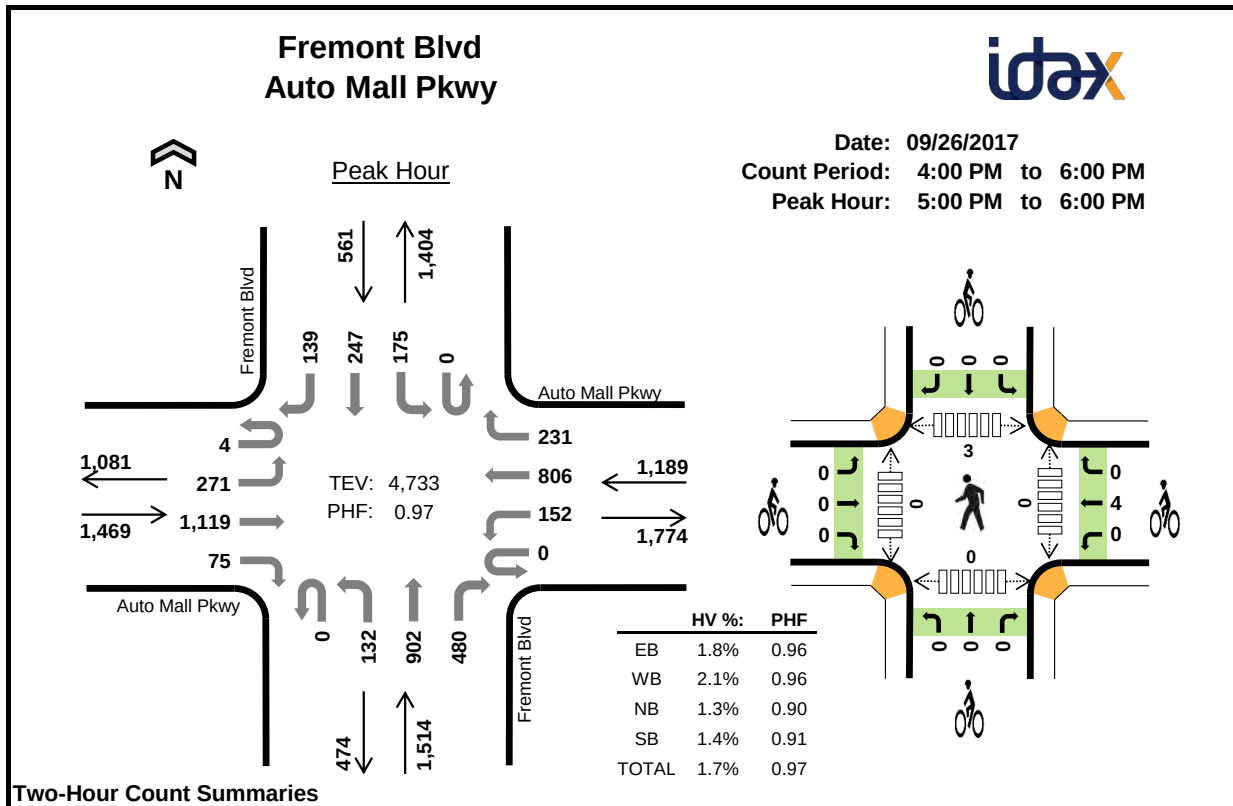
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	13	19	11	4	47	0	0	0	0	0	0	0	2	0	2
7:15 AM	17	18	5	3	43	0	0	0	1	1	1	0	1	2	4
7:30 AM	12	18	8	2	40	0	0	0	1	1	1	0	1	0	2
7:45 AM	15	20	3	2	40	0	0	0	0	0	0	0	1	0	1
8:00 AM	17	13	7	3	40	0	0	1	2	3	0	1	1	0	2
8:15 AM	14	11	6	4	35	0	0	1	2	3	0	0	0	0	0
8:30 AM	6	13	4	5	28	0	0	0	0	0	0	0	0	0	0
8:45 AM	14	17	4	8	43	0	0	0	2	2	0	1	0	1	2
Count Total	108	129	48	31	316	0	0	2	8	10	2	2	6	3	13
Peak Hour	58	62	24	11	155	0	0	2	5	7	1	1	3	0	5

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Auto Mall Pkwy				Auto Mall Pkwy				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	2	10	1	0	2	17	0	0	0	4	7	0	2	2	0	47	0
7:15 AM	0	3	12	2	0	2	16	0	0	0	1	4	0	1	1	1	43	0
7:30 AM	0	1	11	0	0	5	13	0	0	4	1	3	0	1	0	1	40	0
7:45 AM	0	1	11	3	0	2	18	0	0	1	1	1	0	1	1	0	40	170
8:00 AM	0	1	14	2	0	5	8	0	0	2	2	3	0	0	1	2	40	163
8:15 AM	0	1	10	3	0	1	10	0	0	3	0	3	0	0	3	1	35	155
8:30 AM	0	0	6	0	0	2	11	0	0	1	3	0	0	2	2	1	28	143
8:45 AM	0	2	10	2	0	0	16	1	0	1	0	3	0	3	3	2	43	146
Count Total	0	11	84	13	0	19	109	1	0	12	12	24	0	10	13	8	316	0
Peak Hour	0	4	46	8	0	13	49	0	0	10	4	10	0	2	5	4	155	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Auto Mall Pkwy			Auto Mall Pkwy			Fremont Blvd			Fremont Blvd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2				
8:00 AM	0	0	0	0	0	0	0	1	0	0	2	0	3	5				
8:15 AM	0	0	0	0	0	0	0	1	0	0	2	0	3	7				
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6				
8:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	8				
Count Total	0	0	0	0	0	0	0	2	0	0	8	0	10	0				
Peak Hour	0	0	0	0	0	0	0	2	0	0	5	0	7	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Auto Mall Pkwy				Auto Mall Pkwy				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		2	61	258	12	0	35	186	46	0	22	157	116	0	39	51	34	1,019	0
4:15 PM		2	58	265	18	3	31	208	42	0	21	191	101	0	38	63	42	1,083	0
4:30 PM		2	79	250	24	0	32	177	39	0	34	218	120	0	30	56	34	1,095	0
4:45 PM		1	83	249	17	0	30	172	39	0	24	209	83	1	27	56	40	1,031	4,228
5:00 PM		1	68	293	18	0	37	212	51	0	31	194	116	0	42	49	28	1,140	4,349
5:15 PM		1	62	277	14	0	42	212	42	0	27	255	139	0	39	70	43	1,223	4,489
5:30 PM		2	69	261	22	0	34	188	62	0	40	239	123	0	45	71	38	1,194	4,588
5:45 PM		0	72	288	21	0	39	194	76	0	34	214	102	0	49	57	30	1,176	4,733
Count Total		11	552	2,141	146	3	280	1,549	397	0	233	1,677	900	1	309	473	289	8,961	0
Peak Hour	All	4	271	1,119	75	0	152	806	231	0	132	902	480	0	175	247	139	4,733	0
	HV	0	5	21	1	0	5	17	3	0	0	7	13	0	3	1	4	80	0
	HV%	0%	2%	2%	1%	-	3%	2%	1%	-	0%	1%	3%	-	2%	0%	3%	2%	0

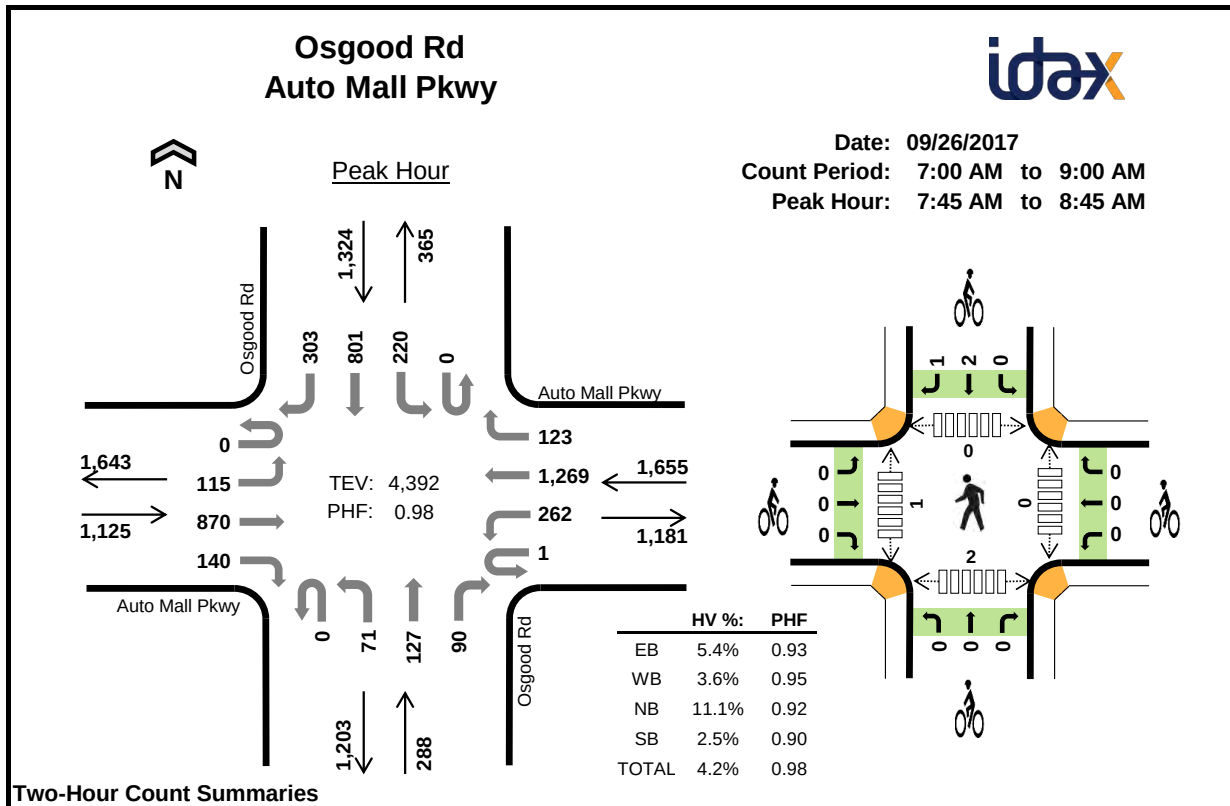
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	8	11	4	6	29	0	0	0	1	1	3	0	0	2	5
4:15 PM	10	7	5	2	24	0	0	0	0	0	2	0	0	0	2
4:30 PM	3	7	6	1	17	0	0	0	0	0	0	0	0	1	1
4:45 PM	6	13	4	4	27	0	0	0	0	0	3	1	1	0	5
5:00 PM	5	7	4	3	19	0	1	0	0	1	0	0	0	0	0
5:15 PM	9	10	7	3	29	0	2	0	0	2	0	0	0	0	0
5:30 PM	4	2	5	1	12	0	0	0	0	0	0	0	2	0	2
5:45 PM	9	6	4	1	20	0	1	0	0	1	0	0	1	0	1
Count Total	54	63	39	21	177	0	4	0	1	5	8	1	4	3	16
Peak Hour	27	25	20	8	80	0	4	0	0	4	0	0	3	0	3

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Auto Mall Pkwy				Auto Mall Pkwy				Fremont Blvd				Fremont Blvd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	6	1	0	0	11	0	0	0	2	2	0	2	3	1	29	0
4:15 PM	0	1	7	2	0	0	7	0	0	0	1	4	0	0	1	1	24	0
4:30 PM	0	1	2	0	0	1	6	0	0	0	1	5	0	1	0	0	17	0
4:45 PM	0	1	5	0	0	4	9	0	0	0	2	2	1	1	0	2	27	97
5:00 PM	0	1	4	0	0	1	6	0	0	0	1	3	0	1	1	1	19	87
5:15 PM	0	1	7	1	0	3	6	1	0	0	1	6	0	1	0	2	29	92
5:30 PM	0	2	2	0	0	1	1	0	0	0	3	2	0	1	0	0	12	87
5:45 PM	0	1	8	0	0	0	4	2	0	0	2	2	0	0	0	1	20	80
Count Total	0	9	41	4	0	10	50	3	0	0	13	26	1	7	5	8	177	0
Peak Hour	0	5	21	1	0	5	17	3	0	0	7	13	0	3	1	4	80	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Auto Mall Pkwy			Auto Mall Pkwy			Fremont Blvd			Fremont Blvd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
5:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	1				
5:15 PM	0	0	0	0	2	0	0	0	0	0	0	0	2	3				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3				
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	4				
Count Total	0	0	0	0	4	0	0	0	0	0	1	0	5	0				
Peak Hour	0	0	0	0	4	0	0	0	0	0	0	0	4	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Auto Mall Pkwy				Auto Mall Pkwy				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	26	117	21	0	65	363	11	0	19	21	25	1	19	90	48	826	0
7:15 AM		0	20	147	23	0	37	385	16	0	22	21	21	0	20	136	65	913	0
7:30 AM		0	18	221	34	0	57	389	40	0	20	27	21	0	23	134	56	1,040	0
7:45 AM		0	34	230	36	1	63	338	33	0	22	37	17	0	46	178	83	1,118	3,897
8:00 AM		0	30	216	42	0	64	332	30	0	16	25	18	0	56	216	64	1,109	4,180
8:15 AM		0	23	186	25	0	73	302	30	0	19	27	29	0	64	217	86	1,081	4,348
8:30 AM		0	28	238	37	0	62	297	30	0	14	38	26	0	54	190	70	1,084	4,392
8:45 AM		0	37	195	39	0	74	341	20	1	24	39	21	0	44	158	67	1,060	4,334
Count Total		0	216	1,550	257	1	495	2,747	210	1	156	235	178	1	326	1,319	539	8,231	0
Peak Hour	All	0	115	870	140	1	262	1,269	123	0	71	127	90	0	220	801	303	4,392	0
	HV	0	13	43	5	0	9	44	6	0	6	9	17	0	14	12	7	185	0
	HV%	-	11%	5%	4%	0%	3%	3%	5%	-	8%	7%	19%	-	6%	1%	2%	4%	0

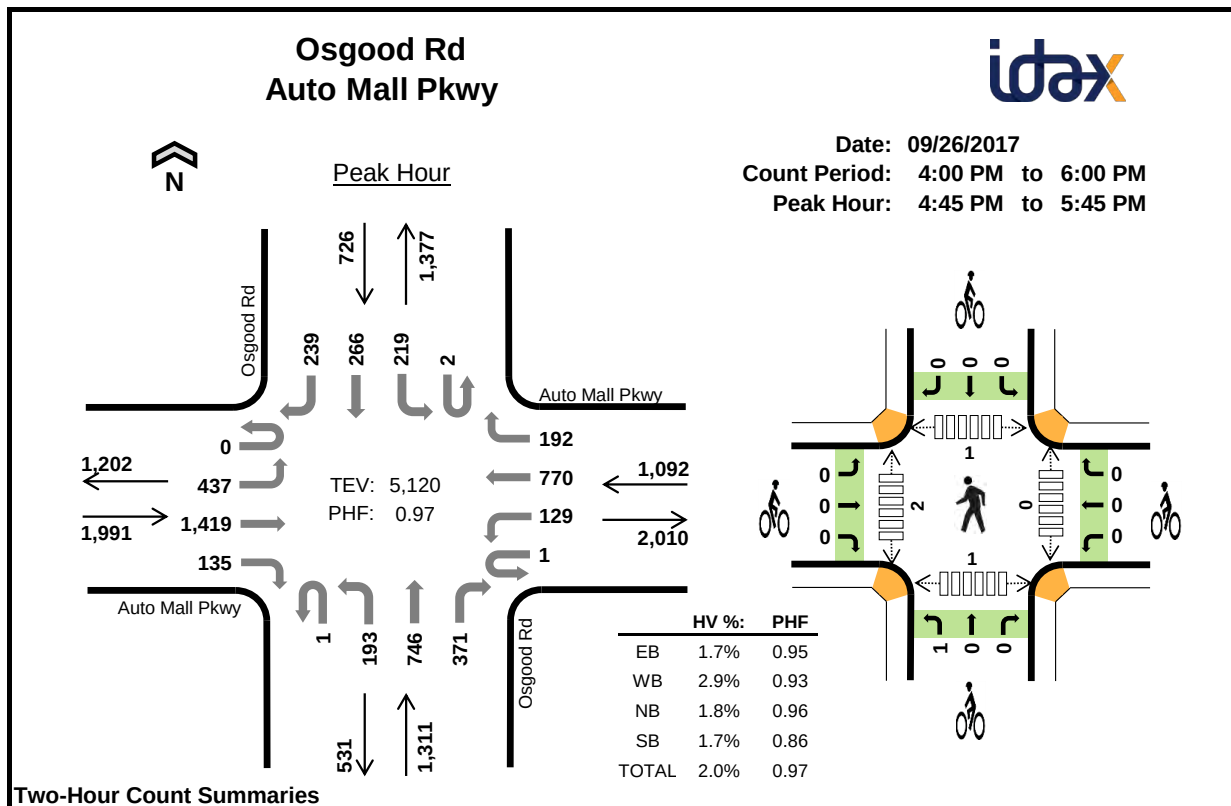
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	17	16	8	12	53	0	0	0	0	0	0	1	0	0	1
7:15 AM	14	17	12	9	52	0	0	0	1	1	0	0	0	0	0
7:30 AM	14	15	8	11	48	0	0	0	1	1	0	1	0	1	2
7:45 AM	17	17	6	10	50	0	0	0	2	2	0	1	0	0	1
8:00 AM	23	15	5	3	46	0	0	0	0	0	0	0	0	1	1
8:15 AM	10	13	9	9	41	0	0	0	1	1	0	0	0	0	0
8:30 AM	11	14	12	11	48	0	0	0	0	0	0	0	0	1	1
8:45 AM	18	20	6	4	48	0	1	0	2	3	0	0	0	0	0
Count Total	124	127	66	69	386	0	1	0	7	8	0	3	0	3	6
Peak Hour	61	59	32	33	185	0	0	0	3	3	0	1	0	2	3

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Auto Mall Pkwy				Auto Mall Pkwy				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	6	11	0	0	1	12	3	0	1	2	5	0	3	5	4	53	0
7:15 AM	0	0	12	2	0	3	13	1	0	3	3	6	0	2	5	2	52	0
7:30 AM	0	0	12	2	0	4	10	1	0	2	2	4	0	1	4	6	48	0
7:45 AM	0	6	10	1	0	4	13	0	0	2	3	1	0	4	2	4	50	203
8:00 AM	0	5	15	3	0	1	12	2	0	0	1	4	0	0	2	1	46	196
8:15 AM	0	0	10	0	0	1	10	2	0	3	1	5	0	4	5	0	41	185
8:30 AM	0	2	8	1	0	3	9	2	0	1	4	7	0	6	3	2	48	185
8:45 AM	0	1	16	1	0	2	15	3	0	2	2	2	0	2	1	1	48	183
Count Total	0	20	94	10	0	19	94	14	0	14	18	34	0	22	27	20	386	0
Peak Hour	0	13	43	5	0	9	44	6	0	6	9	17	0	14	12	7	185	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Auto Mall Pkwy			Auto Mall Pkwy			Osgood Rd			Osgood Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	2	4				
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4				
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	4				
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3				
8:45 AM	0	0	0	0	1	0	0	0	0	0	2	0	3	4				
Count Total	0	0	0	0	1	0	0	0	0	0	6	1	8	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	2	1	3	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Auto Mall Pkwy				Auto Mall Pkwy				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	95	232	23	0	40	151	30	0	64	174	87	2	62	56	49	1,065	0
4:15 PM		0	79	257	28	0	23	167	41	0	32	160	83	3	53	74	68	1,068	0
4:30 PM		0	99	309	24	0	38	161	31	0	41	155	70	2	50	49	51	1,080	0
4:45 PM		0	90	361	38	0	28	199	40	0	32	186	114	2	43	73	49	1,255	4,468
5:00 PM		0	110	324	27	1	27	175	41	1	46	202	92	0	73	68	69	1,256	4,659
5:15 PM		0	104	381	38	0	42	196	56	0	53	199	72	0	60	58	55	1,314	4,905
5:30 PM		0	133	353	32	0	32	200	55	0	62	159	93	0	43	67	66	1,295	5,120
5:45 PM		0	109	324	35	0	37	176	71	0	60	217	76	1	50	59	39	1,254	5,119
Count Total		0	819	2,541	245	1	267	1,425	365	1	390	1,452	687	10	434	504	446	9,587	0
Peak Hour	All	0	437	1,419	135	1	129	770	192	1	193	746	371	2	219	266	239	5,120	0
	HV	0	10	22	2	0	5	23	4	0	4	11	8	0	3	4	5	101	0
	HV%	-	2%	2%	1%	0%	4%	3%	2%	0%	2%	1%	2%	0%	1%	2%	2%	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	9	8	7	3	27	0	0	0	0	0	0	0	0	0	0
4:15 PM	9	9	8	5	31	0	1	0	0	1	0	0	0	0	0
4:30 PM	9	12	10	4	35	0	0	3	0	3	0	0	0	2	2
4:45 PM	10	16	10	2	38	0	0	1	0	1	0	0	0	1	1
5:00 PM	3	4	6	5	18	0	0	0	0	0	0	1	0	0	1
5:15 PM	14	8	6	1	29	0	0	0	0	0	0	1	1	0	2
5:30 PM	7	4	1	4	16	0	0	0	0	0	0	0	0	0	0
5:45 PM	12	10	5	2	29	0	0	0	0	0	0	0	0	0	0
Count Total	73	71	53	26	223	0	1	4	0	5	0	2	1	3	6
Peak Hour	34	32	23	12	101	0	0	1	0	1	0	2	1	1	4

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Auto Mall Pkwy				Auto Mall Pkwy				Osgood Rd				Osgood Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	7	0	0	2	6	0	0	2	4	1	0	0	1	2	27	0
4:15 PM	0	3	6	0	0	0	6	3	0	1	3	4	1	1	3	0	31	0
4:30 PM	0	3	6	0	0	2	10	0	0	1	9	0	0	1	3	0	35	0
4:45 PM	0	4	5	1	0	1	14	1	0	1	6	3	0	0	0	2	38	131
5:00 PM	0	1	2	0	0	1	2	1	0	1	2	3	0	2	1	2	18	122
5:15 PM	0	4	10	0	0	2	6	0	0	2	2	2	0	0	1	0	29	120
5:30 PM	0	1	5	1	0	1	1	2	0	0	1	0	0	1	2	1	16	101
5:45 PM	0	1	11	0	0	1	6	3	0	1	3	1	0	0	1	1	29	92
Count Total	0	19	52	2	0	10	51	10	0	9	30	14	1	5	12	8	223	0
Peak Hour	0	10	22	2	0	5	23	4	0	4	11	8	0	3	4	5	101	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Auto Mall Pkwy			Auto Mall Pkwy			Osgood Rd			Osgood Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	0				
4:30 PM	0	0	0	0	0	0	0	3	0	0	0	0	3	0				
4:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	5				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5				
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Count Total	0	0	0	0	1	0	1	3	0	0	0	0	5	0				
Peak Hour	0	0	0	0	0	0	1	0	0	0	0	0	1	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

I680 Ramps Auto Mall Pkwy

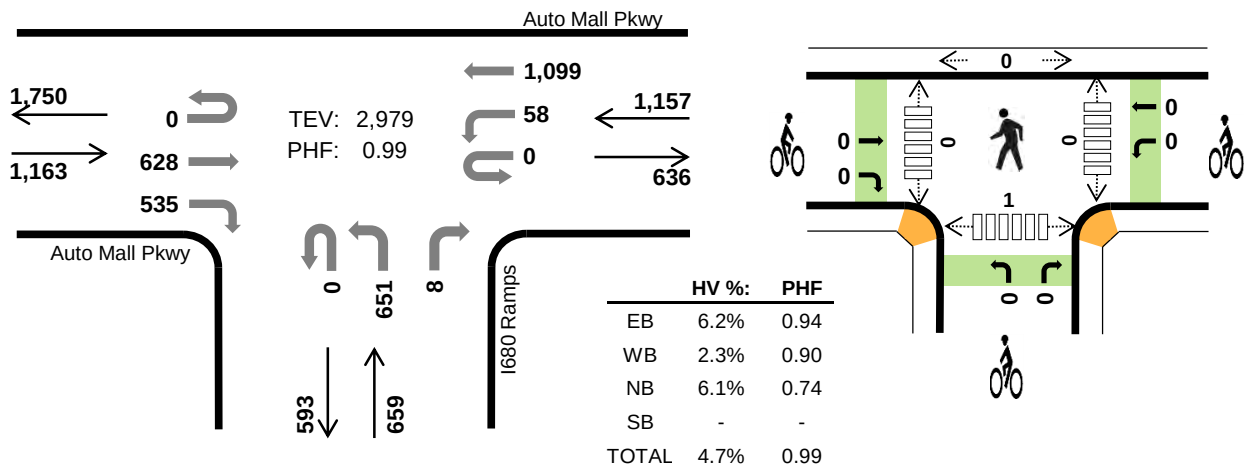


Peak Hour

Date: 09/26/2017

Count Period: 7:00 AM to 9:00 AM

Peak Hour: 7:45 AM to 8:45 AM



Two-Hour Count Summaries

Interval Start		Auto Mall Pkwy				Auto Mall Pkwy				I680 Ramps				0				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	92	45	0	4	180	0	0	237	0	1	0	0	0	0	559	0
7:15 AM		0	0	100	70	0	5	233	0	0	212	0	0	0	0	0	0	620	0
7:30 AM		0	0	143	93	0	4	313	0	0	134	0	0	0	0	0	0	687	0
7:45 AM		0	0	178	105	0	11	311	0	0	148	0	3	0	0	0	0	756	2,622
8:00 AM		0	0	151	137	0	16	222	0	0	221	0	2	0	0	0	0	749	2,812
8:15 AM		0	0	168	141	0	21	281	0	0	140	0	2	0	0	0	0	753	2,945
8:30 AM		0	0	131	152	0	10	285	0	0	142	0	1	0	0	0	0	721	2,979
8:45 AM		0	0	144	144	0	15	297	0	0	142	0	5	0	0	0	0	747	2,970
Count Total		0	0	1,107	887	0	86	2,122	0	0	1,376	0	14	0	0	0	0	5,592	0
Peak Hour	All	0	0	628	535	0	58	1,099	0	0	651	0	8	0	0	0	0	2,979	0
	HV	0	0	52	20	0	1	26	0	0	40	0	0	0	0	0	0	139	0
	HV%	-	-	8%	4%	-	2%	2%	-	-	6%	-	0%	-	-	-	-	5%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	15	9	11	0	35	0	0	0	0	0	0	0	0	0	0
7:15 AM	19	9	9	0	37	0	0	0	0	0	0	0	0	0	0
7:30 AM	16	6	8	0	30	0	0	1	0	1	0	0	0	0	0
7:45 AM	17	10	10	0	37	0	0	0	0	0	0	0	0	0	0
8:00 AM	16	4	14	0	34	0	0	0	0	0	0	0	0	0	0
8:15 AM	23	6	8	0	37	0	0	0	0	0	0	0	0	0	0
8:30 AM	16	7	8	0	31	0	0	0	0	0	0	0	0	1	1
8:45 AM	19	11	8	0	38	0	0	0	0	0	0	0	0	0	0
Count Total	141	62	76	0	279	0	0	1	0	1	0	0	0	1	1
Peak Hr	72	27	40	0	139	0	0	0	0	0	0	0	0	1	1

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Auto Mall Pkwy				Auto Mall Pkwy				I680 Ramps				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	10	5	0	0	9	0	0	11	0	0	0	0	0	0	35	0
7:15 AM	0	0	9	10	0	1	8	0	0	9	0	0	0	0	0	0	37	0
7:30 AM	0	0	12	4	0	0	6	0	0	8	0	0	0	0	0	0	30	0
7:45 AM	0	0	13	4	0	1	9	0	0	10	0	0	0	0	0	0	37	139
8:00 AM	0	0	12	4	0	0	4	0	0	14	0	0	0	0	0	0	34	138
8:15 AM	0	0	16	7	0	0	6	0	0	8	0	0	0	0	0	0	37	138
8:30 AM	0	0	11	5	0	0	7	0	0	8	0	0	0	0	0	0	31	139
8:45 AM	0	0	12	7	0	1	10	0	0	8	0	0	0	0	0	0	38	140
Count Total	0	0	95	46	0	3	59	0	0	76	0	0	0	0	0	0	279	0
Peak Hour	0	0	52	20	0	1	26	0	0	40	0	0	0	0	0	0	139	0

Two-Hour Count Summaries - Bikes

Interval Start	Auto Mall Pkwy			Auto Mall Pkwy			I680 Ramps			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	1	0	0	0	0	0	1	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

I680 Ramps Auto Mall Pkwy

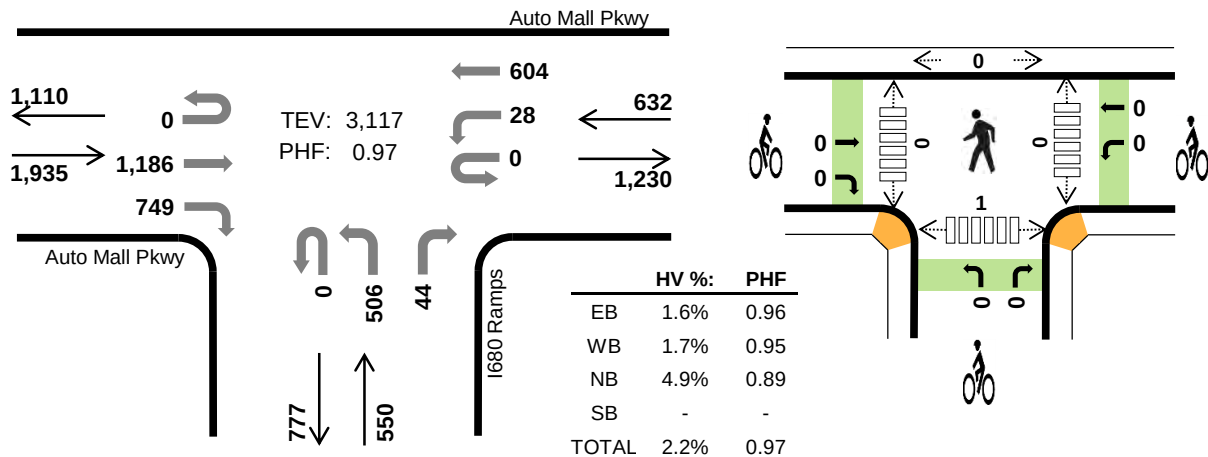


Peak Hour

Date: 09/26/2017

Count Period: 4:00 PM to 6:00 PM

Peak Hour: 4:45 PM to 5:45 PM



Two-Hour Count Summaries

Interval Start		Auto Mall Pkwy				Auto Mall Pkwy				I680 Ramps				0				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	0	248	150	0	8	109	0	0	127	0	9	0	0	0	0	651	0
4:15 PM		0	0	236	137	0	5	134	0	0	100	0	9	0	0	0	0	621	0
4:30 PM		0	0	260	163	0	13	121	0	0	107	0	6	0	0	0	0	670	0
4:45 PM		0	0	302	190	0	11	141	0	0	124	0	14	0	0	0	0	782	2,724
5:00 PM		0	0	314	188	0	2	155	0	0	108	0	7	0	0	0	0	774	2,847
5:15 PM		0	0	299	181	0	8	159	0	0	141	0	13	0	0	0	0	801	3,027
5:30 PM		0	0	271	190	0	7	149	0	0	133	0	10	0	0	0	0	760	3,117
5:45 PM		0	0	292	160	0	9	177	0	0	117	0	10	0	0	0	0	765	3,100
Count Total		0	0	2,222	1,359	0	63	1,145	0	0	957	0	78	0	0	0	0	5,824	0
Peak Hour	All	0	0	1,186	749	0	28	604	0	0	506	0	44	0	0	0	0	3,117	0
	HV	0	0	23	7	0	0	11	0	0	26	0	1	0	0	0	0	68	0
	HV%	-	-	2%	1%	-	0%	2%	-	-	5%	-	2%	-	-	-	-	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	6	2	6	0	14	0	0	0	0	0	0	0	0	0	0
4:15 PM	10	5	6	0	21	0	0	0	0	0	0	0	0	0	0
4:30 PM	7	4	8	0	19	0	0	0	0	0	0	0	0	0	0
4:45 PM	8	4	11	0	23	0	0	0	0	0	0	0	0	1	1
5:00 PM	5	2	2	0	9	0	0	0	0	0	0	0	0	0	0
5:15 PM	10	3	9	0	22	0	0	0	0	0	0	0	0	0	0
5:30 PM	7	2	5	0	14	0	0	0	0	0	0	0	0	0	0
5:45 PM	12	6	8	0	26	0	0	0	0	0	0	0	0	0	0
Count Total	65	28	55	0	148	0	0	0	0	0	0	0	0	1	1
Peak Hr	30	11	27	0	68	0	0	0	0	0	0	0	0	1	1

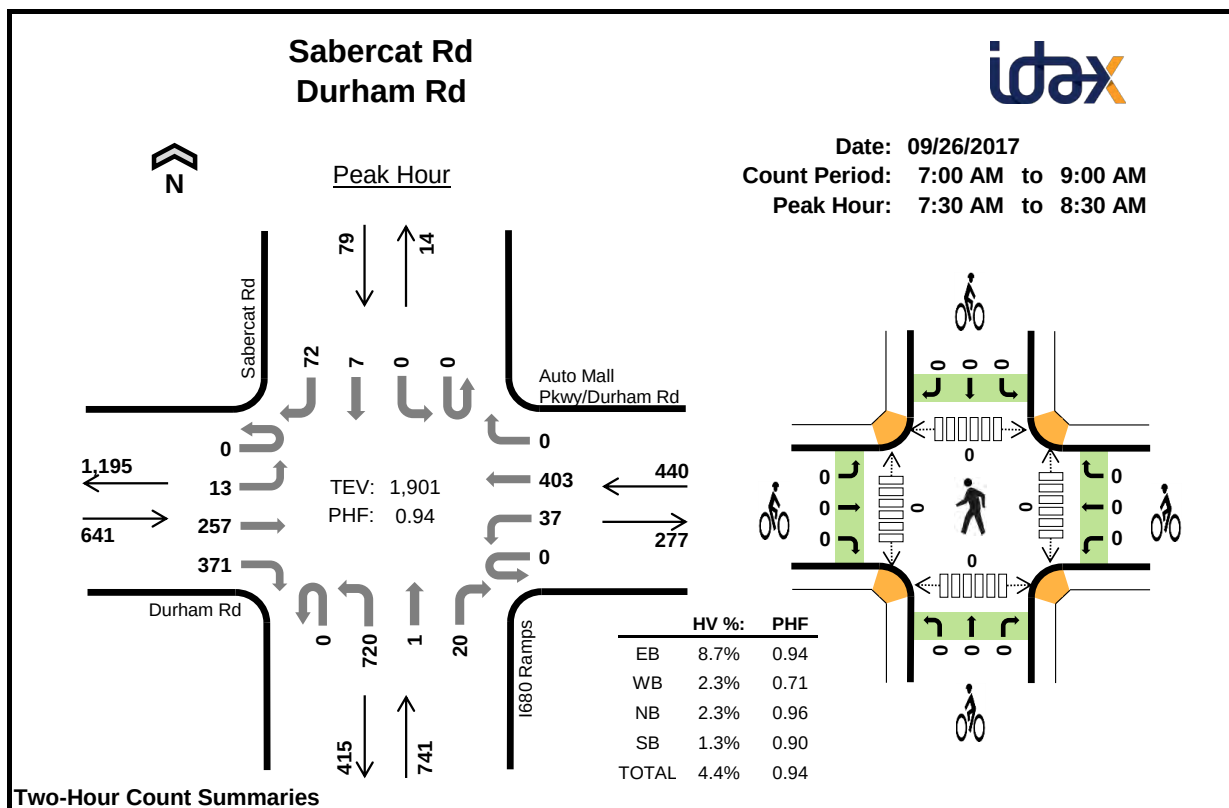
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Auto Mall Pkwy				Auto Mall Pkwy				I680 Ramps				0				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	4	2	0	0	2	0	0	6	0	0	0	0	0	0	0	14	0
4:15 PM	0	0	8	2	0	1	4	0	0	5	0	1	0	0	0	0	0	21	0
4:30 PM	0	0	4	3	0	0	4	0	0	8	0	0	0	0	0	0	0	19	0
4:45 PM	0	0	7	1	0	0	4	0	0	11	0	0	0	0	0	0	0	23	77
5:00 PM	0	0	3	2	0	0	2	0	0	2	0	0	0	0	0	0	0	9	72
5:15 PM	0	0	8	2	0	0	3	0	0	8	0	1	0	0	0	0	0	22	73
5:30 PM	0	0	5	2	0	0	2	0	0	5	0	0	0	0	0	0	0	14	68
5:45 PM	0	0	8	4	0	0	6	0	0	8	0	0	0	0	0	0	0	26	71
Count Total	0	0	47	18	0	1	27	0	0	53	0	2	0	0	0	0	0	148	0
Peak Hour	0	0	23	7	0	0	11	0	0	26	0	1	0	0	0	0	0	68	0

Two-Hour Count Summaries - Bikes

Interval Start	Auto Mall Pkwy			Auto Mall Pkwy			I680 Ramps			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Durham Rd				Auto Mall Pkwy/Durham Rd				I680 Ramps				Sabercat Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	3	28	75	0	8	45	0	0	139	0	2	0	1	1	12	314	0
7:15 AM		0	0	30	72	0	5	76	0	0	162	0	3	0	0	0	13	361	0
7:30 AM		0	1	43	100	0	10	144	0	0	177	0	6	0	0	3	19	503	0
7:45 AM		0	3	80	87	0	10	98	0	0	186	1	4	0	0	3	18	490	1,668
8:00 AM		0	3	78	77	0	10	82	0	0	184	0	9	0	0	1	14	458	1,812
8:15 AM		0	6	56	107	0	7	79	0	0	173	0	1	0	0	0	21	450	1,901
8:30 AM		0	3	36	98	0	12	83	0	0	192	0	3	0	0	1	17	445	1,843
8:45 AM		0	3	45	109	0	7	84	0	0	192	0	6	0	2	3	27	478	1,831
Count Total		0	22	396	725	0	69	691	0	0	1,405	1	34	0	3	12	141	3,499	0
Peak Hour	All	0	13	257	371	0	37	403	0	0	720	1	20	0	0	7	72	1,901	0
	HV	0	0	9	47	0	3	7	0	0	16	0	1	0	0	0	1	84	0
	HV%	-	0%	4%	13%	-	8%	2%	-	-	2%	0%	5%	-	-	0%	1%	4%	0

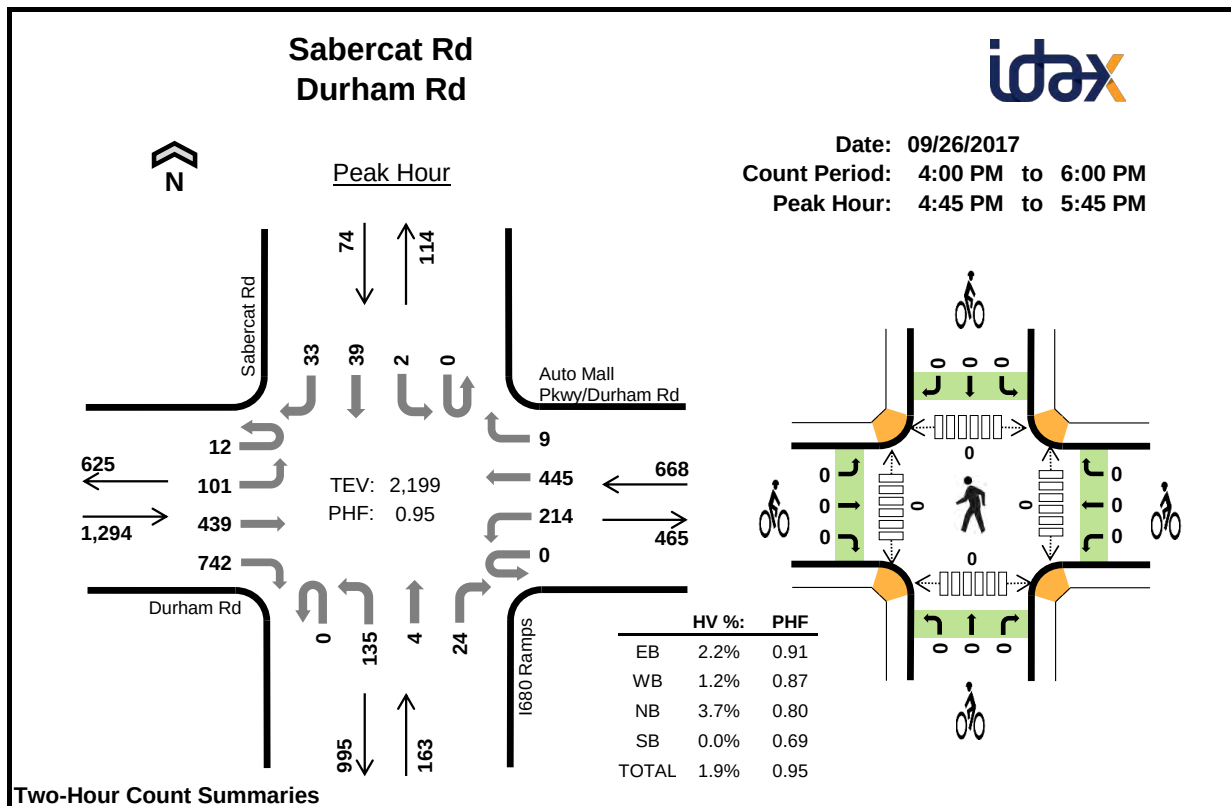
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	13	0	5	0	18	0	0	0	0	0	0	0	0	0	0
7:15 AM	8	2	7	0	17	0	0	0	0	0	0	0	0	0	0
7:30 AM	13	1	6	0	20	0	0	0	0	0	0	0	0	0	0
7:45 AM	15	7	4	1	27	0	0	0	0	0	0	0	0	0	0
8:00 AM	13	1	3	0	17	0	0	0	0	0	0	0	0	0	0
8:15 AM	15	1	4	0	20	0	0	0	0	0	0	0	0	0	0
8:30 AM	11	3	3	0	17	0	0	0	0	0	0	0	0	1	1
8:45 AM	10	2	10	1	23	0	0	0	0	0	0	0	0	0	0
Count Total	98	17	42	2	159	0	0	0	0	0	0	0	0	1	1
Peak Hour	56	10	17	1	84	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Durham Rd				Auto Mall Pkwy/Durham Rd				I680 Ramps				Sabercat Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	13	0	0	0	0	0	5	0	0	0	0	0	0	18	0
7:15 AM	0	0	1	7	0	0	2	0	0	7	0	0	0	0	0	0	17	0
7:30 AM	0	0	2	11	0	1	0	0	0	5	0	1	0	0	0	0	20	0
7:45 AM	0	0	2	13	0	1	6	0	0	4	0	0	0	0	0	1	27	82
8:00 AM	0	0	2	11	0	1	0	0	0	3	0	0	0	0	0	0	17	81
8:15 AM	0	0	3	12	0	0	1	0	0	4	0	0	0	0	0	0	20	84
8:30 AM	0	0	0	11	0	0	3	0	0	3	0	0	0	0	0	0	17	81
8:45 AM	0	1	1	8	0	1	1	0	0	10	0	0	0	0	0	1	23	77
Count Total	0	1	11	86	0	4	13	0	0	41	0	1	0	0	0	2	159	0
Peak Hour	0	0	9	47	0	3	7	0	0	16	0	1	0	0	0	1	84	0

Two-Hour Count Summaries - Bikes																
Interval Start	Durham Rd			Auto Mall Pkwy/Durham Rd			I680 Ramps			Sabercat Rd			15-min Total	Rolling One Hour		
	Eastbound			Westbound			Northbound			Southbound						
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



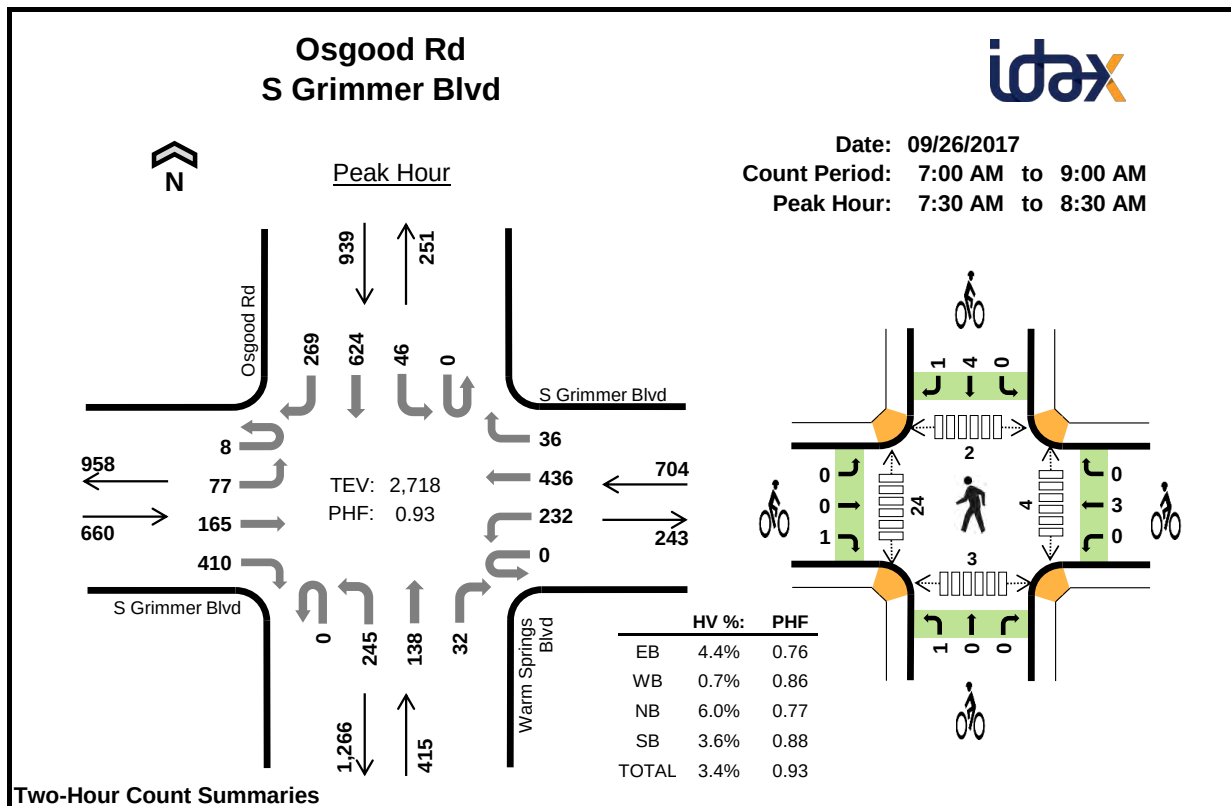
Interval Start		Durham Rd				Auto Mall Pkwy/Durham Rd				I680 Ramps				Sabercat Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
	4:00 PM	3	40	64	155	0	80	91	8	0	15	2	4	0	2	32	11	507	0
	4:15 PM	6	31	88	118	0	77	95	18	0	27	0	2	0	1	35	9	507	0
	4:30 PM	3	39	86	140	0	59	101	8	0	22	1	2	0	0	33	8	502	0
	4:45 PM	6	35	105	211	0	48	108	3	0	26	1	5	0	1	16	10	575	2,091
	5:00 PM	3	31	110	161	0	68	110	3	0	33	2	3	0	0	12	4	540	2,124
	5:15 PM	2	22	109	198	0	64	126	3	0	35	1	6	0	0	7	8	581	2,198
	5:30 PM	1	13	115	172	0	34	101	0	0	41	0	10	0	1	4	11	503	2,199
	5:45 PM	2	22	140	137	0	20	99	6	0	85	2	10	0	0	1	13	537	2,161
Count Total		26	233	817	1,292	0	450	831	49	0	284	9	42	0	5	140	74	4,252	0
Peak Hour	All	12	101	439	742	0	214	445	9	0	135	4	24	0	2	39	33	2,199	0
	HV	0	0	3	25	0	4	4	0	0	6	0	0	0	0	0	0	42	0
	HV%	0%	0%	1%	3%	-	2%	1%	0%	-	4%	0%	0%	-	0%	0%	0%	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	2	1	1	6	0	0	0	0	0	0	0	0	0	0
4:15 PM	11	3	1	2	17	0	0	0	0	0	0	0	0	0	0
4:30 PM	3	3	1	0	7	0	0	0	0	0	0	0	0	0	0
4:45 PM	8	6	2	0	16	0	0	0	0	0	0	0	0	0	0
5:00 PM	3	1	1	0	5	0	0	0	0	0	0	0	0	0	0
5:15 PM	10	0	3	0	13	0	0	0	0	0	0	0	0	0	0
5:30 PM	7	1	0	0	8	0	0	0	0	0	0	0	0	0	0
5:45 PM	6	4	4	0	14	0	1	0	0	1	0	0	0	0	0
Count Total	50	20	13	3	86	0	1	0	0	1	0	0	0	0	0
Peak Hour	28	8	6	0	42	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Durham Rd				Auto Mall Pkwy/Durham Rd				I680 Ramps				Sabercat Rd				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	0	2	0	0	2	0	0	1	0	0	0	0	0	0	1	6	0
4:15 PM	0	1	0	10	0	0	3	0	0	1	0	0	0	0	0	0	2	17	0
4:30 PM	0	0	0	3	0	1	2	0	0	1	0	0	0	0	0	0	0	7	0
4:45 PM	0	0	0	8	0	3	3	0	0	2	0	0	0	0	0	0	0	16	46
5:00 PM	0	0	0	3	0	1	0	0	0	1	0	0	0	0	0	0	0	5	45
5:15 PM	0	0	2	8	0	0	0	0	0	3	0	0	0	0	0	0	0	13	41
5:30 PM	0	0	1	6	0	0	1	0	0	0	0	0	0	0	0	0	0	8	42
5:45 PM	0	0	1	5	0	0	3	1	0	4	0	0	0	0	0	0	0	14	40
Count Total	0	1	4	45	0	5	14	1	0	13	0	0	0	0	0	0	3	86	0
Peak Hour	0	0	3	25	0	4	4	0	0	6	0	0	0	0	0	0	0	42	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Durham Rd			Auto Mall Pkwy/Durham Rd			I680 Ramps			Sabercat Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	1				
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	1	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Note: U-Turn volumes for bikes are included in Left-Turn, if any.																		



Interval Start		S Grimmer Blvd				S Grimmer Blvd				Warm Springs Blvd				Osgood Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
	7:00 AM	0	16	18	48	0	27	48	5	0	37	26	2	0	1	111	38	377	0
	7:15 AM	0	12	19	49	0	43	87	7	1	44	33	7	0	1	89	44	436	0
	7:30 AM	2	14	24	75	0	38	157	9	0	94	35	6	0	7	149	49	659	0
	7:45 AM	2	19	56	107	0	68	109	8	0	64	29	7	0	10	132	76	687	2,159
	8:00 AM	1	23	54	140	0	58	81	11	0	40	47	11	0	20	176	71	733	2,515
	8:15 AM	3	21	31	88	0	68	89	8	0	47	27	8	0	9	167	73	639	2,718
	8:30 AM	0	28	13	93	0	44	107	15	0	33	39	10	0	5	132	89	608	2,667
	8:45 AM	4	23	15	93	0	53	80	11	0	29	53	8	0	1	189	38	597	2,577
Count Total		12	156	230	693	0	399	758	74	1	388	289	59	0	54	1,145	478	4,736	0
Peak Hour	All	8	77	165	410	0	232	436	36	0	245	138	32	0	46	624	269	2,718	0
	HV	0	13	3	13	0	2	2	1	0	13	10	2	0	0	11	23	93	0
	HV%	0%	17%	2%	3%	-	1%	0%	3%	-	5%	7%	6%	-	0%	2%	9%	3%	0

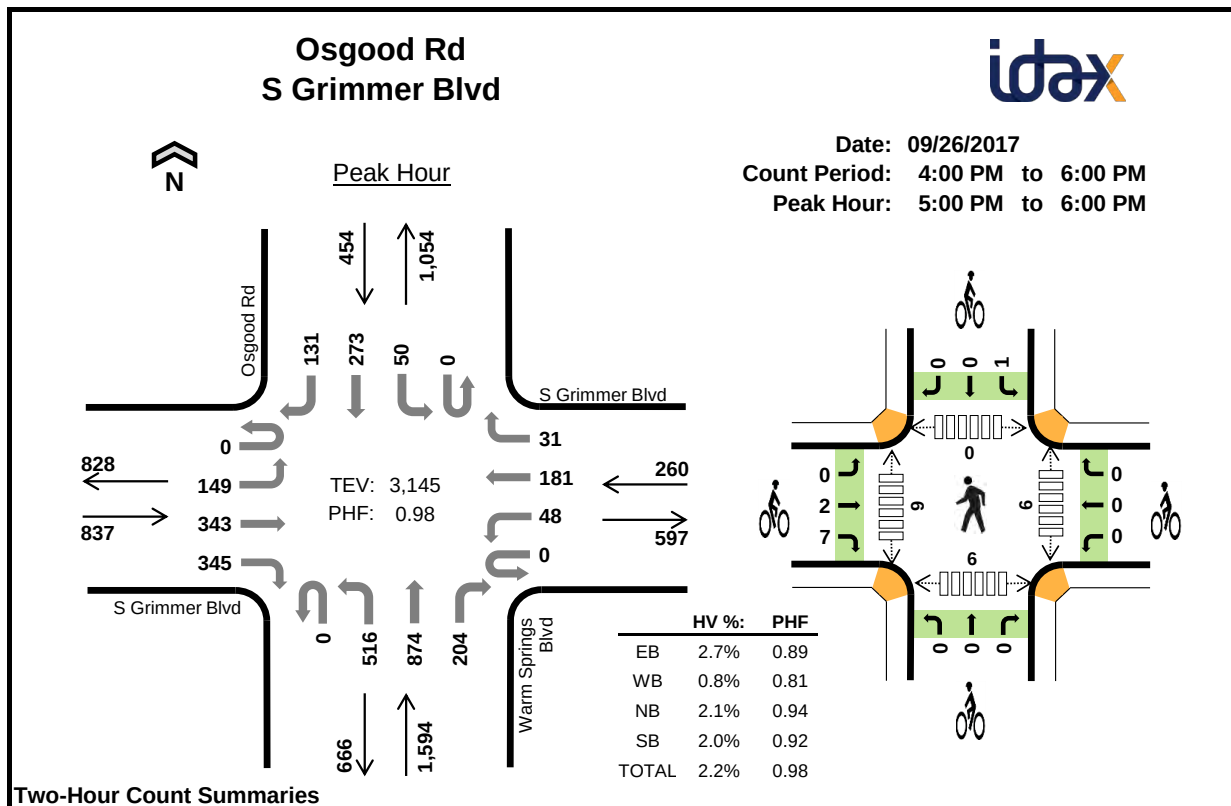
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	6	0	4	8	18	0	0	0	0	0	3	2	1	3	9
7:15 AM	6	1	10	6	23	0	0	0	1	1	1	8	3	3	15
7:30 AM	6	0	5	12	23	1	0	1	1	3	2	3	0	2	7
7:45 AM	5	1	7	10	23	0	2	0	1	3	0	6	0	0	6
8:00 AM	8	4	7	6	25	0	1	0	2	3	1	7	1	0	9
8:15 AM	10	0	6	6	22	0	0	0	1	1	1	8	1	1	11
8:30 AM	12	2	11	9	34	0	0	0	0	0	2	3	0	0	5
8:45 AM	6	2	10	5	23	0	0	0	2	2	1	7	0	0	8
Count Total	59	10	60	62	191	1	3	1	8	13	11	44	6	9	70
Peak Hour	29	5	25	34	93	1	3	1	5	10	4	24	2	3	33

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	S Grimmer Blvd				S Grimmer Blvd				Warm Springs Blvd				Osgood Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	3	0	3	0	0	0	0	0	2	2	0	0	0	7	1	18	0
7:15 AM	0	3	0	3	0	0	1	0	0	2	8	0	0	1	2	3	23	0
7:30 AM	0	1	3	2	0	0	0	0	0	3	2	0	0	0	6	6	23	0
7:45 AM	0	2	0	3	0	1	0	0	0	2	4	1	0	0	2	8	23	87
8:00 AM	0	6	0	2	0	1	2	1	0	4	3	0	0	0	2	4	25	94
8:15 AM	0	4	0	6	0	0	0	0	0	4	1	1	0	0	1	5	22	93
8:30 AM	0	6	1	5	0	0	2	0	0	5	5	1	0	0	4	5	34	104
8:45 AM	0	3	0	3	0	0	2	0	0	4	5	1	0	0	5	0	23	104
Count Total	0	28	4	27	0	2	7	1	0	26	30	4	0	1	29	32	191	0
Peak Hour	0	13	3	13	0	2	2	1	0	13	10	2	0	0	11	23	93	0

Two-Hour Count Summaries - Bikes																	
Interval Start	S Grimmer Blvd			S Grimmer Blvd			Warm Springs Blvd			Osgood Rd			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0			
7:30 AM	0	0	1	0	0	0	1	0	0	0	1	0	3	0			
7:45 AM	0	0	0	0	2	0	0	0	0	0	1	0	3	7			
8:00 AM	0	0	0	0	1	0	0	0	0	0	1	1	3	10			
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	10			
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	7			
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	2	6			
Count Total	0	0	1	0	3	0	1	0	0	0	6	2	13	0			
Peak Hour	0	0	1	0	3	0	1	0	0	0	4	1	10	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		S Grimmer Blvd				S Grimmer Blvd				Warm Springs Blvd				Osgood Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	52	130	53	0	8	28	15	1	81	194	33	0	12	61	40	708	0
4:15 PM		1	59	85	51	0	3	31	15	0	87	217	55	0	16	70	38	728	0
4:30 PM		1	49	101	55	0	12	39	11	1	108	184	55	0	9	57	34	716	0
4:45 PM		2	48	77	94	0	13	51	9	0	104	155	43	0	17	57	33	703	2,855
5:00 PM		0	45	111	78	0	11	36	9	0	106	220	49	0	11	76	23	775	2,922
5:15 PM		0	38	83	98	0	14	55	11	0	122	220	56	0	13	60	36	806	3,000
5:30 PM		0	31	81	93	0	7	50	6	0	148	205	46	0	14	71	38	790	3,074
5:45 PM		0	35	68	76	0	16	40	5	0	140	229	53	0	12	66	34	774	3,145
Count Total		4	357	736	598	0	84	330	81	2	896	1,624	390	0	104	518	276	6,000	0
Peak Hour	All	0	149	343	345	0	48	181	31	0	516	874	204	0	50	273	131	3,145	0
	HV	0	5	0	18	0	2	0	0	0	14	16	4	0	0	5	4	68	0
	HV%	-	3%	0%	5%	-	4%	0%	0%	-	3%	2%	2%	-	0%	2%	3%	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	9	2	11	8	30	0	0	0	0	0	0	5	1	0	6
4:15 PM	4	0	8	3	15	0	0	0	1	1	0	1	0	0	1
4:30 PM	13	2	11	4	30	1	0	0	0	1	1	4	0	0	5
4:45 PM	7	1	13	6	27	0	0	0	0	0	0	2	0	0	2
5:00 PM	6	2	11	1	20	2	0	0	0	2	1	3	0	1	5
5:15 PM	5	0	9	4	18	3	0	0	1	4	0	3	0	0	3
5:30 PM	4	0	4	2	10	2	0	0	0	2	5	3	0	5	13
5:45 PM	8	0	10	2	20	2	0	0	0	2	0	0	0	0	0
Count Total	56	7	77	30	170	10	0	0	2	12	7	21	1	6	35
Peak Hour	23	2	34	9	68	9	0	0	1	10	6	9	0	6	21

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	S Grimmer Blvd				S Grimmer Blvd				Warm Springs Blvd				Osgood Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	3	1	5	0	1	1	0	0	10	1	0	0	1	2	5	30	0
4:15 PM	0	2	1	1	0	0	0	0	0	3	4	1	0	1	1	1	15	0
4:30 PM	0	7	0	6	0	0	2	0	0	5	5	1	0	0	1	3	30	0
4:45 PM	0	5	0	2	0	1	0	0	0	5	6	2	0	0	2	4	27	102
5:00 PM	0	1	0	5	0	2	0	0	0	5	6	0	0	0	1	0	20	92
5:15 PM	0	1	0	4	0	0	0	0	0	2	5	2	0	0	1	3	18	95
5:30 PM	0	0	0	4	0	0	0	0	0	2	1	1	0	0	2	0	10	75
5:45 PM	0	3	0	5	0	0	0	0	0	5	4	1	0	0	1	1	20	68
Count Total	0	22	2	32	0	4	3	0	0	37	32	8	0	2	11	17	170	0
Peak Hour	0	5	0	18	0	2	0	0	0	14	16	4	0	0	5	4	68	0

Two-Hour Count Summaries - Bikes																		
Interval Start	S Grimmer Blvd			S Grimmer Blvd			Warm Springs Blvd			Osgood Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0				
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2				
5:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	2	4				
5:15 PM	0	1	2	0	0	0	0	0	0	1	0	0	4	7				
5:30 PM	0	0	2	0	0	0	0	0	0	0	0	0	2	8				
5:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	2	10				
Count Total	0	3	7	0	0	0	0	0	0	1	1	0	12	0				
Peak Hour	0	2	7	0	0	0	0	0	0	1	0	0	10	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

APPENDIX D: INTERSECTION LOS CALCULATIONS



HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	516	371	158	641	216	196	259	70	157	608	222
Future Volume (veh/h)	156	516	371	158	641	216	196	259	70	157	608	222
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	188	622	0	190	772	0	236	312	0	189	733	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	226	1116	0	228	1119	0	273	1007	0	227	915	0
Arrive On Green	0.13	0.31	0.00	0.13	0.31	0.00	0.15	0.28	0.00	0.13	0.26	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	188	622	0	190	772	0	236	312	0	189	733	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	10.8	15.2	0.0	10.9	19.9	0.0	13.5	7.2	0.0	10.8	20.2	0.0
Cycle Q Clear(g_c), s	10.8	15.2	0.0	10.9	19.9	0.0	13.5	7.2	0.0	10.8	20.2	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	226	1116	0	228	1119	0	273	1007	0	227	915	0
V/C Ratio(X)	0.83	0.56	0.00	0.83	0.69	0.00	0.87	0.31	0.00	0.83	0.80	0.00
Avail Cap(c_a), veh/h	256	1116	0	256	1119	0	273	1007	0	273	987	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.8	30.1	0.0	44.8	31.6	0.0	43.5	29.7	0.0	44.8	36.6	0.0
Incr Delay (d2), s/veh	16.5	2.0	0.0	17.1	3.5	0.0	23.0	0.2	0.0	14.5	4.8	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	6.4	7.8	0.0	6.5	10.3	0.0	8.4	3.6	0.0	6.3	10.6	0.0
LnGrp Delay(d),s/veh	61.3	32.1	0.0	61.8	35.1	0.0	66.5	29.9	0.0	59.2	41.4	0.0
LnGrp LOS	E	C		E	D		E	C		E	D	
Approach Vol, veh/h		810			962			548			922	
Approach Delay, s/veh		38.9			40.4			45.7			45.1	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.3	36.8	17.3	33.6	17.2	36.9	20.0	30.9				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	14.5	28.0	15.5	27.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	12.9	17.2	12.8	9.2	12.8	21.9	15.5	22.2				
Green Ext Time (p_c), s	0.0	7.7	0.0	8.6	0.0	4.7	0.0	3.2				
Intersection Summary												
HCM 2010 Ctrl Delay			42.2									
HCM 2010 LOS			D									
Notes												

Irvington BART 8:00 am 09/26/2017 Existing NP AM

Synchro 9 Report
Page 1

User approved ignoring U-Turning movement.

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	1227	372	136	775	86	232	321	113	133	400	206
Future Volume (veh/h)	84	1227	372	136	775	86	232	321	113	133	400	206
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	87	1265	270	140	799	84	239	331	88	137	412	69
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	128	1843	813	255	1688	177	298	524	137	165	692	305
Arrive On Green	0.07	0.53	0.53	0.15	1.00	1.00	0.09	0.19	0.18	0.09	0.20	0.20
Sat Flow, veh/h	1757	3505	1545	3408	3197	336	3408	2741	717	1757	3505	1544
Grp Volume(v), veh/h	87	1265	270	140	438	445	239	210	209	137	412	69
Grp Sat Flow(s),veh/h/ln	1757	1752	1545	1704	1752	1780	1704	1752	1706	1757	1752	1544
Q Serve(g_s), s	6.8	37.5	14.1	5.3	0.0	0.0	9.6	15.4	15.9	10.7	15.0	5.3
Cycle Q Clear(g_c), s	6.8	37.5	14.1	5.3	0.0	0.0	9.6	15.4	15.9	10.7	15.0	5.3
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	128	1843	813	255	925	940	298	335	326	165	692	305
V/C Ratio(X)	0.68	0.69	0.33	0.55	0.47	0.47	0.80	0.63	0.64	0.83	0.59	0.23
Avail Cap(c_a), veh/h	151	1843	813	292	925	940	536	501	487	176	801	353
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.3	24.6	19.1	57.4	0.0	0.0	62.7	52.0	52.5	62.3	51.1	47.2
Incr Delay (d2), s/veh	6.5	2.1	1.1	0.6	1.6	1.6	1.9	2.7	3.0	24.0	1.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	18.6	6.2	2.5	0.4	0.4	4.6	7.7	7.8	6.3	7.4	2.3
LnGrp Delay(d),s/veh	69.8	26.7	20.2	58.0	1.6	1.6	64.6	54.8	55.5	86.3	52.3	47.7
LnGrp LOS	E	C	C	E	A	A	E	D	E	F	D	D
Approach Vol, veh/h	1622					1023		658		618		
Approach Delay, s/veh	27.9					9.3		58.6		59.3		
Approach LOS	C					A		E		E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.5	77.6	16.3	31.7	14.2	77.9	17.2	30.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	11.5	56.0	21.5	30.5	11.5	56.0	13.5	38.5				
Max Q Clear Time (g_c+17.3), s	17.3	39.5	11.6	17.0	8.8	2.0	12.7	17.9				
Green Ext Time (p_c), s	0.0	14.7	0.1	5.9	0.0	39.5	0.0	7.4				
Intersection Summary												
HCM 2010 Ctrl Delay			33.2									
HCM 2010 LOS			C									

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	15	1005	405	5	321	49	783	6	210	26	243	33
Future Volume (vph)	15	1005	405	5	321	49	783	6	210	26	243	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.96	1.00	
Satd. Flow (prot)	1752	3505	1568		1595	1665	3500		1665	1687	1543	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.96	1.00	
Satd. Flow (perm)	1752	3505	1568		1595	1665	3500		1665	1687	1543	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	17	1142	460	6	365	56	890	7	239	30	276	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	227	0
Lane Group Flow (vph)	17	1142	466	0	212	209	897	0	134	135	49	0
Confl. Peds. (#/hr)	4		2			2		4	10		2	2
Confl. Bikes (#/hr)			2								1	
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	3.6	61.8	90.6		23.1	23.1	81.3		23.3	23.3	23.3	
Effective Green, g (s)	4.1	63.3	92.1		23.6	23.6	82.8		24.8	24.8	24.8	
Actuated g/C Ratio	0.03	0.45	0.66		0.17	0.17	0.59		0.18	0.18	0.18	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	51	1584	1031		268	280	2070		294	298	273	
v/s Ratio Prot	0.01	c0.33	c0.30		c0.13	0.13	0.26		0.08	0.08		
v/s Ratio Perm											0.03	
v/c Ratio	0.33	0.72	0.45		0.79	0.75	0.43		0.46	0.45	0.18	
Uniform Delay, d1	66.6	31.2	11.7		55.8	55.4	15.7		51.6	51.5	48.9	
Progression Factor	1.22	0.88	1.72		0.92	0.92	0.53		1.39	1.39	5.75	
Incremental Delay, d2	1.1	2.2	0.3		11.7	7.7	0.6		1.4	1.4	0.4	
Delay (s)	82.6	29.7	20.4		63.0	58.7	8.8		73.1	72.9	281.7	
Level of Service	F	C	C		E	E	A		E	E	F	
Approach Delay (s)		27.6					25.4			178.7		
Approach LOS		C					C			F		
Intersection Summary												
HCM 2000 Control Delay			50.9				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			66.3%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR	SBR2
Lane Configurations	←→		
Traffic Volume (vph)	90	4	24
Future Volume (vph)	90	4	24
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0		
Lane Util. Factor	0.95		
Frpb, ped/bikes	0.99		
Flpb, ped/bikes	1.00		
Frt	0.97		
Flt Protected	0.99		
Satd. Flow (prot)	3343		
Flt Permitted	0.99		
Satd. Flow (perm)	3343		
Peak-hour factor, PHF	0.88	0.88	0.88
Adj. Flow (vph)	102	5	27
RTOR Reduction (vph)	13	0	0
Lane Group Flow (vph)	159	0	0
Confl. Peds. (#/hr)		10	
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	3%	3%	3%
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	11.3		
Effective Green, g (s)	12.3		
Actuated g/C Ratio	0.09		
Clearance Time (s)	5.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	293		
v/s Ratio Prot	c0.05		
v/s Ratio Perm			
v/c Ratio	0.54		
Uniform Delay, d1	61.2		
Progression Factor	1.00		
Incremental Delay, d2	1.1		
Delay (s)	62.3		
Level of Service	E		
Approach Delay (s)	62.3		
Approach LOS	E		
Intersection Summary			

HCM 2010 Signalized Intersection Summary

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	1202	30	202	1098	37	49	32	305	54	25	6
Future Volume (veh/h)	12	1202	30	202	1098	37	49	32	305	54	25	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	14	1398	34	235	1277	41	57	37	156	63	29	5
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	0	1	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	556	1663	40	443	1425	46	288	60	253	115	47	7
Arrive On Green	0.10	0.16	0.15	0.50	0.81	0.79	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1774	3529	86	1774	3497	112	1362	310	1307	378	244	34
Grp Volume(v), veh/h	14	700	732	235	646	672	57	0	193	97	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1845	1774	1770	1840	1362	0	1617	656	0	0
Q Serve(g_s), s	1.0	53.8	53.9	12.6	35.0	35.3	0.0	0.0	15.3	8.4	0.0	0.0
Cycle Q Clear(g_c), s	1.0	53.8	53.9	12.6	35.0	35.3	5.6	0.0	15.3	23.7	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.06	1.00		0.81	0.65		0.05
Lane Grp Cap(c), veh/h	556	834	870	443	721	749	288	0	313	169	0	0
V/C Ratio(X)	0.03	0.84	0.84	0.53	0.90	0.90	0.20	0.00	0.62	0.57	0.00	0.00
Avail Cap(c_a), veh/h	556	872	909	443	1049	1091	346	0	381	226	0	0
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	0.69	0.69	0.69	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	43.5	54.0	54.0	29.4	10.9	11.0	47.8	0.0	52.0	59.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	6.9	6.7	0.4	11.8	11.5	0.1	0.0	0.8	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	28.0	29.2	6.2	18.5	19.2	1.9	0.0	6.9	3.7	0.0	0.0
LnGrp Delay(d),s/veh	43.5	60.9	60.7	29.9	22.7	22.5	47.9	0.0	52.8	61.0	0.0	0.0
LnGrp LOS	D	E	E	C	C	C	D		D	E		
Approach Vol, veh/h		1446			1553			250			97	
Approach Delay, s/veh		60.6			23.7			51.7			61.0	
Approach LOS		E			C			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	39.0	70.0		31.1	47.9	61.0		31.1				
Change Period (Y+Rc), s	4.5	5.5		4.6	4.5	5.5		4.6				
Max Green Setting (Gmax), s	25.5	67.5		32.4	11.5	81.5		32.4				
Max Q Clear Time (g_c+1.4), s	14.6	55.9		25.7	3.0	37.3		17.3				
Green Ext Time (p_c), s	0.1	8.5		0.8	0.1	18.2		1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			42.8									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	1091	329	354	903	113	153	99	40	154	770	230
Future Volume (veh/h)	96	1091	329	354	903	113	153	99	40	154	770	230
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	102	1161	183	377	961	43	163	105	12	164	819	67
Adj No. of Lanes	1	3	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	339	1514	465	402	1153	509	307	964	431	307	939	418
Arrive On Green	0.38	0.60	0.60	0.23	0.33	0.33	0.09	0.27	0.27	0.09	0.27	0.27
Sat Flow, veh/h	1774	5085	1562	1774	3539	1563	3442	3539	1582	3442	3539	1578
Grp Volume(v), veh/h	102	1161	183	377	961	43	163	105	12	164	819	67
Grp Sat Flow(s),veh/h/ln	1774	1695	1562	1774	1770	1563	1721	1770	1582	1721	1770	1578
Q Serve(g_s), s	5.6	23.8	6.5	29.2	35.2	2.0	6.3	3.1	0.8	6.4	31.0	4.6
Cycle Q Clear(g_c), s	5.6	23.8	6.5	29.2	35.2	2.0	6.3	3.1	0.8	6.4	31.0	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	339	1514	465	402	1153	509	307	964	431	307	939	418
V/C Ratio(X)	0.30	0.77	0.39	0.94	0.83	0.08	0.53	0.11	0.03	0.53	0.87	0.16
Avail Cap(c_a), veh/h	339	1514	465	405	1315	581	344	1011	452	320	986	440
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.7	24.7	12.2	53.2	43.7	18.5	61.0	38.2	37.3	61.0	49.2	39.5
Incr Delay (d2), s/veh	0.3	1.9	1.2	28.9	7.1	0.3	0.5	0.1	0.0	0.7	8.7	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	2.7	11.2	2.9	17.6	18.4	0.9	3.0	1.5	0.3	3.1	16.3	2.0
LnGrp Delay(d),s/veh	37.0	26.6	13.4	82.1	50.8	18.8	61.5	38.3	37.4	61.7	57.9	39.7
LnGrp LOS	D	C	B	F	D	B	E	D	D	E	E	D
Approach Vol, veh/h	1446			1381			280			1050		
Approach Delay, s/veh	25.7			58.3			51.8			57.3		
Approach LOS	C			E			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	35.7	45.7	17.5	41.1	31.8	49.6	16.5	42.1				
Change Period (Y+Rc), s	4.5	5.5	5.5	* 5.5	5.5	* 5.5	4.5	5.5				
Max Green Setting (Gmax), s	31.5	37.5	13.5	* 38	18.5	* 51	12.5	38.5				
Max Q Clear Time (g_c+Q), s	31.2	25.8	8.3	33.0	7.6	37.2	8.4	5.1				
Green Ext Time (p_c), s	0.0	8.1	0.4	2.7	7.7	6.9	0.0	0.8				
Intersection Summary												
HCM 2010 Ctrl Delay	46.3											
HCM 2010 LOS	D											
Notes												

Irvington BART 8:00 am 09/26/2017 Existing NP AM

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

HCM 2010 TWSC
6: Driveway/Olive Ave & Washington Blvd

03/06/2019

Intersection												
Int Delay, s/veh	10.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	1284	0	4	1264	56	0	0	0	24	0	0
Future Vol, veh/h	64	1284	0	4	1264	56	0	0	0	24	0	0
Conflicting Peds, #/hr	0	0	1	1	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	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	1529	0	5	1505	67	0	0	0	29	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1572	0	0	1530	0	0	2445	3264	766	2466	3231	786
Stage 1	-	-	-	-	-	-	1682	1682	-	1549	1549	-
Stage 2	-	-	-	-	-	-	763	1582	-	917	1682	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	415	-	-	431	-	-	16	9	345	~ 15	9	335
Stage 1	-	-	-	-	-	-	98	149	-	119	174	-
Stage 2	-	-	-	-	-	-	363	167	-	293	149	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	415	-	-	431	-	-	14	7	345	~ 13	7	335
Mov Cap-2 Maneuver	-	-	-	-	-	-	14	7	-	~ 13	7	-
Stage 1	-	-	-	-	-	-	80	122	-	97	172	-
Stage 2	-	-	-	-	-	-	359	165	-	239	122	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	0	\$ 1140.1
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	415	-	-	431	-	-	13
HCM Lane V/C Ratio	-	0.184	-	-	0.011	-	-	2.198
HCM Control Delay (s)	0	15.6	-	-	13.4	-	-	\$ 1140.1
HCM Lane LOS	A	C	-	-	B	-	-	F
HCM 95th %tile Q(veh)	-	0.7	-	-	0	-	-	4.4

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

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	370	844	602	273	47	633		
Future Volume (veh/h)	370	844	602	273	47	633		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	420	959	684	173	53	355		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	469	2219	1084	485	462	413		
Arrive On Green	0.26	0.63	0.31	0.31	0.26	0.26		
Sat Flow, veh/h	1774	3632	3632	1583	1774	1583		
Grp Volume(v), veh/h	420	959	684	173	53	355		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1774	1583		
Q Serve(g_s), s	16.2	9.9	11.8	6.0	1.6	15.2		
Cycle Q Clear(g_c), s	16.2	9.9	11.8	6.0	1.6	15.2		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	469	2219	1084	485	462	413		
V/C Ratio(X)	0.90	0.43	0.63	0.36	0.11	0.86		
Avail Cap(c_a), veh/h	604	2219	1787	799	791	706		
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	25.2	6.8	21.2	19.2	20.0	25.1		
Incr Delay (d2), s/veh	11.6	0.2	0.9	0.6	0.0	2.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	9.4	4.9	5.8	2.7	0.8	12.4		
LnGrp Delay(d),s/veh	36.8	7.0	22.1	19.8	20.1	27.3		
LnGrp LOS	D	A	C	B	C	C		
Approach Vol, veh/h		1379	857		408			
Approach Delay, s/veh		16.1	21.6		26.3			
Approach LOS		B	C		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		48.6		22.5	22.8	25.8		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		11.9		17.2	18.2	13.8		
Green Ext Time (p_c), s		16.2		0.6	0.4	7.1		
Intersection Summary								
HCM 2010 Ctrl Delay			19.5					
HCM 2010 LOS			B					
Notes								

Irvington BART 8:00 am 09/26/2017 Existing NP AM

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

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	602	326	50	29	502	191	44	27	27	109	11	297
Future Volume (veh/h)	602	326	50	29	502	191	44	27	27	109	11	297
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	684	370	50	33	570	183	50	31	16	124	12	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	697	1993	267	112	810	259	170	98	38	316	270	230
Arrive On Green	0.39	0.63	0.63	0.06	0.30	0.30	0.14	0.14	0.15	0.14	0.14	0.00
Sat Flow, veh/h	1792	3158	423	1792	2660	851	667	678	266	1366	1881	1599
Grp Volume(v), veh/h	684	208	212	33	382	371	97	0	0	124	12	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1794	1792	1787	1724	1612	0	0	1366	1881	1599
Q Serve(g_s), s	27.8	3.6	3.7	1.3	14.0	14.1	2.0	0.0	0.0	1.1	0.4	0.0
Cycle Q Clear(g_c), s	27.8	3.6	3.7	1.3	14.0	14.1	3.8	0.0	0.0	5.0	0.4	0.0
Prop In Lane	1.00		0.24	1.00		0.49	0.52		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	697	1128	1132	112	544	525	306	0	0	316	270	230
V/C Ratio(X)	0.98	0.18	0.19	0.29	0.70	0.71	0.32	0.00	0.00	0.39	0.04	0.00
Avail Cap(c_a), veh/h	697	1128	1132	381	857	827	838	0	0	485	502	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.3	5.7	5.7	33.0	22.7	22.8	28.6	0.0	0.0	29.1	27.2	0.0
Incr Delay (d2), s/veh	29.3	0.1	0.1	0.5	2.4	2.5	0.2	0.0	0.0	0.3	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	19.4	1.8	1.8	0.7	7.3	7.1	1.8	0.0	0.0	2.4	0.2	0.0
LnGrp Delay(d),s/veh	51.6	5.8	5.8	33.6	25.1	25.3	28.8	0.0	0.0	29.4	27.2	0.0
LnGrp LOS	D	A	A	C	C	C	C			C	C	
Approach Vol, veh/h	1104			786			97			136		
Approach Delay, s/veh	34.2			25.5			28.8			29.2		
Approach LOS	C			C			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	50.6		14.6	32.7	26.5		14.6				
Change Period (Y+Rc), s	3.7	4.4		3.7	3.7	4.4		3.7				
Max Green Setting (Gmax), s	10.0	35.0		20.0	29.0	35.0		36.0				
Max Q Clear Time (g_c+1), s	13.3	5.7		7.0	29.8	16.1		5.8				
Green Ext Time (p_c), s	0.0	11.5		0.5	0.0	6.0		0.6				
Intersection Summary												
HCM 2010 Ctrl Delay	30.4											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	296	91	108	326	256	52	329	44	281	268	359
Future Volume (veh/h)	114	296	91	108	326	256	52	329	44	281	268	359
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	133	344	30	126	379	208	60	383	44	327	312	158
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	208	543	451	207	644	348	187	731	83	367	613	513
Arrive On Green	0.12	0.29	0.29	0.12	0.29	0.27	0.10	0.23	0.22	0.20	0.33	0.33
Sat Flow, veh/h	1792	1881	1562	1792	2239	1211	1792	3234	369	1792	1881	1573
Grp Volume(v), veh/h	133	344	30	126	301	286	60	211	216	327	312	158
Grp Sat Flow(s),veh/h/ln	1792	1881	1562	1792	1787	1663	1792	1787	1816	1792	1881	1573
Q Serve(g_s), s	6.8	15.4	1.3	6.5	13.9	14.4	3.0	10.0	10.1	17.1	12.9	7.3
Cycle Q Clear(g_c), s	6.8	15.4	1.3	6.5	13.9	14.4	3.0	10.0	10.1	17.1	12.9	7.3
Prop In Lane	1.00		1.00	1.00		0.73	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	208	543	451	207	514	478	187	404	410	367	613	513
V/C Ratio(X)	0.64	0.63	0.07	0.61	0.59	0.60	0.32	0.52	0.53	0.89	0.51	0.31
Avail Cap(c_a), veh/h	473	906	753	473	861	801	566	852	866	566	897	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.7	29.9	24.9	40.6	29.4	30.1	40.0	32.8	32.9	37.3	26.3	24.4
Incr Delay (d2), s/veh	1.2	1.8	0.1	1.1	1.5	1.7	0.4	1.5	1.5	7.8	0.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	8.2	0.6	3.2	7.1	6.8	1.5	5.1	5.2	9.2	6.8	3.2
LnGrp Delay(d),s/veh	42.0	31.7	25.0	41.7	31.0	31.8	40.4	34.3	34.4	45.1	27.2	24.9
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		507			713			487			797	
Approach Delay, s/veh		34.0			33.2			35.1			34.1	
Approach LOS		C			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.1	31.8	14.1	35.5	15.2	31.8	23.7	25.8				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+1.0), s	19.5	17.4	5.0	14.9	8.8	16.4	19.1	12.1				
Green Ext Time (p_c), s	0.0	8.8	0.0	7.9	0.0	9.0	0.1	8.1				
Intersection Summary												
HCM 2010 Ctrl Delay			34.0									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	232	169	87	175	44	132	426	36	45	851	159
Future Volume (veh/h)	161	232	169	87	175	44	132	426	36	45	851	159
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.93	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	181	261	83	98	197	32	148	479	34	51	956	170
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	499	155	155	510	81	450	661	47	732	1070	190
Arrive On Green	0.11	0.19	0.17	0.09	0.17	0.15	0.25	0.20	0.19	0.41	0.36	0.35
Sat Flow, veh/h	1774	2651	823	1774	3026	480	1774	3347	237	1774	3001	533
Grp Volume(v), veh/h	181	172	172	98	113	116	148	253	260	51	563	563
Grp Sat Flow(s),veh/h/ln	1774	1770	1704	1774	1770	1737	1774	1770	1814	1774	1770	1765
Q Serve(g_s), s	14.2	12.2	12.8	7.5	8.0	8.3	9.5	18.7	18.8	2.4	42.1	42.2
Cycle Q Clear(g_c), s	14.2	12.2	12.8	7.5	8.0	8.3	9.5	18.7	18.8	2.4	42.1	42.2
Prop In Lane	1.00		0.48	1.00		0.28	1.00		0.13	1.00		0.30
Lane Grp Cap(c), veh/h	190	333	321	155	298	293	450	350	358	732	631	629
V/C Ratio(X)	0.95	0.52	0.54	0.63	0.38	0.40	0.33	0.72	0.73	0.07	0.89	0.89
Avail Cap(c_a), veh/h	190	468	450	165	442	434	450	758	777	732	657	655
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.81	0.81	0.81
Uniform Delay (d), s/veh	62.1	51.1	51.7	61.7	51.7	52.1	42.6	52.6	52.7	24.9	42.5	42.8
Incr Delay (d2), s/veh	51.0	1.8	2.0	5.0	1.1	1.2	0.2	12.2	12.1	0.0	14.7	14.9
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	0.7	6.1	6.2	3.9	4.0	4.1	4.7	10.3	10.7	1.2	23.1	23.1
LnGrp Delay(d),s/veh	113.2	52.8	53.7	66.7	52.8	53.3	42.7	64.8	64.8	24.9	57.3	57.7
LnGrp LOS	F	D	D	E	D	D	D	E	E	C	E	E
Approach Vol, veh/h	525				327		661				1177	
Approach Delay, s/veh	73.9				57.2		59.9				56.0	
Approach LOS	E				E		E				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	27.6	61.7	31.7	16.2	30.4	39.5	53.9				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	14.5	33.0	13.5	58.5	12.5	35.0	21.5	50.5				
Max Q Clear Time (g_c+10), s	10.2	10.3	4.4	20.8	9.5	14.8	11.5	44.2				
Green Ext Time (p_c), s	0.0	1.6	0.2	4.6	0.1	2.5	0.1	4.2				
Intersection Summary												
HCM 2010 Ctrl Delay			60.6									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	0	5	0	0	0	14	249	0	2	1406	21
Future Volume (veh/h)	13	0	5	0	0	0	14	249	0	2	1406	21
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	15	0	0				16	283	0	2	1598	0
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	65	0	58				59	2796	0	20	2717	1216
Arrive On Green	0.04	0.00	0.00				0.03	0.79	0.00	0.01	0.77	0.00
Sat Flow, veh/h	1774	0	1583				1774	3632	0	1774	3539	1583
Grp Volume(v), veh/h	15	0	0				16	283	0	2	1598	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				1774	1770	0	1774	1770	1583
Q Serve(g_s), s	0.6	0.0	0.0				0.7	1.4	0.0	0.1	14.1	0.0
Cycle Q Clear(g_c), s	0.6	0.0	0.0				0.7	1.4	0.0	0.1	14.1	0.0
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	65	0	58				59	2796	0	20	2717	1216
V/C Ratio(X)	0.23	0.00	0.00				0.27	0.10	0.00	0.10	0.59	0.00
Avail Cap(c_a), veh/h	686	0	612				216	2796	0	240	2717	1216
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.97	0.97	0.00	0.49	0.49	0.00
Uniform Delay (d), s/veh	34.6	0.0	0.0				34.9	1.8	0.0	36.2	3.6	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0				0.9	0.1	0.0	0.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0				0.3	0.7	0.0	0.0	6.8	0.0
LnGrp Delay(d),s/veh	35.3	0.0	0.0				35.8	1.8	0.0	36.6	4.1	0.0
LnGrp LOS	D						D	A		D	A	
Approach Vol, veh/h		15						299			1600	
Approach Delay, s/veh		35.3						3.7			4.1	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	60.8				4.8	62.5		6.7				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	22.5				9.5	21.5		28.0				
Max Q Clear Time (g_c+1/2), s	16.1				2.1	3.4		2.6				
Green Ext Time (p_c), s	0.0	5.7			0.0	14.7		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			4.3									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	90	628	99	353	1189	105	70	288	73	320	945	200
Future Volume (veh/h)	90	628	99	353	1189	105	70	288	73	320	945	200
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	95	661	0	372	1252	46	74	303	0	337	995	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
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, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	200	1809	563	430	1496	668	217	967	432	395	1150	514
Arrive On Green	0.06	0.36	0.00	0.13	0.43	0.43	0.06	0.28	0.00	0.12	0.33	0.00
Sat Flow, veh/h	3375	4988	1553	3375	3471	1550	3375	3471	1553	3375	3471	1553
Grp Volume(v), veh/h	95	661	0	372	1252	46	74	303	0	337	995	0
Grp Sat Flow(s),veh/h/ln	1688	1663	1553	1688	1736	1550	1688	1736	1553	1688	1736	1553
Q Serve(g_s), s	3.8	13.6	0.0	15.1	44.9	2.4	2.9	9.7	0.0	13.7	37.6	0.0
Cycle Q Clear(g_c), s	3.8	13.6	0.0	15.1	44.9	2.4	2.9	9.7	0.0	13.7	37.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	200	1809	563	430	1496	668	217	967	432	395	1150	514
V/C Ratio(X)	0.47	0.37	0.00	0.86	0.84	0.07	0.34	0.31	0.00	0.85	0.87	0.00
Avail Cap(c_a), veh/h	265	1809	563	796	1496	668	289	967	432	579	1215	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	63.7	32.8	0.0	59.9	35.5	23.4	62.7	39.9	0.0	60.6	43.9	0.0
Incr Delay (d2), s/veh	0.6	0.6	0.0	2.1	5.7	0.2	0.3	0.3	0.0	5.7	6.8	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	6.3	0.0	7.2	22.8	1.1	1.4	4.7	0.0	6.7	19.0	0.0
LnGrp Delay(d),s/veh	64.4	33.3	0.0	62.0	41.2	23.6	63.0	40.2	0.0	66.3	50.7	0.0
LnGrp LOS	E	C		E	D	C	E	D		E	D	
Approach Vol, veh/h		756			1670			377			1332	
Approach Delay, s/veh		37.2			45.3			44.7			54.6	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.8	54.8	13.0	50.4	12.3	64.3	20.4	43.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	32.5	28.0	11.5	47.0	10.5	50.0	23.5	35.0				
Max Q Clear Time (g_c+1), s	17.1	15.6	4.9	39.6	5.8	46.9	15.7	11.7				
Green Ext Time (p_c), s	0.2	10.4	0.0	4.7	0.0	2.8	0.2	12.5				
Intersection Summary												
HCM 2010 Ctrl Delay			46.8									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 			 		
Traffic Volume (veh/h)	115	870	140	263	1269	123	71	127	90	220	801	303
Future Volume (veh/h)	115	870	140	263	1269	123	71	127	90	220	801	303
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	117	888	125	268	1295	121	72	130	42	224	817	109
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	298	1245	174	900	1510	141	284	825	1359	301	843	371
Arrive On Green	0.09	0.28	0.27	0.27	0.47	0.46	0.08	0.24	0.23	0.09	0.24	0.24
Sat Flow, veh/h	3375	4421	620	3375	3211	299	3375	3471	2733	3375	3471	1530
Grp Volume(v), veh/h	117	667	346	268	698	718	72	130	42	224	817	109
Grp Sat Flow(s),veh/h/ln	1688	1663	1716	1688	1736	1774	1688	1736	1367	1688	1736	1530
Q Serve(g_s), s	4.6	25.2	25.5	8.9	49.9	50.4	2.8	4.2	0.2	9.1	32.6	8.1
Cycle Q Clear(g_c), s	4.6	25.2	25.5	8.9	49.9	50.4	2.8	4.2	0.2	9.1	32.6	8.1
Prop In Lane	1.00		0.36	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	298	936	483	900	816	835	284	825	1359	301	843	371
V/C Ratio(X)	0.39	0.71	0.72	0.30	0.86	0.86	0.25	0.16	0.03	0.74	0.97	0.29
Avail Cap(c_a), veh/h	338	1330	686	900	816	835	338	825	1359	579	843	371
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	0.77	0.77	0.77	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	60.3	45.2	45.6	40.9	32.8	33.1	60.0	42.3	7.6	62.2	52.5	43.2
Incr Delay (d2), s/veh	0.3	4.6	8.8	0.1	8.8	9.0	0.2	0.1	0.0	1.2	21.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	12.2	13.2	4.1	25.9	26.8	1.3	2.0	0.2	4.3	18.2	3.5
LnGrp Delay(d),s/veh	60.6	49.8	54.4	41.0	41.7	42.1	60.2	42.4	7.6	63.3	73.9	43.7
LnGrp LOS	E	D	D	D	D	D	E	D	A	E	E	D
Approach Vol, veh/h	1130			1684			244			1150		
Approach Delay, s/veh	52.3			41.7			41.7			69.0		
Approach LOS	D			D			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.4	69.9	15.8	38.0	42.8	43.4	16.5	37.3				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	6.0	* 6	4.5	5.5				
Max Green Setting (Gmax), s	13.5	60.0	13.5	32.5	19.5	* 54	23.5	22.5				
Max Q Clear Time (g_c+10), s	10.6	52.4	4.8	34.6	10.9	27.5	11.1	6.2				
Green Ext Time (p_c), s	0.0	5.8	0.0	0.0	6.5	9.7	0.1	8.1				
Intersection Summary												
HCM 2010 Ctrl Delay	52.0											
HCM 2010 LOS	D											
Notes												

Irvington BART 8:00 am 09/26/2017 Existing NP AM

Synchro 9 Report
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* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↱	↱	↱	↑↑	↱↱	↱		
Traffic Volume (veh/h)	628	535	58	1099	651	8		
Future Volume (veh/h)	628	535	58	1099	651	8		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810		
Adj Flow Rate, veh/h	792	370	59	1110	658	0		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99		
Percent Heavy Veh, %	5	5	5	5	5	5		
Cap, veh/h	2387	1329	62	2495	717	330		
Arrive On Green	0.66	0.65	0.07	1.00	0.21	0.00		
Sat Flow, veh/h	3619	1537	1723	3529	3343	1538		
Grp Volume(v), veh/h	792	370	59	1110	658	0		
Grp Sat Flow(s),veh/h/ln	1810	1537	1723	1719	1672	1538		
Q Serve(g_s), s	12.8	5.8	4.6	0.0	25.8	0.0		
Cycle Q Clear(g_c), s	12.8	5.8	4.6	0.0	25.8	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	2387	1329	62	2495	717	330		
V/C Ratio(X)	0.33	0.28	0.95	0.44	0.92	0.00		
Avail Cap(c_a), veh/h	2387	1329	180	2495	1340	616		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.76	0.76	0.78	0.78	1.00	0.00		
Uniform Delay (d), s/veh	9.9	1.6	62.0	0.0	51.5	0.0		
Incr Delay (d2), s/veh	0.3	0.4	18.0	0.5	4.0	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	6.5	15.7	2.5	0.2	12.3	0.0		
LnGrp Delay(d),s/veh	10.2	2.0	80.0	0.5	55.5	0.0		
LnGrp LOS	B	A	F	A	E			
Approach Vol, veh/h	1162			1169	658			
Approach Delay, s/veh	7.6			4.5	55.5			
Approach LOS	A			A	E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		101.2		32.8	8.9	92.4		
Change Period (Y+Rc), s		4.3		3.0	3.0	4.3		
Max Green Setting (Gmax), s		72.0		54.7	15.0	54.0		
Max Q Clear Time (g_c+I1), s		2.0		27.8	6.6	14.8		
Green Ext Time (p_c), s		13.2		2.0	0.0	12.3		
Intersection Summary								
HCM 2010 Ctrl Delay		16.9						
HCM 2010 LOS		B						
Notes								

Irvington BART 8:00 am 09/26/2017 Existing NP AM

Synchro 9 Report
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User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	250	369	39	342	0	735	1	17	0	5	70
Future Volume (veh/h)	15	250	369	39	342	0	735	1	17	0	5	70
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	16	266	0	41	364	0	782	1	0	0	5	0
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	3	1629	729	29	1686	0	915	495	421	7	7	6
Arrive On Green	0.00	0.15	0.00	0.02	0.49	0.00	0.27	0.27	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1740	3471	1553	1740	3563	0	3375	1827	1553	1740	1827	1553
Grp Volume(v), veh/h	16	266	0	41	364	0	782	1	0	0	5	0
Grp Sat Flow(s),veh/h/ln	1740	1736	1553	1740	1736	0	1688	1827	1553	1740	1827	1553
Q Serve(g_s), s	0.1	4.5	0.0	1.1	4.0	0.0	14.7	0.0	0.0	0.0	0.2	0.0
Cycle Q Clear(g_c), s	0.1	4.5	0.0	1.1	4.0	0.0	14.7	0.0	0.0	0.0	0.2	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	3	1629	729	29	1686	0	915	495	421	7	7	6
V/C Ratio(X)	6.16	0.16	0.00	1.39	0.22	0.00	0.85	0.00	0.00	0.00	0.72	0.00
Avail Cap(c_a), veh/h	208	1629	729	234	1686	0	1118	605	515	205	215	183
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	33.5	16.9	0.0	32.9	9.9	0.0	23.2	17.8	0.0	0.0	33.3	0.0
Incr Delay (d2), s/veh	2382.0	0.2	0.0	191.9	0.3	0.0	5.3	0.0	0.0	0.0	40.1	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	1.8	2.2	0.0	2.1	2.0	0.0	7.5	0.0	0.0	0.0	0.2	0.0
LnGrp Delay(d),s/veh	2415.5	17.1	0.0	224.9	10.2	0.0	28.4	17.8	0.0	0.0	73.4	0.0
LnGrp LOS	F	B		F	B		C	B			E	
Approach Vol, veh/h		282			405			783			5	
Approach Delay, s/veh		153.2			31.9			28.4			73.4	
Approach LOS		F			C			C			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.0	36.5		4.3	5.1	35.4		22.2				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	9.0	12.6		8.0	10.0	11.6		22.0				
Max Q Clear Time (g_c+1/2), s	12.5	6.0		2.2	3.1	6.5		16.7				
Green Ext Time (p_c), s	0.0	2.7		0.0	0.0	2.2		1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			53.4									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	154	428	238	386	42	184	142	36	44	607	309
Future Volume (veh/h)	97	154	428	238	386	42	184	142	36	44	607	309
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	104	166	242	256	415	15	198	153	23	47	653	106
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	142	585	496	315	606	507	280	1264	187	112	1382	598
Arrive On Green	0.08	0.32	0.32	0.09	0.33	0.33	0.08	0.41	0.40	0.06	0.39	0.39
Sat Flow, veh/h	1757	1845	1564	3408	1845	1543	3408	3062	452	1757	3505	1518
Grp Volume(v), veh/h	104	166	242	256	415	15	198	86	90	47	653	106
Grp Sat Flow(s),veh/h/ln	1757	1845	1564	1704	1845	1543	1704	1752	1762	1757	1752	1518
Q Serve(g_s), s	8.1	9.5	17.5	10.3	27.3	0.9	7.9	4.3	4.4	3.6	19.4	6.4
Cycle Q Clear(g_c), s	8.1	9.5	17.5	10.3	27.3	0.9	7.9	4.3	4.4	3.6	19.4	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	142	585	496	315	606	507	280	724	728	112	1382	598
V/C Ratio(X)	0.73	0.28	0.49	0.81	0.68	0.03	0.71	0.12	0.12	0.42	0.47	0.18
Avail Cap(c_a), veh/h	176	585	496	511	606	507	487	724	728	251	1382	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.9	35.9	38.6	62.3	40.7	31.9	62.6	25.4	25.5	63.1	31.6	27.6
Incr Delay (d2), s/veh	8.1	0.4	1.1	2.0	6.2	0.1	1.2	0.3	0.3	0.9	1.2	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	4.2	4.9	7.7	5.0	14.9	0.4	3.8	2.1	2.2	1.8	9.7	2.8
LnGrp Delay(d),s/veh	71.0	36.3	39.7	64.3	46.9	32.0	63.8	25.7	25.9	64.0	32.7	28.3
LnGrp LOS	E	D	D	E	D	C	E	C	C	E	C	C
Approach Vol, veh/h		512			686			374			806	
Approach Delay, s/veh		44.9			53.1			45.9			34.0	
Approach LOS		D			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.9	61.8	16.9	48.4	15.5	59.2	15.3	50.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	19.5	42.5	20.5	37.5	19.5	42.5	13.5	44.5				
Max Q Clear Time (g_c+1.5), s	15.6	6.4	12.3	19.5	9.9	21.4	10.1	29.3				
Green Ext Time (p_c), s	0.0	9.5	0.1	5.8	0.1	7.8	0.0	5.3				
Intersection Summary												
HCM 2010 Ctrl Delay			43.7									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	204	528	200	65	479	144	214	794	55	69	250	112
Future Volume (veh/h)	204	528	200	65	479	144	214	794	55	69	250	112
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	208	539	0	66	489	0	218	810	0	70	255	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	238	1342	0	146	1158	0	248	982	0	148	783	0
Arrive On Green	0.13	0.38	0.00	0.08	0.32	0.00	0.14	0.27	0.00	0.08	0.22	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	208	539	0	66	489	0	218	810	0	70	255	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	12.0	11.6	0.0	3.7	11.3	0.0	12.5	22.3	0.0	3.9	6.3	0.0
Cycle Q Clear(g_c), s	12.0	11.6	0.0	3.7	11.3	0.0	12.5	22.3	0.0	3.9	6.3	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	238	1342	0	146	1158	0	248	982	0	148	783	0
V/C Ratio(X)	0.87	0.40	0.00	0.45	0.42	0.00	0.88	0.83	0.00	0.47	0.33	0.00
Avail Cap(c_a), veh/h	247	1342	0	230	1158	0	264	1072	0	196	936	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.7	24.1	0.0	46.0	27.8	0.0	44.4	35.7	0.0	46.0	34.5	0.0
Incr Delay (d2), s/veh	25.6	0.9	0.0	0.8	1.1	0.0	24.7	5.4	0.0	0.9	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	5.9	0.0	1.9	5.8	0.0	7.9	11.8	0.0	2.0	3.2	0.0
LnGrp Delay(d),s/veh	70.3	25.0	0.0	46.8	28.9	0.0	69.1	41.1	0.0	46.8	34.8	0.0
LnGrp LOS	E	C		D	C		E	D		D	C	
Approach Vol, veh/h		747			555			1028			325	
Approach Delay, s/veh		37.6			31.1			47.0			37.4	
Approach LOS		D			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	44.4	13.2	34.3	18.4	39.0	19.0	28.5				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	13.5	29.0	11.5	31.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	5.7	13.6	5.9	24.3	14.0	13.3	14.5	8.3				
Green Ext Time (p_c), s	0.0	7.7	0.0	4.5	0.0	7.5	0.0	9.1				
Intersection Summary												
HCM 2010 Ctrl Delay				39.9								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	888	318	99	963	98	390	519	103	119	271	115
Future Volume (veh/h)	141	888	318	99	963	98	390	519	103	119	271	115
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	147	925	155	103	1003	97	406	541	91	124	282	23
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	329	1076	474	699	1047	101	463	723	121	162	693	306
Arrive On Green	0.18	0.30	0.30	0.40	0.64	0.64	0.13	0.24	0.24	0.09	0.19	0.19
Sat Flow, veh/h	1792	3574	1576	3476	3289	318	3476	3052	511	1792	3574	1578
Grp Volume(v), veh/h	147	925	155	103	545	555	406	316	316	124	282	23
Grp Sat Flow(s),veh/h/ln	1792	1787	1576	1738	1787	1820	1738	1787	1777	1792	1787	1578
Q Serve(g_s), s	8.8	29.3	6.3	2.3	34.1	34.1	13.8	19.7	19.8	8.1	8.3	1.0
Cycle Q Clear(g_c), s	8.8	29.3	6.3	2.3	34.1	34.1	13.8	19.7	19.8	8.1	8.3	1.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	329	1076	474	699	569	579	463	423	421	162	693	306
V/C Ratio(X)	0.45	0.86	0.33	0.15	0.96	0.96	0.88	0.75	0.75	0.77	0.41	0.08
Avail Cap(c_a), veh/h	329	1162	512	699	581	592	797	573	570	172	693	306
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.6	39.6	15.2	29.3	21.0	21.1	51.0	42.4	42.5	53.4	42.3	17.7
Incr Delay (d2), s/veh	0.4	9.0	1.8	0.0	24.9	24.7	2.6	4.5	4.7	15.6	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	4.4	15.7	3.0	1.1	20.3	20.6	6.8	10.3	10.3	4.7	4.2	0.4
LnGrp Delay(d),s/veh	43.9	48.5	17.1	29.4	45.9	45.7	53.6	47.0	47.3	69.0	42.9	17.8
LnGrp LOS	D	D	B	C	D	D	D	D	D	E	D	B
Approach Vol, veh/h	1227			1203			1038			429		
Approach Delay, s/veh	44.0			44.4			49.7			49.1		
Approach LOS	D			D			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.6	42.1	20.5	28.8	26.5	44.2	15.3	33.9				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	10.5	39.0	27.5	22.5	10.5	39.0	11.5	38.5				
Max Q Clear Time (g_c+14), s	14.3	31.3	15.8	10.3	10.8	36.1	10.1	21.8				
Green Ext Time (p_c), s	0.1	4.8	0.2	5.8	0.0	2.1	0.0	6.6				
Intersection Summary												
HCM 2010 Ctrl Delay	46.2											
HCM 2010 LOS	D											

Irvington BART 5:00 pm 09/26/2017 Existing NP PM

Synchro 9 Report
Page 2

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		 					 					
Traffic Volume (vph)	39	690	243	9	203	35	773	11	483	90	346	35
Future Volume (vph)	39	690	243	9	203	35	773	11	483	90	346	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5		4.5	4.5	5.5		5.5	5.5	5.5	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (prot)	1787	3574	1598		1610	1686	3563		1698	1728	1564	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (perm)	1787	3574	1598		1610	1686	3563		1698	1728	1564	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	726	256	9	214	37	814	12	508	95	364	37
RTOR Reduction (vph)	0	0	19	0	0	0	1	0	0	0	272	0
Lane Group Flow (vph)	41	726	246	0	126	125	825	0	300	303	92	0
Confl. Peds. (#/hr)	22		9			9		22	19		9	9
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	1%	1%	1%	2%	2%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	7.2	44.9	80.6		15.4	15.4	53.1		30.2	30.2	30.2	
Effective Green, g (s)	7.2	44.9	80.6		15.4	15.4	53.1		30.2	30.2	30.2	
Actuated g/C Ratio	0.06	0.37	0.67		0.13	0.13	0.44		0.25	0.25	0.25	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	107	1337	1073		206	216	1576		427	434	393	
v/s Ratio Prot	0.02	0.20	0.15		c0.08	0.07	c0.23		c0.18	0.18		
v/s Ratio Perm											0.06	
v/c Ratio	0.38	0.54	0.23		0.61	0.58	0.52		0.70	0.70	0.23	
Uniform Delay, d1	54.3	29.5	7.6		49.5	49.2	24.3		40.8	40.8	35.7	
Progression Factor	0.98	0.94	2.37		0.74	0.74	1.77		0.72	0.72	0.65	
Incremental Delay, d2	0.6	1.2	0.1		3.4	2.1	1.1		4.7	4.5	0.4	
Delay (s)	53.7	28.8	18.2		40.1	38.6	44.1		34.0	33.7	23.7	
Level of Service	D	C	B		D	D	D		C	C	C	
Approach Delay (s)		27.1					43.0			30.0		
Approach LOS		C					D			C		
Intersection Summary												
HCM 2000 Control Delay			34.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.5		
Intersection Capacity Utilization			71.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Irvington BART 5:00 pm 09/26/2017 Existing NP PM

Synchro 9 Report
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HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR2
Lane Configurations	4T	
Traffic Volume (vph)	73	42
Future Volume (vph)	73	42
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.0	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.96	
Flt Protected	0.99	
Satd. Flow (prot)	3385	
Flt Permitted	0.99	
Satd. Flow (perm)	3385	
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	77	44
RTOR Reduction (vph)	105	0
Lane Group Flow (vph)	53	0
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	1%	1%
Turn Type	NA	
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	9.0	
Effective Green, g (s)	9.0	
Actuated g/C Ratio	0.08	
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	253	
v/s Ratio Prot	c0.02	
v/s Ratio Perm		
v/c Ratio	0.21	
Uniform Delay, d1	52.1	
Progression Factor	1.00	
Incremental Delay, d2	0.1	
Delay (s)	52.3	
Level of Service	D	
Approach Delay (s)	52.3	
Approach LOS	D	
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	911	68	250	942	75	56	59	264	31	42	20
Future Volume (vph)	26	911	68	250	942	75	56	59	264	31	42	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.88			0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1787	3529		1787	3528		1765	1651			1787	
Flt Permitted	0.95	1.00		0.95	1.00		0.66	1.00			0.46	
Satd. Flow (perm)	1787	3529		1787	3528		1230	1651			839	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	28	969	72	266	1002	80	60	63	281	33	45	21
RTOR Reduction (vph)	0	4	0	0	4	0	0	144	0	0	9	0
Lane Group Flow (vph)	28	1037	0	266	1078	0	60	200	0	0	90	0
Confl. Peds. (#/hr)			5			3	13					13
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.4	50.1		25.0	75.2		25.8	25.8			25.8	
Effective Green, g (s)	4.4	50.1		25.0	75.2		25.8	25.8			25.8	
Actuated g/C Ratio	0.04	0.42		0.21	0.63		0.22	0.22			0.22	
Clearance Time (s)	4.5	5.5			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	1.0	4.0			4.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	65	1473		372	2210		264	354			180	
v/s Ratio Prot	0.02	c0.29		c0.15	0.31			c0.12				
v/s Ratio Perm							0.05				0.11	
v/c Ratio	0.43	0.70		0.72	0.49		0.23	0.57			0.50	
Uniform Delay, d1	56.6	28.8		44.2	12.0		38.9	42.1			41.4	
Progression Factor	1.26	0.70		1.67	0.07		1.00	1.00			1.00	
Incremental Delay, d2	1.4	2.5		3.1	0.4		0.2	1.2			0.8	
Delay (s)	72.8	22.8		76.8	1.3		39.0	43.3			42.3	
Level of Service	E	C		E	A		D	D			D	
Approach Delay (s)		24.1			16.2			42.7			42.3	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			23.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			19.1			
Intersection Capacity Utilization			85.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	247	717	220	101	820	65	315	840	345	90	238	147
Future Volume (veh/h)	247	717	220	101	820	65	315	840	345	90	238	147
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	263	763	234	107	872	69	335	894	367	96	253	156
Adj No. of Lanes	1	3	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	276	1838	564	174	1076	475	362	1009	446	333	980	433
Arrive On Green	0.05	0.12	0.12	0.10	0.30	0.30	0.10	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1792	5136	1576	1792	3574	1579	3476	3574	1579	3476	3574	1579
Grp Volume(v), veh/h	263	763	234	107	872	69	335	894	367	96	253	156
Grp Sat Flow(s),veh/h/ln	1792	1712	1576	1792	1787	1579	1738	1787	1579	1738	1787	1579
Q Serve(g_s), s	17.6	16.5	16.5	6.9	27.1	3.8	11.5	28.7	26.1	3.1	6.6	9.6
Cycle Q Clear(g_c), s	17.6	16.5	16.5	6.9	27.1	3.8	11.5	28.7	26.1	3.1	6.6	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	1838	564	174	1076	475	362	1009	446	333	980	433
V/C Ratio(X)	0.95	0.42	0.41	0.61	0.81	0.15	0.93	0.89	0.82	0.29	0.26	0.36
Avail Cap(c_a), veh/h	276	1838	564	202	1076	475	362	1028	454	362	1028	454
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	0.68	1.00	1.00	1.00	0.86	0.86	0.86	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	41.3	41.3	52.0	38.8	30.7	53.3	41.2	40.3	50.4	34.0	35.1
Incr Delay (d2), s/veh	32.6	0.5	1.5	2.2	6.6	0.6	25.9	8.4	10.5	0.2	0.2	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	11.2	7.9	7.5	3.5	14.3	1.8	6.8	15.3	12.6	1.5	3.3	4.3
LnGrp Delay(d),s/veh	89.2	41.7	42.8	54.2	45.4	31.3	79.2	49.6	50.8	50.6	34.2	35.8
LnGrp LOS	F	D	D	D	D	C	E	D	D	D	C	D
Approach Vol, veh/h	1260			1048			1596			505		
Approach Delay, s/veh	51.8			45.4			56.1			37.8		
Approach LOS	D			D			E			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.2	48.5	17.0	38.4	23.0	41.6	16.0	39.4				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	13.5	39.5	12.5	34.5	18.5	34.5	12.5	34.5				
Max Q Clear Time (g_c+1/9), s	13.5	18.5	13.5	11.6	19.6	29.1	5.1	30.7				
Green Ext Time (p_c), s	0.0	15.6	0.0	14.0	0.0	4.8	0.0	3.1				
Intersection Summary												
HCM 2010 Ctrl Delay	50.2											
HCM 2010 LOS	D											

HCM 2010 TWSC
6: Driveway/Olive Ave & Washington Blvd

03/06/2019

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	137	1009	1	8	887	32	0	0	2	10	0	0
Future Vol, veh/h	137	1009	1	8	887	32	0	0	2	10	0	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	151	1109	1	9	975	35	0	0	2	11	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1010	0	0	1111	0	0	1919	2441	559	1871	2424	505
Stage 1	-	-	-	-	-	-	1413	1413	-	1011	1011	-
Stage 2	-	-	-	-	-	-	506	1028	-	860	1413	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.52	6.52	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.51	4.01	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	688	-	-	630	-	-	41	31	475	45	32	515
Stage 1	-	-	-	-	-	-	146	204	-	258	317	-
Stage 2	-	-	-	-	-	-	520	312	-	319	204	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	688	-	-	629	-	-	34	24	473	37	25	515
Mov Cap-2 Maneuver	-	-	-	-	-	-	34	24	-	37	25	-
Stage 1	-	-	-	-	-	-	114	159	-	201	313	-
Stage 2	-	-	-	-	-	-	513	308	-	247	159	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.1	12.6	139.1
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	473	688	-	-	629	-	-	37
HCM Lane V/C Ratio	0.005	0.219	-	-	0.014	-	-	0.297
HCM Control Delay (s)	12.6	11.7	-	-	10.8	-	-	139.1
HCM Lane LOS	B	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0	0.8	-	-	0	-	-	1

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	154	943	350	137	52	555		
Future Volume (veh/h)	154	943	350	137	52	555		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	167	1025	380	36	57	75		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	1	1	1	1	1	1		
Cap, veh/h	218	2503	1717	752	137	122		
Arrive On Green	0.12	0.70	0.48	0.48	0.08	0.08		
Sat Flow, veh/h	1792	3668	3668	1566	1792	1599		
Grp Volume(v), veh/h	167	1025	380	36	57	75		
Grp Sat Flow(s),veh/h/ln	1792	1787	1787	1566	1792	1599		
Q Serve(g_s), s	3.9	5.2	2.7	0.5	1.3	2.0		
Cycle Q Clear(g_c), s	3.9	5.2	2.7	0.5	1.3	2.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	218	2503	1717	752	137	122		
V/C Ratio(X)	0.76	0.41	0.22	0.05	0.42	0.61		
Avail Cap(c_a), veh/h	1001	2912	2912	1276	1293	1154		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	18.3	2.7	6.5	5.9	18.9	19.2		
Incr Delay (d2), s/veh	2.1	0.2	0.1	0.0	0.8	1.9		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	2.0	2.5	1.3	0.2	0.7	1.8		
LnGrp Delay(d),s/veh	20.4	2.9	6.6	6.0	19.7	21.1		
LnGrp LOS	C	A	A	A	B	C		
Approach Vol, veh/h		1192	416		132			
Approach Delay, s/veh		5.3	6.5		20.5			
Approach LOS		A	A		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		35.0		8.0	9.4	25.5		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		7.2		4.0	5.9	4.7		
Green Ext Time (p_c), s		15.2		0.2	0.2	16.0		
Intersection Summary								
HCM 2010 Ctrl Delay			6.8					
HCM 2010 LOS			A					
Notes								

Irvington BART 5:00 pm 09/26/2017 Existing NP PM

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

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	371	467	91	34	378	344	50	156	11	4	5	15
Future Volume (veh/h)	371	467	91	34	378	344	50	156	11	4	5	15
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	382	481	83	35	390	208	52	161	9	4	5	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	442	1608	276	133	803	423	133	273	14	353	364	309
Arrive On Green	0.25	0.53	0.53	0.07	0.35	0.35	0.19	0.19	0.19	0.19	0.19	0.00
Sat Flow, veh/h	1792	3051	524	1792	2264	1192	290	1411	72	1221	1881	1599
Grp Volume(v), veh/h	382	281	283	35	307	291	222	0	0	4	5	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1788	1792	1787	1669	1773	0	0	1221	1881	1599
Q Serve(g_s), s	11.7	5.1	5.1	1.1	7.7	7.9	3.4	0.0	0.0	0.0	0.1	0.0
Cycle Q Clear(g_c), s	11.7	5.1	5.1	1.1	7.7	7.9	6.5	0.0	0.0	0.2	0.1	0.0
Prop In Lane	1.00		0.29	1.00		0.71	0.23		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	442	942	942	133	634	592	420	0	0	353	364	309
V/C Ratio(X)	0.86	0.30	0.30	0.26	0.48	0.49	0.53	0.00	0.00	0.01	0.01	0.00
Avail Cap(c_a), veh/h	903	1087	1088	498	1087	1015	1170	0	0	541	654	556
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.7	7.6	7.6	25.1	14.5	14.5	21.3	0.0	0.0	18.8	18.8	0.0
Incr Delay (d2), s/veh	2.0	0.2	0.3	0.4	0.8	0.9	0.4	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	6.0	2.6	2.6	0.5	3.9	3.7	3.3	0.0	0.0	0.1	0.1	0.0
LnGrp Delay(d),s/veh	22.8	7.9	7.9	25.5	15.3	15.4	21.7	0.0	0.0	18.8	18.8	0.0
LnGrp LOS	C	A	A	C	B	B	C			B	B	
Approach Vol, veh/h		946			633			222			9	
Approach Delay, s/veh		13.9			15.9			21.7			18.8	
Approach LOS		B			B			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	34.7		14.8	17.9	24.8		14.8				
Change Period (Y+Rc), s	3.7	4.4		3.7	3.7	4.4		3.7				
Max Green Setting (Gmax), s	16.0	35.0		20.0	29.0	35.0		36.0				
Max Q Clear Time (g_c+1.1), s	13.1	7.1		2.2	13.7	9.9		8.5				
Green Ext Time (p_c), s	0.0	11.1		0.8	0.5	10.6		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay				15.6								
HCM 2010 LOS				B								

Irvington BART 5:00 pm 09/26/2017 Existing NP PM

Synchro 9 Report
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HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	334	99	60	392	266	262	285	138	223	132	138
Future Volume (veh/h)	79	334	99	60	392	266	262	285	138	223	132	138
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	86	363	33	65	426	213	285	310	109	242	143	16
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	200	588	499	180	699	346	321	531	182	279	340	288
Arrive On Green	0.11	0.31	0.31	0.10	0.30	0.30	0.18	0.20	0.20	0.16	0.18	0.18
Sat Flow, veh/h	1792	1881	1596	1792	2316	1146	1792	2591	891	1792	1881	1594
Grp Volume(v), veh/h	86	363	33	65	328	311	285	212	207	242	143	16
Grp Sat Flow(s),veh/h/ln	1792	1881	1596	1792	1787	1675	1792	1787	1695	1792	1881	1594
Q Serve(g_s), s	3.9	14.2	1.2	2.9	13.5	13.7	13.4	9.2	9.5	11.4	5.8	0.7
Cycle Q Clear(g_c), s	3.9	14.2	1.2	2.9	13.5	13.7	13.4	9.2	9.5	11.4	5.8	0.7
Prop In Lane	1.00		1.00	1.00		0.68	1.00		0.53	1.00		1.00
Lane Grp Cap(c), veh/h	200	588	499	180	539	506	321	366	347	279	340	288
V/C Ratio(X)	0.43	0.62	0.07	0.36	0.61	0.62	0.89	0.58	0.60	0.87	0.42	0.06
Avail Cap(c_a), veh/h	520	983	834	520	934	875	624	934	886	624	983	833
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	25.2	20.8	36.1	25.7	25.8	34.5	30.9	31.0	35.5	31.3	29.2
Incr Delay (d2), s/veh	0.5	1.5	0.1	0.4	1.6	1.7	3.3	2.1	2.3	3.2	1.2	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	1.9	7.6	0.6	1.5	6.9	6.6	6.9	4.7	4.7	5.9	3.1	0.3
LnGrp Delay(d),s/veh	36.3	26.7	20.9	36.6	27.3	27.5	37.8	33.0	33.4	38.7	32.4	29.3
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h	482			704			704			401		
Approach Delay, s/veh	28.0			28.2			35.0			36.1		
Approach LOS	C			C			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.2	32.4	20.0	20.6	14.1	31.5	17.9	22.6				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+1.9), s	14.9	16.2	15.4	7.8	5.9	15.7	13.4	11.5				
Green Ext Time (p_c), s	0.0	9.8	0.1	5.4	0.0	9.9	0.1	5.3				
Intersection Summary												
HCM 2010 Ctrl Delay	31.7											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	211	185	43	195	28	193	851	50	51	326	164
Future Volume (veh/h)	195	211	185	43	195	28	193	851	50	51	326	164
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	201	218	33	44	201	18	199	877	49	53	336	124
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	228	684	102	103	496	44	216	1662	93	124	1108	402
Arrive On Green	0.13	0.22	0.22	0.06	0.15	0.15	0.12	0.48	0.48	0.07	0.43	0.43
Sat Flow, veh/h	1792	3119	465	1792	3311	293	1792	3441	192	1792	2569	932
Grp Volume(v), veh/h	201	124	127	44	107	112	199	456	470	53	232	228
Grp Sat Flow(s),veh/h/ln	1792	1787	1797	1792	1787	1817	1792	1787	1846	1792	1787	1713
Q Serve(g_s), s	13.2	7.0	7.1	2.8	6.5	6.7	13.2	21.2	21.2	3.4	10.2	10.5
Cycle Q Clear(g_c), s	13.2	7.0	7.1	2.8	6.5	6.7	13.2	21.2	21.2	3.4	10.2	10.5
Prop In Lane	1.00		0.26	1.00		0.16	1.00		0.10	1.00		0.54
Lane Grp Cap(c), veh/h	228	392	394	103	268	272	216	863	891	124	771	739
V/C Ratio(X)	0.88	0.32	0.32	0.43	0.40	0.41	0.92	0.53	0.53	0.43	0.30	0.31
Avail Cap(c_a), veh/h	261	581	584	157	477	485	216	863	891	157	771	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	51.5	39.3	39.3	54.6	46.1	46.2	52.2	21.5	21.5	53.6	22.3	22.4
Incr Delay (d2), s/veh	23.4	0.6	0.7	1.0	1.4	1.4	38.9	2.3	2.2	0.8	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	8.0	3.5	3.6	1.4	3.3	3.5	8.9	11.1	11.4	1.7	5.2	5.1
LnGrp Delay(d),s/veh	74.9	39.9	40.0	55.6	47.5	47.6	91.1	23.8	23.8	54.4	23.2	23.4
LnGrp LOS	E	D	D	E	D	D	F	C	C	D	C	C
Approach Vol, veh/h	452					263	1125			513		
Approach Delay, s/veh	55.5					48.9	35.7			26.5		
Approach LOS	E					D	D			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.8	24.0	12.8	63.5	11.4	32.3	19.0	57.2				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	17.5	32.0	10.5	39.5	10.5	39.0	14.5	35.5				
Max Q Clear Time (g_c+1.5), s	15.2	8.7	5.4	23.2	4.8	9.1	15.2	12.5				
Green Ext Time (p_c), s	0.1	3.6	0.0	9.9	0.0	3.9	0.0	12.3				
Intersection Summary												
HCM 2010 Ctrl Delay			39.0									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	0	26	0	0	0	20	1402	0	8	512	32
Future Volume (veh/h)	38	0	26	0	0	0	20	1402	0	8	512	32
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	1881				1881	1881	0	1881	1881	1881
Adj Flow Rate, veh/h	40	0	0				21	1491	0	9	545	0
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	0	1				1	1	0	1	1	1
Cap, veh/h	106	0	94				58	2647	0	32	2595	1161
Arrive On Green	0.06	0.00	0.00				0.03	0.74	0.00	0.02	0.73	0.00
Sat Flow, veh/h	1792	0	1599				1792	3668	0	1792	3574	1599
Grp Volume(v), veh/h	40	0	0				21	1491	0	9	545	0
Grp Sat Flow(s),veh/h/ln	1792	0	1599				1792	1787	0	1792	1787	1599
Q Serve(g_s), s	1.7	0.0	0.0				0.9	14.9	0.0	0.4	3.9	0.0
Cycle Q Clear(g_c), s	1.7	0.0	0.0				0.9	14.9	0.0	0.4	3.9	0.0
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	106	0	94				58	2647	0	32	2595	1161
V/C Ratio(X)	0.38	0.00	0.00				0.36	0.56	0.00	0.28	0.21	0.00
Avail Cap(c_a), veh/h	627	0	560				213	2647	0	213	2595	1161
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.32	0.32	0.00	0.95	0.95	0.00
Uniform Delay (d), s/veh	36.2	0.0	0.0				37.9	4.6	0.0	38.8	3.5	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0				0.4	0.3	0.0	1.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0				0.5	7.1	0.0	0.2	2.0	0.0
LnGrp Delay(d),s/veh	37.1	0.0	0.0				38.3	4.9	0.0	40.4	3.7	0.0
LnGrp LOS	D						D	A		D	A	
Approach Vol, veh/h		40						1512			554	
Approach Delay, s/veh		37.1						5.4			4.3	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.1	63.6			6.0	64.7		9.3				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	9.5	27.5			9.5	27.5		28.0				
Max Q Clear Time (g_c+1.2), s	12.5	5.9			2.4	16.9		3.7				
Green Ext Time (p_c), s	0.0	17.5			0.0	9.4		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			5.7									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	  	  		  	 		  	 		  	 	
Traffic Volume (veh/h)	275	1119	75	152	806	231	132	902	480	175	247	139
Future Volume (veh/h)	275	1119	75	152	806	231	132	902	480	175	247	139
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	284	1154	0	157	831	147	136	930	0	180	255	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	334	2238	697	207	1427	628	230	951	425	257	978	438
Arrive On Green	0.10	0.44	0.00	0.06	0.40	0.40	0.07	0.27	0.00	0.07	0.28	0.00
Sat Flow, veh/h	3442	5085	1583	3442	3539	1557	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	284	1154	0	157	831	147	136	930	0	180	255	0
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1557	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	10.9	22.0	0.0	6.0	24.5	8.3	5.1	34.9	0.0	6.8	7.5	0.0
Cycle Q Clear(g_c), s	10.9	22.0	0.0	6.0	24.5	8.3	5.1	34.9	0.0	6.8	7.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	334	2238	697	207	1427	628	230	951	425	257	978	438
V/C Ratio(X)	0.85	0.52	0.00	0.76	0.58	0.23	0.59	0.98	0.00	0.70	0.26	0.00
Avail Cap(c_a), veh/h	501	2238	697	347	1427	628	347	951	425	347	978	438
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	59.5	27.2	0.0	62.0	31.2	26.4	60.8	48.6	0.0	60.6	37.8	0.0
Incr Delay (d2), s/veh	5.7	0.9	0.0	2.2	1.7	0.9	0.9	23.9	0.0	1.9	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	10.4	0.0	2.9	12.3	3.7	2.5	20.2	0.0	3.3	3.7	0.0
LnGrp Delay(d),s/veh	65.3	28.0	0.0	64.2	32.9	27.2	61.7	72.5	0.0	62.4	38.0	0.0
LnGrp LOS	E	C		E	C	C	E	E		E	D	
Approach Vol, veh/h	1438				1135		1066				435	
Approach Delay, s/veh	35.4				36.5		71.1				48.1	
Approach LOS	D				D		E				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.5	65.0	13.4	43.0	17.5	60.0	14.5	42.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	13.5	50.0	13.5	36.0	19.5	44.0	13.5	36.0				
Max Q Clear Time (g_c+1.0), s	19.0	24.0	7.1	9.5	12.9	26.5	8.8	36.9				
Green Ext Time (p_c), s	0.0	19.8	0.0	11.9	0.1	14.3	0.1	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			46.4									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑		↰↰	↑↑		↰↰	↑↑	↰↰	↰↰	↑↑	↰
Traffic Volume (veh/h)	456	1382	132	139	747	223	222	777	333	227	252	229
Future Volume (veh/h)	456	1382	132	139	747	223	222	777	333	227	252	229
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	470	1425	128	143	770	208	229	801	276	234	260	56
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	515	2165	194	256	1048	283	308	806	841	308	806	359
Arrive On Green	0.15	0.46	0.46	0.07	0.38	0.38	0.09	0.23	0.23	0.09	0.23	0.23
Sat Flow, veh/h	3442	4751	427	3442	2756	744	3442	3539	2787	3442	3539	1579
Grp Volume(v), veh/h	470	1017	536	143	494	484	229	801	276	234	260	56
Grp Sat Flow(s),veh/h/ln	1721	1695	1787	1721	1770	1731	1721	1770	1393	1721	1770	1579
Q Serve(g_s), s	18.0	31.3	31.3	5.4	32.2	32.2	8.7	30.3	10.3	8.9	8.2	3.8
Cycle Q Clear(g_c), s	18.0	31.3	31.3	5.4	32.2	32.2	8.7	30.3	10.3	8.9	8.2	3.8
Prop In Lane	1.00		0.24	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	515	1545	814	256	673	658	308	806	841	308	806	359
V/C Ratio(X)	0.91	0.66	0.66	0.56	0.73	0.73	0.74	0.99	0.33	0.76	0.32	0.16
Avail Cap(c_a), veh/h	527	1545	814	295	673	658	372	806	841	424	858	383
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	0.87	0.87	0.87	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	56.1	28.4	28.4	59.9	35.7	35.7	59.5	51.7	36.2	59.6	43.1	41.4
Incr Delay (d2), s/veh	19.6	2.2	4.1	0.6	6.2	6.3	4.7	30.2	0.3	3.1	0.3	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	10.0	15.0	16.3	2.6	16.8	16.5	4.3	18.2	4.0	4.4	4.0	1.7
LnGrp Delay(d),s/veh	75.7	30.6	32.5	60.5	41.9	42.0	64.2	81.9	36.6	62.7	43.5	41.7
LnGrp LOS	E	C	C	E	D	D	E	F	D	E	D	D
Approach Vol, veh/h	2023					1121		1306		550		
Approach Delay, s/veh	41.6					44.3		69.2		51.5		
Approach LOS	D					D		E		D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.6	56.9	16.5	36.0	14.5	67.1	16.5	36.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	20.5	46.0	14.5	32.5	11.5	55.0	16.5	30.5				
Max Q Clear Time (g_c+20.0), s	20.5	34.2	10.7	10.2	7.4	33.3	10.9	32.3				
Green Ext Time (p_c), s	0.0	10.8	0.1	11.9	0.0	19.0	0.1	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			50.5									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↱	↱	↱	↑↑	↱↱	↱		
Traffic Volume (veh/h)	1176	719	26	640	499	40		
Future Volume (veh/h)	1176	719	26	640	499	40		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1273	626	27	660	514	0		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1467	893	615	2738	586	270		
Arrive On Green	0.39	0.39	0.69	1.00	0.17	0.00		
Sat Flow, veh/h	3725	1583	1774	3632	3442	1583		
Grp Volume(v), veh/h	1273	626	27	660	514	0		
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1770	1721	1583		
Q Serve(g_s), s	40.9	10.2	0.6	0.0	18.9	0.0		
Cycle Q Clear(g_c), s	40.9	10.2	0.6	0.0	18.9	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1467	893	615	2738	586	270		
V/C Ratio(X)	0.87	0.70	0.04	0.24	0.88	0.00		
Avail Cap(c_a), veh/h	2141	1179	615	2738	847	390		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.69	0.69	0.96	0.96	1.00	0.00		
Uniform Delay (d), s/veh	36.3	15.5	13.1	0.0	52.6	0.0		
Incr Delay (d2), s/veh	5.1	3.2	0.0	0.2	6.7	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	22.1	25.9	0.3	0.1	9.5	0.0		
LnGrp Delay(d),s/veh	41.4	18.7	13.1	0.2	59.3	0.0		
LnGrp LOS	D	B	B	A	E			
Approach Vol, veh/h	1899			687	514			
Approach Delay, s/veh	33.9			0.7	59.3			
Approach LOS	C			A	E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		104.9		25.1	49.4	55.5		
Change Period (Y+Rc), s		4.3		3.0	4.3	* 4.3		
Max Green Setting (Gmax), s		90.7		32.0	13.0	* 75		
Max Q Clear Time (g_c+I1), s		2.0		20.9	2.6	42.9		
Green Ext Time (p_c), s		2.8		1.2	2.1	8.3		
Intersection Summary								
HCM 2010 Ctrl Delay		30.7						
HCM 2010 LOS		C						
Notes								

Irvington BART 5:00 pm 09/26/2017 Existing NP PM

Synchro 9 Report
Page 13

User approved volume balancing among the lanes for turning movement.

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

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	474	668	186	436	12	194	5	29	1	24	36
Future Volume (veh/h)	96	474	668	186	436	12	194	5	29	1	24	36
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	103	510	0	200	469	13	209	5	0	1	26	39
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	1736	777	242	1943	54	320	173	147	76	80	68
Arrive On Green	0.10	0.65	0.00	0.14	0.55	0.55	0.09	0.09	0.00	0.04	0.04	0.04
Sat Flow, veh/h	1774	3539	1583	1774	3515	97	3442	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	510	0	200	236	246	209	5	0	1	26	39
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1843	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.7	4.0	0.0	7.1	4.5	4.5	3.8	0.2	0.0	0.0	0.9	1.6
Cycle Q Clear(g_c), s	3.7	4.0	0.0	7.1	4.5	4.5	3.8	0.2	0.0	0.0	0.9	1.6
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	132	1736	777	242	978	1019	320	173	147	76	80	68
V/C Ratio(X)	0.78	0.29	0.00	0.82	0.24	0.24	0.65	0.03	0.00	0.01	0.33	0.57
Avail Cap(c_a), veh/h	273	1736	777	246	978	1019	847	459	390	191	201	171
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	6.5	0.0	27.3	7.5	7.5	28.5	26.8	0.0	29.8	30.2	30.5
Incr Delay (d2), s/veh	3.0	0.3	0.0	18.6	0.6	0.6	1.7	0.0	0.0	0.0	0.9	2.8
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	1.9	2.0	0.0	4.8	2.3	2.4	1.9	0.1	0.0	0.0	0.5	0.7
LnGrp Delay(d),s/veh	31.8	6.8	0.0	45.9	8.1	8.1	30.1	26.9	0.0	29.8	31.1	33.4
LnGrp LOS	C	A		D	A	A	C	C		C	C	C
Approach Vol, veh/h		613			682			214			66	
Approach Delay, s/veh		11.0			19.2			30.1			32.4	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	40.2		6.7	11.9	36.2		10.2				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	10.0	16.6		7.0	9.0	17.6		16.0				
Max Q Clear Time (g_c+1.5), s	15.5	6.5		3.6	9.1	6.0		5.8				
Green Ext Time (p_c), s	0.0	5.4		0.0	0.0	5.9		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			18.0									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	343	345	48	181	31	516	874	204	50	273	131
Future Volume (veh/h)	149	343	345	48	181	31	516	874	204	50	273	131
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	152	350	131	49	185	11	527	892	193	51	279	29
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	564	470	237	507	431	574	1202	260	113	1106	490
Arrive On Green	0.10	0.30	0.30	0.07	0.27	0.27	0.17	0.42	0.42	0.06	0.31	0.31
Sat Flow, veh/h	1774	1863	1553	3442	1863	1583	3442	2891	625	1774	3539	1570
Grp Volume(v), veh/h	152	350	131	49	185	11	527	546	539	51	279	29
Grp Sat Flow(s),veh/h/ln	1774	1863	1553	1721	1863	1583	1721	1770	1747	1774	1770	1570
Q Serve(g_s), s	11.3	21.6	8.6	1.8	10.8	0.7	20.2	34.9	35.0	3.7	7.9	1.7
Cycle Q Clear(g_c), s	11.3	21.6	8.6	1.8	10.8	0.7	20.2	34.9	35.0	3.7	7.9	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		1.00
Lane Grp Cap(c), veh/h	176	564	470	237	507	431	574	736	726	113	1106	490
V/C Ratio(X)	0.86	0.62	0.28	0.21	0.36	0.03	0.92	0.74	0.74	0.45	0.25	0.06
Avail Cap(c_a), veh/h	285	619	516	347	507	431	629	736	726	139	1106	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.5	40.1	35.6	58.9	39.4	35.7	54.9	33.1	33.1	60.5	34.4	32.3
Incr Delay (d2), s/veh	8.1	2.1	0.5	0.2	2.0	0.1	16.9	6.7	6.8	1.1	0.5	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	11.4	3.8	0.9	5.8	0.3	10.9	18.3	18.1	1.9	4.0	0.8
LnGrp Delay(d),s/veh	67.6	42.2	36.0	59.1	41.4	35.8	71.9	39.7	39.8	61.6	34.9	32.5
LnGrp LOS	E	D	D	E	D	D	E	D	D	E	C	C
Approach Vol, veh/h	633			245			1612			359		
Approach Delay, s/veh	47.0			44.7			50.3			38.5		
Approach LOS	D			D			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	61.2	13.7	46.1	26.8	47.4	17.8	42.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	10.5	45.5	13.5	44.5	24.5	31.5	21.5	36.5				
Max Q Clear Time (g_c+1.5), s	15.7	37.0	3.8	23.6	22.2	9.9	13.3	12.8				
Green Ext Time (p_c), s	0.0	6.3	0.0	5.0	0.2	12.6	0.0	5.2				
Intersection Summary												
HCM 2010 Ctrl Delay	47.6											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	520	500	170	720	240	270	360	80	170	640	280
Future Volume (veh/h)	250	520	500	170	720	240	270	360	80	170	640	280
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	278	578	0	189	800	0	300	400	0	189	711	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	1123	0	227	1065	0	273	1002	0	227	909	0
Arrive On Green	0.14	0.31	0.00	0.13	0.30	0.00	0.15	0.28	0.00	0.13	0.25	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	278	578	0	189	800	0	300	400	0	189	711	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	15.0	13.9	0.0	10.8	21.3	0.0	16.0	9.5	0.0	10.8	19.4	0.0
Cycle Q Clear(g_c), s	15.0	13.9	0.0	10.8	21.3	0.0	16.0	9.5	0.0	10.8	19.4	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	256	1123	0	227	1065	0	273	1002	0	227	909	0
V/C Ratio(X)	1.09	0.51	0.00	0.83	0.75	0.00	1.10	0.40	0.00	0.83	0.78	0.00
Avail Cap(c_a), veh/h	256	1123	0	256	1065	0	273	1002	0	273	987	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.0	29.4	0.0	44.8	33.3	0.0	44.5	30.6	0.0	44.8	36.4	0.0
Incr Delay (d2), s/veh	81.1	1.7	0.0	16.9	4.9	0.0	83.5	0.4	0.0	14.5	4.2	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	13.2	7.1	0.0	6.4	11.2	0.0	14.2	4.8	0.0	6.3	10.1	0.0
LnGrp Delay(d),s/veh	126.1	31.1	0.0	61.7	38.2	0.0	128.0	31.0	0.0	59.2	40.6	0.0
LnGrp LOS	F	C		E	D		F	C		E	D	
Approach Vol, veh/h		856			989			700			900	
Approach Delay, s/veh		62.0			42.7			72.6			44.5	
Approach LOS		E			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.3	37.0	17.3	33.4	19.0	35.3	20.0	30.7				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	14.5	28.0	15.5	27.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	12.8	15.9	12.8	11.5	17.0	23.3	18.0	21.4				
Green Ext Time (p_c), s	0.0	8.4	0.0	8.4	0.0	3.7	0.0	3.8				
Intersection Summary												
HCM 2010 Ctrl Delay				54.0								
HCM 2010 LOS				D								
Notes												

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User approved ignoring U-Turning movement.

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	1250	400	200	840	100	250	370	170	170	540	220
Future Volume (veh/h)	100	1250	400	200	840	100	250	370	170	170	540	220
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	103	1289	278	206	866	97	258	381	134	175	557	120
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	130	1701	749	260	1547	173	317	570	198	176	810	357
Arrive On Green	0.07	0.49	0.49	0.15	0.97	0.95	0.09	0.22	0.21	0.10	0.23	0.23
Sat Flow, veh/h	1757	3505	1543	3408	3174	355	3408	2544	882	1757	3505	1543
Grp Volume(v), veh/h	103	1289	278	206	478	485	258	261	254	175	557	120
Grp Sat Flow(s),veh/h/ln	1757	1752	1543	1704	1752	1777	1704	1752	1673	1757	1752	1543
Q Serve(g_s), s	8.1	41.9	15.8	8.2	2.1	2.6	10.4	19.0	19.5	13.9	20.3	9.1
Cycle Q Clear(g_c), s	8.1	41.9	15.8	8.2	2.1	2.6	10.4	19.0	19.5	13.9	20.3	9.1
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.53	1.00		1.00
Lane Grp Cap(c), veh/h	130	1701	749	260	854	866	317	393	375	176	810	357
V/C Ratio(X)	0.79	0.76	0.37	0.79	0.56	0.56	0.81	0.66	0.68	1.00	0.69	0.34
Avail Cap(c_a), veh/h	151	1701	749	292	854	866	536	501	478	176	810	357
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.7	29.3	22.6	58.3	0.9	1.2	62.3	49.5	50.1	63.0	49.2	44.9
Incr Delay (d2), s/veh	18.2	3.2	1.4	9.4	2.3	2.2	1.9	3.0	3.5	66.7	2.7	0.8
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	4.6	21.0	7.0	4.2	1.1	1.4	5.0	9.5	9.4	10.0	10.1	3.9
LnGrp Delay(d),s/veh	81.9	32.5	24.0	67.7	3.2	3.4	64.2	52.5	53.5	129.6	51.9	45.7
LnGrp LOS	F	C	C	E	A	A	E	D	D	F	D	D
Approach Vol, veh/h	1670					1169		773		852		
Approach Delay, s/veh	34.2					14.7		56.8		67.0		
Approach LOS	C					B		E		E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.7	71.9	17.0	36.4	14.4	72.2	18.0	35.4				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	11.5	56.0	21.5	30.5	11.5	56.0	13.5	38.5				
Max Q Clear Time (g_c+10), s	10.2	43.9	12.4	22.3	10.1	4.6	15.9	21.5				
Green Ext Time (p_c), s	0.0	11.2	0.1	5.2	0.0	39.9	0.0	8.4				
Intersection Summary												
HCM 2010 Ctrl Delay			39.2									
HCM 2010 LOS			D									

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	20	1040	490	10	500	60	840	10	290	50	360	40
Future Volume (vph)	20	1040	490	10	500	60	840	10	290	50	360	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (prot)	1752	3505	1568		1595	1665	3497		1665	1692	1542	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (perm)	1752	3505	1568		1595	1665	3497		1665	1692	1542	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	1156	544	11	556	67	933	11	322	56	400	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	312	0
Lane Group Flow (vph)	22	1156	555	0	322	301	944	0	180	198	88	0
Confl. Peds. (#/hr)	5		3			3		5	13		3	3
Confl. Bikes (#/hr)			3								1	
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	5.4	35.3	70.0		42.3	42.3	72.2		29.2	29.2	29.2	
Effective Green, g (s)	5.9	36.8	71.5		42.8	42.8	73.7		30.7	30.7	30.7	
Actuated g/C Ratio	0.04	0.26	0.51		0.31	0.31	0.53		0.22	0.22	0.22	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	73	921	800		487	509	1840		365	371	338	
v/s Ratio Prot	0.01	c0.33	c0.35		c0.20	0.18	0.27		0.11	0.12		
v/s Ratio Perm											0.06	
v/c Ratio	0.30	1.26	0.69		0.66	0.59	0.51		0.49	0.53	0.26	
Uniform Delay, d1	65.1	51.6	26.0		42.3	41.2	21.5		47.8	48.3	45.2	
Progression Factor	1.22	0.88	1.50		0.56	0.57	0.53		1.24	1.23	5.80	
Incremental Delay, d2	0.6	120.8	1.9		1.9	0.9	0.8		1.3	1.7	0.5	
Delay (s)	80.0	166.3	40.9		25.6	24.2	12.1		60.4	61.4	262.8	
Level of Service	E	F	D		C	C	B		E	E	F	
Approach Delay (s)		125.0					17.2			164.7		
Approach LOS		F					B			F		
Intersection Summary												
HCM 2000 Control Delay			89.8				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			82.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR	SBR2
Lane Configurations	4T		
Traffic Volume (vph)	110	10	30
Future Volume (vph)	110	10	30
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0		
Lane Util. Factor	0.95		
Frpb, ped/bikes	0.99		
Flpb, ped/bikes	1.00		
Frt	0.97		
Flt Protected	0.99		
Satd. Flow (prot)	3325		
Flt Permitted	0.99		
Satd. Flow (perm)	3325		
Peak-hour factor, PHF	0.90	0.90	0.90
Adj. Flow (vph)	122	11	33
RTOR Reduction (vph)	13	0	0
Lane Group Flow (vph)	197	0	0
Confl. Peds. (#/hr)		13	
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	3%	3%	3%
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	12.7		
Effective Green, g (s)	13.7		
Actuated g/C Ratio	0.10		
Clearance Time (s)	5.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	325		
v/s Ratio Prot	c0.06		
v/s Ratio Perm			
v/c Ratio	0.61		
Uniform Delay, d1	60.6		
Progression Factor	1.00		
Incremental Delay, d2	2.2		
Delay (s)	62.8		
Level of Service	E		
Approach Delay (s)	62.8		
Approach LOS	E		
Intersection Summary			

HCM 2010 Signalized Intersection Summary

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1330	50	230	1330	40	60	40	320	60	30	10
Future Volume (veh/h)	20	1330	50	230	1330	40	60	40	320	60	30	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.99		0.99	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	22	1478	54	256	1478	42	67	44	169	67	33	8
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	0	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	394	1683	61	392	1695	48	297	70	269	116	51	10
Arrive On Green	0.07	0.16	0.16	0.44	0.96	0.94	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1774	3480	127	1774	3512	100	1352	334	1284	355	246	48
Grp Volume(v), veh/h	22	750	782	256	743	777	67	0	213	108	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1837	1774	1770	1842	1352	0	1618	648	0	0
Q Serve(g_s), s	1.6	58.0	58.3	15.9	12.9	13.5	0.0	0.0	16.8	9.4	0.0	0.0
Cycle Q Clear(g_c), s	1.6	58.0	58.3	15.9	12.9	13.5	6.8	0.0	16.8	26.2	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.05	1.00		0.79	0.62		0.07
Lane Grp Cap(c), veh/h	394	856	889	392	854	889	297	0	339	178	0	0
V/C Ratio(X)	0.06	0.88	0.88	0.65	0.87	0.87	0.23	0.00	0.63	0.61	0.00	0.00
Avail Cap(c_a), veh/h	394	872	905	392	1049	1092	332	0	381	212	0	0
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.52	0.52	0.52	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	51.2	54.7	54.9	34.9	1.5	1.6	46.4	0.0	50.6	59.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	1.3	1.6	6.6	6.5	0.1	0.0	1.7	1.5	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	0.8	28.8	30.0	7.9	5.7	5.9	2.2	0.0	7.7	4.2	0.0	0.0
LnGrp Delay(d),s/veh	51.2	56.0	56.2	36.5	8.1	8.1	46.6	0.0	52.2	60.7	0.0	0.0
LnGrp LOS	D	E	E	D	A	A	D		D	E		
Approach Vol, veh/h	1554			1776			280			108		
Approach Delay, s/veh	56.0			12.2			50.9			60.7		
Approach LOS	E			B			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	34.9	71.7		33.4	46.8	59.9		33.4				
Change Period (Y+Rc), s	4.5	5.5		4.6	4.5	5.5		4.6				
Max Green Setting (Gmax), s	25.5	67.5		32.4	11.5	81.5		32.4				
Max Q Clear Time (g_c+1.0), s	17.9	60.3		28.2	3.6	15.5		18.8				
Green Ext Time (p_c), s	0.1	5.9		0.6	0.1	27.2		1.3				
Intersection Summary												
HCM 2010 Ctrl Delay	34.8											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1180	380	380	960	120	320	290	110	170	910	260
Future Volume (veh/h)	110	1180	380	380	960	120	320	290	110	170	910	260
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	117	1255	242	404	1021	45	340	309	34	181	968	83
Adj No. of Lanes	1	3	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	289	1425	438	405	1199	530	344	1049	469	307	986	439
Arrive On Green	0.33	0.56	0.56	0.23	0.34	0.34	0.10	0.30	0.30	0.09	0.28	0.28
Sat Flow, veh/h	1774	5085	1561	1774	3539	1563	3442	3539	1582	3442	3539	1577
Grp Volume(v), veh/h	117	1255	242	404	1021	45	340	309	34	181	968	83
Grp Sat Flow(s),veh/h/ln	1774	1695	1561	1774	1770	1563	1721	1770	1582	1721	1770	1577
Q Serve(g_s), s	7.2	30.0	10.4	31.8	37.5	2.1	13.8	9.4	2.2	7.1	38.0	5.6
Cycle Q Clear(g_c), s	7.2	30.0	10.4	31.8	37.5	2.1	13.8	9.4	2.2	7.1	38.0	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	289	1425	438	405	1199	530	344	1049	469	307	986	439
V/C Ratio(X)	0.40	0.88	0.55	1.00	0.85	0.08	0.99	0.29	0.07	0.59	0.98	0.19
Avail Cap(c_a), veh/h	289	1425	438	405	1315	581	344	1049	469	320	986	439
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.33	0.33	0.33	1.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	28.7	14.3	53.9	43.0	18.2	62.9	38.0	35.4	61.3	50.1	38.5
Incr Delay (d2), s/veh	0.4	2.9	1.7	43.6	7.7	0.3	44.5	0.2	0.1	1.7	24.2	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	8.5	14.1	4.5	20.5	19.6	1.0	8.7	4.6	1.0	3.4	21.9	2.5
LnGrp Delay(d),s/veh	42.3	31.6	16.0	97.6	50.7	18.5	107.4	38.2	35.5	63.0	74.4	38.8
LnGrp LOS	D	C	B	F	D	B	F	D	D	E	E	D
Approach Vol, veh/h	1614			1470			683			1232		
Approach Delay, s/veh	30.1			62.6			72.5			70.3		
Approach LOS	C			E			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	36.0	43.2	19.0	43.0	27.8	51.4	16.5	45.5				
Change Period (Y+Rc), s	4.5	5.5	5.5	* 5.5	5.5	* 5.5	4.5	5.5				
Max Green Setting (Gmax), s	31.5	37.5	13.5	* 38	18.5	* 51	12.5	38.5				
Max Q Clear Time (g_c+Q), s	33.8	32.0	15.8	40.0	9.2	39.5	9.1	11.4				
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	7.2	6.4	0.0	2.5				
Intersection Summary												
HCM 2010 Ctrl Delay	55.4											
HCM 2010 LOS	E											
Notes												

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

Intersection												
Int Delay, s/veh	42.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	90	1410	0	10	1360	60	0	0	0	40	0	0
Future Vol, veh/h	90	1410	0	10	1360	60	0	0	0	40	0	0
Conflicting Peds, #/hr	0	0	1	1	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	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	90	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	107	1679	0	12	1619	71	0	0	0	48	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1690	0	0	1680	0	0	2728	3608	841	2733	3573	845
Stage 1	-	-	-	-	-	-	1894	1894	-	1679	1679	-
Stage 2	-	-	-	-	-	-	834	1714	-	1054	1894	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	374	-	-	377	-	-	10	5	308	~ 10	6	306
Stage 1	-	-	-	-	-	-	72	117	-	99	150	-
Stage 2	-	-	-	-	-	-	329	144	-	242	117	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	374	-	-	377	-	-	8	3	308	~ 8	4	306
Mov Cap-2 Maneuver	-	-	-	-	-	-	8	3	-	~ 8	4	-
Stage 1	-	-	-	-	-	-	51	83	-	71	145	-
Stage 2	-	-	-	-	-	-	319	139	-	173	83	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.1	0	\$ 3133.6
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	374	-	-	377	-	-	8
HCM Lane V/C Ratio	-	0.286	-	-	0.032	-	-	5.952
HCM Control Delay (s)	0	18.4	-	-	14.9	-	-	\$ 3133.6
HCM Lane LOS	A	C	-	-	B	-	-	F
HCM 95th %tile Q(veh)	-	1.2	-	-	0.1	-	-	7.4

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

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	460	890	640	290	70	720		
Future Volume (veh/h)	460	890	640	290	70	720		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	511	989	711	186	78	480		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	469	2076	985	441	579	516		
Arrive On Green	0.26	0.59	0.28	0.28	0.33	0.33		
Sat Flow, veh/h	1774	3632	3632	1583	1774	1583		
Grp Volume(v), veh/h	511	989	711	186	78	480		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1774	1583		
Q Serve(g_s), s	24.2	14.7	16.6	8.8	2.8	26.8		
Cycle Q Clear(g_c), s	24.2	14.7	16.6	8.8	2.8	26.8		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	469	2076	985	441	579	516		
V/C Ratio(X)	1.09	0.48	0.72	0.42	0.13	0.93		
Avail Cap(c_a), veh/h	469	2076	1388	621	614	548		
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	33.7	10.9	29.8	27.0	21.7	29.8		
Incr Delay (d2), s/veh	67.9	0.2	1.5	0.9	0.0	21.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	20.6	7.2	8.3	3.9	1.4	23.4		
LnGrp Delay(d),s/veh	101.6	11.1	31.3	27.9	21.8	51.0		
LnGrp LOS	F	B	C	C	C	D		
Approach Vol, veh/h		1500	897		558			
Approach Delay, s/veh		41.9	30.6		46.9			
Approach LOS		D	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		57.7		33.9	28.2	29.5		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		16.7		28.8	26.2	18.6		
Green Ext Time (p_c), s		13.9		0.3	0.0	6.0		
Intersection Summary								
HCM 2010 Ctrl Delay			39.5					
HCM 2010 LOS			D					
Notes								

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

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	660	340	60	40	520	280	50	30	30	130	30	350
Future Volume (veh/h)	660	340	60	40	520	280	50	30	30	130	30	350
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	733	378	58	44	578	251	56	33	19	144	33	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	675	1942	295	135	788	342	165	91	39	300	264	224
Arrive On Green	0.38	0.63	0.62	0.08	0.33	0.32	0.14	0.14	0.14	0.14	0.14	0.00
Sat Flow, veh/h	1792	3099	471	1792	2423	1050	665	648	280	1360	1881	1599
Grp Volume(v), veh/h	733	217	219	44	426	403	108	0	0	144	33	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1783	1792	1787	1686	1593	0	0	1360	1881	1599
Q Serve(g_s), s	28.7	3.9	4.0	1.8	16.1	16.2	2.7	0.0	0.0	2.2	1.2	0.0
Cycle Q Clear(g_c), s	28.7	3.9	4.0	1.8	16.1	16.2	4.6	0.0	0.0	6.8	1.2	0.0
Prop In Lane	1.00		0.26	1.00		0.62	0.52		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	675	1120	1117	135	581	549	295	0	0	300	264	224
V/C Ratio(X)	1.09	0.19	0.20	0.32	0.73	0.73	0.37	0.00	0.00	0.48	0.13	0.00
Avail Cap(c_a), veh/h	675	1120	1117	369	831	784	803	0	0	462	487	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.7	6.0	6.1	33.4	22.8	22.9	30.0	0.0	0.0	31.0	28.7	0.0
Incr Delay (d2), s/veh	60.1	0.1	0.1	0.5	2.7	2.9	0.3	0.0	0.0	0.4	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.3	2.0	2.0	0.9	8.4	8.0	2.1	0.0	0.0	2.9	0.6	0.0
LnGrp Delay(d),s/veh	83.8	6.2	6.2	33.9	25.5	25.8	30.3	0.0	0.0	31.4	28.7	0.0
LnGrp LOS	F	A	A	C	C	C	C			C	C	
Approach Vol, veh/h	1169				873		108				177	
Approach Delay, s/veh	54.9				26.0		30.3				30.9	
Approach LOS	D				C		C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			4	5	6	8				
Phs Duration (G+Y+Rc), s	9.8	51.7			14.7	32.7	28.8	14.7				
Change Period (Y+Rc), s	3.7	4.4			3.7	3.7	4.4	3.7				
Max Green Setting (Gmax), s	10.0	35.0			20.0	29.0	35.0	36.0				
Max Q Clear Time (g_c+1.3), s	13.8	6.0			8.8	30.7	18.2	6.6				
Green Ext Time (p_c), s	0.0	12.6			0.6	0.0	6.2	0.7				
Intersection Summary												
HCM 2010 Ctrl Delay			41.1									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	320	110	110	360	270	80	390	50	300	280	410
Future Volume (veh/h)	120	320	110	110	360	270	80	390	50	300	280	410
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	133	356	43	122	400	221	89	433	50	333	311	165
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	196	547	454	195	646	353	201	771	89	370	626	523
Arrive On Green	0.11	0.29	0.29	0.11	0.29	0.28	0.11	0.24	0.23	0.21	0.33	0.33
Sat Flow, veh/h	1792	1881	1562	1792	2230	1217	1792	3231	371	1792	1881	1571
Grp Volume(v), veh/h	133	356	43	122	320	301	89	239	244	333	311	165
Grp Sat Flow(s),veh/h/ln	1792	1881	1562	1792	1787	1660	1792	1787	1816	1792	1881	1571
Q Serve(g_s), s	7.3	17.0	2.1	6.7	15.9	16.3	4.8	12.0	12.2	18.6	13.6	8.0
Cycle Q Clear(g_c), s	7.3	17.0	2.1	6.7	15.9	16.3	4.8	12.0	12.2	18.6	13.6	8.0
Prop In Lane	1.00		1.00	1.00		0.73	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	196	547	454	195	518	481	201	426	433	370	626	523
V/C Ratio(X)	0.68	0.65	0.09	0.63	0.62	0.63	0.44	0.56	0.56	0.90	0.50	0.32
Avail Cap(c_a), veh/h	445	851	707	445	809	751	532	800	813	532	842	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.0	31.9	26.6	43.8	31.6	32.2	42.6	34.4	34.5	39.7	27.4	25.6
Incr Delay (d2), s/veh	1.5	1.9	0.1	1.2	1.7	1.9	0.6	1.6	1.6	11.0	0.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	9.1	0.9	3.4	8.1	7.8	2.4	6.2	6.3	10.4	7.1	3.5
LnGrp Delay(d),s/veh	45.5	33.8	26.7	45.0	33.3	34.1	43.1	36.0	36.2	50.7	28.3	26.1
LnGrp LOS	D	C	C	D	C	C	D	D	D	D	C	C
Approach Vol, veh/h	532				743				572			
Approach Delay, s/veh	36.1				35.5				37.2			
Approach LOS	D				D				D			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	33.8	15.6	38.2	15.3	33.8	25.2	28.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+1.7), s	19.7	19.0	6.8	15.6	9.3	18.3	20.6	14.2				
Green Ext Time (p_c), s	0.0	9.2	0.0	8.6	0.0	9.3	0.1	8.7				
Intersection Summary												
HCM 2010 Ctrl Delay	36.5											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	250	210	100	220	50	230	580	40	60	1050	250
Future Volume (veh/h)	210	250	210	100	220	50	230	580	40	60	1050	250
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.92	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	233	278	114	111	244	40	256	644	40	67	1167	264
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	504	201	162	570	91	387	837	52	607	1066	239
Arrive On Green	0.11	0.20	0.19	0.09	0.19	0.17	0.22	0.25	0.24	0.34	0.37	0.36
Sat Flow, veh/h	1774	2459	982	1774	3016	484	1774	3379	210	1774	2870	643
Grp Volume(v), veh/h	233	198	194	111	141	143	256	337	347	67	716	715
Grp Sat Flow(s),veh/h/ln	1774	1770	1671	1774	1770	1730	1774	1770	1819	1774	1770	1743
Q Serve(g_s), s	15.0	14.0	14.7	8.5	9.8	10.3	18.5	24.8	24.8	3.6	52.0	52.0
Cycle Q Clear(g_c), s	15.0	14.0	14.7	8.5	9.8	10.3	18.5	24.8	24.8	3.6	52.0	52.0
Prop In Lane	1.00		0.59	1.00		0.28	1.00		0.12	1.00		0.37
Lane Grp Cap(c), veh/h	190	363	342	162	334	327	387	438	451	607	657	648
V/C Ratio(X)	1.23	0.55	0.57	0.69	0.42	0.44	0.66	0.77	0.77	0.11	1.09	1.10
Avail Cap(c_a), veh/h	190	468	442	165	442	432	387	758	780	607	657	648
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.69	0.69	0.69
Uniform Delay (d), s/veh	62.5	49.8	50.6	61.7	50.0	50.4	50.0	48.9	49.0	31.5	44.0	44.3
Incr Delay (d2), s/veh	139.2	1.8	2.1	9.1	1.2	1.3	3.4	12.2	12.0	0.0	56.4	62.3
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	14.7	7.1	7.0	4.6	4.9	5.0	9.4	13.6	14.0	1.8	35.7	36.2
LnGrp Delay(d),s/veh	201.7	51.6	52.7	70.8	51.2	51.8	53.4	61.2	61.1	31.5	100.4	106.6
LnGrp LOS	F	D	D	E	D	D	D	E	E	C	F	F
Approach Vol, veh/h		625			395			940			1498	
Approach Delay, s/veh		107.9			56.9			59.0			100.3	
Approach LOS		F			E			E			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	30.5	51.9	38.7	16.8	32.7	34.5	56.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	14.5	33.0	13.5	58.5	12.5	35.0	21.5	50.5				
Max Q Clear Time (g_c+17.0), s	17.0	12.3	5.6	26.8	10.5	16.7	20.5	54.0				
Green Ext Time (p_c), s	0.0	2.0	0.3	6.3	0.1	2.9	0.1	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			85.5									
HCM 2010 LOS			F									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	20	0	0	0	30	680	0	10	1620	30
Future Volume (veh/h)	20	0	20	0	0	0	30	680	0	10	1620	30
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	22	0	0				33	756	0	11	1800	0
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	84	0	75				95	2696	0	51	2609	1167
Arrive On Green	0.05	0.00	0.00				0.05	0.76	0.00	0.03	0.74	0.00
Sat Flow, veh/h	1774	0	1583				1774	3632	0	1774	3539	1583
Grp Volume(v), veh/h	22	0	0				33	756	0	11	1800	0
Grp Sat Flow(s),veh/h/ln	1774	0	1583				1774	1770	0	1774	1770	1583
Q Serve(g_s), s	0.9	0.0	0.0				1.3	4.8	0.0	0.4	20.1	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0				1.3	4.8	0.0	0.4	20.1	0.0
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	84	0	75				95	2696	0	51	2609	1167
V/C Ratio(X)	0.26	0.00	0.00				0.35	0.28	0.00	0.22	0.69	0.00
Avail Cap(c_a), veh/h	686	0	612				216	2696	0	240	2609	1167
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.83	0.83	0.00	0.28	0.28	0.00
Uniform Delay (d), s/veh	34.0	0.0	0.0				33.8	2.7	0.0	35.1	5.2	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0				0.7	0.2	0.0	0.2	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0				0.7	2.4	0.0	0.2	9.7	0.0
LnGrp Delay(d),s/veh	34.6	0.0	0.0				34.5	2.9	0.0	35.3	5.6	0.0
LnGrp LOS	C						C	A		D	A	
Approach Vol, veh/h		22						789			1811	
Approach Delay, s/veh		34.6						4.2			5.8	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.9	58.5			6.1	60.4		7.5				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	22.5				9.5	21.5		28.0				
Max Q Clear Time (g_c+1), s	11.3	22.1			2.4	6.8		2.9				
Green Ext Time (p_c), s	0.0	0.4			0.0	13.8		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			5.6									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	 		 	 		 	 	
Traffic Volume (veh/h)	110	660	130	520	1550	170	100	430	100	350	1120	230
Future Volume (veh/h)	110	660	130	520	1550	170	100	430	100	350	1120	230
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	116	695	0	547	1632	99	105	453	0	368	1179	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
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, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	203	1447	451	604	1419	633	225	1009	451	425	1215	544
Arrive On Green	0.06	0.29	0.00	0.18	0.41	0.41	0.07	0.29	0.00	0.13	0.35	0.00
Sat Flow, veh/h	3375	4988	1553	3375	3471	1548	3375	3471	1553	3375	3471	1553
Grp Volume(v), veh/h	116	695	0	547	1632	99	105	453	0	368	1179	0
Grp Sat Flow(s),veh/h/ln	1688	1663	1553	1688	1736	1548	1688	1736	1553	1688	1736	1553
Q Serve(g_s), s	4.7	16.1	0.0	22.2	57.2	5.7	4.2	14.9	0.0	15.0	46.8	0.0
Cycle Q Clear(g_c), s	4.7	16.1	0.0	22.2	57.2	5.7	4.2	14.9	0.0	15.0	46.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	1447	451	604	1419	633	225	1009	451	425	1215	544
V/C Ratio(X)	0.57	0.48	0.00	0.91	1.15	0.16	0.47	0.45	0.00	0.87	0.97	0.00
Avail Cap(c_a), veh/h	265	1447	451	796	1419	633	289	1009	451	579	1215	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	64.0	41.0	0.0	56.3	41.4	26.1	62.9	40.5	0.0	60.0	44.8	0.0
Incr Delay (d2), s/veh	0.9	1.1	0.0	9.9	76.1	0.5	0.6	0.4	0.0	7.9	19.1	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	2.2	7.6	0.0	11.2	42.4	2.5	2.0	7.2	0.0	7.5	25.7	0.0
LnGrp Delay(d),s/veh	65.0	42.1	0.0	66.3	117.5	26.7	63.5	40.9	0.0	67.9	63.9	0.0
LnGrp LOS	E	D		E	F	C	E	D		E	E	
Approach Vol, veh/h	811			2278			558			1547		
Approach Delay, s/veh	45.4			101.2			45.2			64.9		
Approach LOS	D			F			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.0	44.6	13.3	53.0	12.4	61.2	21.6	44.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	32.5	28.0	11.5	47.0	10.5	50.0	23.5	35.0				
Max Q Clear Time (g_c+24.2), s	24.2	18.1	6.2	48.8	6.7	59.2	17.0	16.9				
Green Ext Time (p_c), s	0.3	9.2	0.0	0.0	0.0	0.0	0.2	12.9				
Intersection Summary												
HCM 2010 Ctrl Delay	75.7											
HCM 2010 LOS	E											

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	👉👉	👉👉👉		👉👉	👉👉		👉👉	👉👉	👉👉	👉👉	👉👉	👉
Traffic Volume (veh/h)	140	940	150	440	1670	220	210	430	290	270	950	360
Future Volume (veh/h)	140	940	150	440	1670	220	210	430	290	270	950	360
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	143	959	135	449	1704	217	214	439	224	276	969	220
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	300	1321	185	823	1443	180	301	809	1284	335	843	371
Arrive On Green	0.09	0.30	0.28	0.24	0.46	0.45	0.09	0.23	0.23	0.10	0.24	0.24
Sat Flow, veh/h	3375	4420	620	3375	3106	388	3375	3471	2733	3375	3471	1528
Grp Volume(v), veh/h	143	721	373	449	937	984	214	439	224	276	969	220
Grp Sat Flow(s),veh/h/ln	1688	1663	1715	1688	1736	1759	1688	1736	1367	1688	1736	1528
Q Serve(g_s), s	5.6	27.2	27.4	16.2	65.0	65.0	8.6	15.5	1.6	11.2	34.0	17.8
Cycle Q Clear(g_c), s	5.6	27.2	27.4	16.2	65.0	65.0	8.6	15.5	1.6	11.2	34.0	17.8
Prop In Lane	1.00		0.36	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	994	513	823	806	817	301	809	1284	335	843	371
V/C Ratio(X)	0.48	0.73	0.73	0.55	1.16	1.20	0.71	0.54	0.17	0.82	1.15	0.59
Avail Cap(c_a), veh/h	338	1330	686	823	806	817	338	809	1284	579	843	371
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	0.59	0.59	0.59	1.00	1.00	1.00	0.74	0.74	0.74
Uniform Delay (d), s/veh	60.7	43.9	44.3	46.2	37.5	37.7	62.0	47.1	9.2	61.9	53.0	46.9
Incr Delay (d2), s/veh	0.4	4.6	8.8	0.3	81.2	99.1	4.6	1.0	0.1	1.5	77.8	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	2.7	13.1	14.2	7.6	49.3	54.0	4.2	7.5	1.5	5.3	25.4	7.7
LnGrp Delay(d),s/veh	61.1	48.5	53.1	46.4	118.7	136.8	66.6	48.1	9.3	63.3	130.8	49.1
LnGrp LOS	E	D	D	D	F	F	E	D	A	E	F	D
Approach Vol, veh/h	1237			2370			877			1465		
Approach Delay, s/veh	51.4			112.5			42.7			105.8		
Approach LOS	D			F			D			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	69.0	16.5	38.0	39.6	45.9	17.9	36.6				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	6.0	* 6	4.5	5.5				
Max Green Setting (Gmax), s	13.5	60.0	13.5	32.5	19.5	* 54	23.5	22.5				
Max Q Clear Time (g_c+1), s	17.6	67.0	10.6	36.0	18.2	29.4	13.2	17.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	1.2	10.2	0.1	4.3				
Intersection Summary												
HCM 2010 Ctrl Delay			87.8									
HCM 2010 LOS			F									
Notes												

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

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↱	↱	↱	↑↑	↱↱	↱		
Traffic Volume (veh/h)	880	620	90	1400	930	20		
Future Volume (veh/h)	880	620	90	1400	930	20		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810		
Adj Flow Rate, veh/h	998	481	91	1414	939	0		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99		
Percent Heavy Veh, %	5	5	5	5	5	5		
Cap, veh/h	1997	1296	99	2198	1007	463		
Arrive On Green	0.55	0.54	0.12	1.00	0.30	0.00		
Sat Flow, veh/h	3619	1537	1723	3529	3343	1538		
Grp Volume(v), veh/h	998	481	91	1414	939	0		
Grp Sat Flow(s),veh/h/ln	1810	1537	1723	1719	1672	1538		
Q Serve(g_s), s	22.9	9.6	7.0	0.0	36.6	0.0		
Cycle Q Clear(g_c), s	22.9	9.6	7.0	0.0	36.6	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1997	1296	99	2198	1007	463		
V/C Ratio(X)	0.50	0.37	0.92	0.64	0.93	0.00		
Avail Cap(c_a), veh/h	1997	1296	180	2198	1340	616		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.74	0.74	0.57	0.57	1.00	0.00		
Uniform Delay (d), s/veh	18.6	2.4	59.0	0.0	45.5	0.0		
Incr Delay (d2), s/veh	0.7	0.6	8.4	0.8	9.4	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	11.6	20.8	3.6	0.3	18.1	0.0		
LnGrp Delay(d),s/veh	19.3	3.0	67.4	0.8	54.9	0.0		
LnGrp LOS	B	A	E	A	D			
Approach Vol, veh/h	1479			1505	939			
Approach Delay, s/veh	14.0			4.9	54.9			
Approach LOS	B			A	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		89.6		44.4	11.7	77.9		
Change Period (Y+Rc), s		4.3		3.0	3.0	4.3		
Max Green Setting (Gmax), s		72.0		54.7	15.0	54.0		
Max Q Clear Time (g_c+I1), s		2.0		38.6	9.0	24.9		
Green Ext Time (p_c), s		22.1		2.8	0.0	16.1		
Intersection Summary								
HCM 2010 Ctrl Delay		20.3						
HCM 2010 LOS		C						
Notes								

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User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	320	560	50	390	0	1010	10	20	0	10	90
Future Volume (veh/h)	20	320	560	50	390	0	1010	10	20	0	10	90
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	21	340	0	53	415	0	1074	11	0	0	11	6
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	8	1363	610	39	1426	0	1118	605	515	26	27	23
Arrive On Green	0.00	0.13	0.00	0.02	0.41	0.00	0.33	0.33	0.00	0.00	0.01	0.01
Sat Flow, veh/h	1740	3471	1553	1740	3563	0	3375	1827	1553	1740	1827	1553
Grp Volume(v), veh/h	21	340	0	53	415	0	1074	11	0	0	11	6
Grp Sat Flow(s),veh/h/ln	1740	1736	1553	1740	1736	0	1688	1827	1553	1740	1827	1553
Q Serve(g_s), s	0.3	5.9	0.0	1.5	5.4	0.0	20.9	0.3	0.0	0.0	0.4	0.3
Cycle Q Clear(g_c), s	0.3	5.9	0.0	1.5	5.4	0.0	20.9	0.3	0.0	0.0	0.4	0.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	8	1363	610	39	1426	0	1118	605	515	26	27	23
V/C Ratio(X)	2.75	0.25	0.00	1.35	0.29	0.00	0.96	0.02	0.00	0.00	0.41	0.26
Avail Cap(c_a), veh/h	208	1363	610	234	1426	0	1118	605	515	205	215	183
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	20.3	0.0	32.7	13.2	0.0	22.0	15.1	0.0	0.0	32.7	32.6
Incr Delay (d2), s/veh	807.9	0.3	0.0	171.9	0.5	0.0	18.1	0.0	0.0	0.0	3.7	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	1.9	2.9	0.0	2.6	2.6	0.0	12.5	0.1	0.0	0.0	0.2	0.1
LnGrp Delay(d),s/veh	841.4	20.6	0.0	204.7	13.7	0.0	40.0	15.1	0.0	0.0	36.4	34.9
LnGrp LOS	F	C		F	B		D	B			D	C
Approach Vol, veh/h		361			468			1085			17	
Approach Delay, s/veh		68.3			35.4			39.8			35.9	
Approach LOS		E			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.3	31.5		5.0	5.5	30.3		26.2				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	9.0	12.6		8.0	10.0	11.6		22.0				
Max Q Clear Time (g_c+12.5), s	12.3	7.4		2.4	3.5	7.9		22.9				
Green Ext Time (p_c), s	0.0	2.6		0.0	0.0	2.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay				44.0								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	200	480	440	560	160	320	620	90	80	900	370
Future Volume (veh/h)	160	200	480	440	560	160	320	620	90	80	900	370
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	172	215	314	473	602	112	344	667	89	86	968	233
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	176	514	435	511	606	506	401	1195	159	127	1190	510
Arrive On Green	0.10	0.28	0.28	0.15	0.33	0.33	0.12	0.38	0.37	0.07	0.34	0.34
Sat Flow, veh/h	1757	1845	1561	3408	1845	1541	3408	3107	414	1757	3505	1502
Grp Volume(v), veh/h	172	215	314	473	602	112	344	376	380	86	968	233
Grp Sat Flow(s),veh/h/ln	1757	1845	1561	1704	1845	1541	1704	1752	1768	1757	1752	1502
Q Serve(g_s), s	13.7	13.3	25.4	19.2	45.5	7.4	13.9	23.5	23.6	6.7	35.3	17.0
Cycle Q Clear(g_c), s	13.7	13.3	25.4	19.2	45.5	7.4	13.9	23.5	23.6	6.7	35.3	17.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h	176	514	435	511	606	506	401	674	680	127	1190	510
V/C Ratio(X)	0.98	0.42	0.72	0.93	0.99	0.22	0.86	0.56	0.56	0.68	0.81	0.46
Avail Cap(c_a), veh/h	176	514	435	511	606	506	487	674	680	251	1190	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.9	41.2	45.6	58.7	46.8	34.0	60.6	33.7	33.9	63.3	42.2	36.2
Incr Delay (d2), s/veh	61.3	0.8	6.3	22.5	34.9	1.0	10.6	3.3	3.3	2.3	6.2	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	6.9	11.8	10.7	29.1	3.3	7.1	12.0	12.2	3.3	18.1	7.4
LnGrp Delay(d),s/veh	124.2	42.0	51.9	81.2	81.8	35.0	71.2	37.1	37.2	65.6	48.4	39.1
LnGrp LOS	F	D	D	F	F	D	E	D	D	E	D	D
Approach Vol, veh/h		701			1187			1100			1287	
Approach Delay, s/veh		66.6			77.2			47.8			47.8	
Approach LOS		E			E			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	34.1	57.9	25.0	43.0	20.5	51.5	18.0	50.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	19.5	42.5	20.5	37.5	19.5	42.5	13.5	44.5				
Max Q Clear Time (g_c+1.7), s	19.7	25.6	21.2	27.4	15.9	37.3	15.7	47.5				
Green Ext Time (p_c), s	0.0	13.2	0.0	6.0	0.1	4.6	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			59.0									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	660	310	80	520	160	260	860	70	100	440	180
Future Volume (veh/h)	250	660	310	80	520	160	260	860	70	100	440	180
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	255	673	0	82	531	0	265	878	0	102	449	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	247	1248	0	155	1064	0	264	1030	0	162	825	0
Arrive On Green	0.14	0.35	0.00	0.09	0.30	0.00	0.15	0.29	0.00	0.09	0.23	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	255	673	0	82	531	0	265	878	0	102	449	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	14.5	15.9	0.0	4.6	12.9	0.0	15.5	24.3	0.0	5.8	11.6	0.0
Cycle Q Clear(g_c), s	14.5	15.9	0.0	4.6	12.9	0.0	15.5	24.3	0.0	5.8	11.6	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	247	1248	0	155	1064	0	264	1030	0	162	825	0
V/C Ratio(X)	1.03	0.54	0.00	0.53	0.50	0.00	1.00	0.85	0.00	0.63	0.54	0.00
Avail Cap(c_a), veh/h	247	1248	0	230	1064	0	264	1072	0	196	936	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.3	27.4	0.0	45.9	30.4	0.0	44.8	35.3	0.0	46.1	35.5	0.0
Incr Delay (d2), s/veh	65.4	1.7	0.0	1.0	1.7	0.0	55.8	6.9	0.0	2.2	0.8	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	11.6	8.1	0.0	2.3	6.6	0.0	11.7	12.9	0.0	3.0	5.8	0.0
LnGrp Delay(d),s/veh	110.7	29.1	0.0	46.9	32.1	0.0	100.6	42.1	0.0	48.2	36.3	0.0
LnGrp LOS	F	C		D	C		F	D		D	D	
Approach Vol, veh/h		928			613			1143			551	
Approach Delay, s/veh		51.5			34.1			55.7			38.5	
Approach LOS		D			C			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	41.7	14.0	35.8	19.0	36.3	20.0	29.7				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	13.5	29.0	11.5	31.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	6.6	17.9	7.8	26.3	16.5	14.9	17.5	13.6				
Green Ext Time (p_c), s	0.0	7.1	0.0	3.9	0.0	8.0	0.0	8.9				
Intersection Summary												
HCM 2010 Ctrl Delay				47.5								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	1120	330	110	1110	180	410	610	140	170	320	130
Future Volume (veh/h)	160	1120	330	110	1110	180	410	610	140	170	320	130
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	167	1167	195	115	1156	178	427	635	129	177	333	30
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	262	1162	512	507	1008	155	484	773	157	172	782	345
Arrive On Green	0.15	0.32	0.32	0.29	0.65	0.65	0.14	0.26	0.26	0.10	0.22	0.22
Sat Flow, veh/h	1792	3574	1575	3476	3101	476	3476	2948	598	1792	3574	1578
Grp Volume(v), veh/h	167	1167	195	115	664	670	427	385	379	177	333	30
Grp Sat Flow(s),veh/h/ln	1792	1787	1575	1738	1787	1790	1738	1787	1758	1792	1787	1578
Q Serve(g_s), s	10.5	39.0	7.6	3.0	39.0	39.0	14.5	24.3	24.4	11.5	9.6	1.3
Cycle Q Clear(g_c), s	10.5	39.0	7.6	3.0	39.0	39.0	14.5	24.3	24.4	11.5	9.6	1.3
Prop In Lane	1.00		1.00	1.00		0.27	1.00		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	262	1162	512	507	581	582	484	469	461	172	782	345
V/C Ratio(X)	0.64	1.00	0.38	0.23	1.14	1.15	0.88	0.82	0.82	1.03	0.43	0.09
Avail Cap(c_a), veh/h	262	1162	512	507	581	582	797	573	564	172	782	345
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.65	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	40.5	13.8	37.3	21.0	21.0	50.7	41.6	41.6	54.3	40.4	18.6
Incr Delay (d2), s/veh	4.0	27.5	2.1	0.1	77.9	80.9	3.8	8.6	8.9	77.0	0.5	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	0.3	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	23.6	3.6	1.4	31.3	31.8	7.2	13.1	12.9	9.3	4.8	0.6
LnGrp Delay(d),s/veh	52.2	68.0	15.9	37.4	98.9	101.9	54.5	50.2	50.5	131.5	40.9	18.8
LnGrp LOS	D	F	B	D	F	F	D	D	D	F	D	B
Approach Vol, veh/h	1529					1449		1191		540		
Approach Delay, s/veh	59.7					95.4		51.8		69.4		
Approach LOS	E					F		D		E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	45.0	21.2	31.8	22.0	45.0	16.0	37.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	10.5	39.0	27.5	22.5	10.5	39.0	11.5	38.5				
Max Q Clear Time (g_c+1.0), s	10.5	41.0	16.5	11.6	12.5	41.0	13.5	26.4				
Green Ext Time (p_c), s	0.1	0.0	0.2	6.3	0.0	0.0	0.0	5.1				
Intersection Summary												
HCM 2010 Ctrl Delay	69.8											
HCM 2010 LOS	E											

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	50	870	380	20	270	50	820	20	680	110	510	40
Future Volume (vph)	50	870	380	20	270	50	820	20	680	110	510	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5		4.5	4.5	5.5		5.5	5.5	5.5	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (prot)	1787	3574	1598		1610	1686	3554		1698	1725	1559	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (perm)	1787	3574	1598		1610	1686	3554		1698	1725	1559	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	916	400	21	284	53	863	21	716	116	537	42
RTOR Reduction (vph)	0	0	24	0	0	0	1	0	0	0	387	0
Lane Group Flow (vph)	53	916	397	0	168	169	883	0	415	417	150	0
Confl. Peds. (#/hr)			12					29			12	
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	1%	1%	1%	2%	2%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	7.5	31.9	70.9		22.9	22.9	47.3		33.5	33.5	33.5	
Effective Green, g (s)	7.5	31.9	70.9		22.9	22.9	47.3		33.5	33.5	33.5	
Actuated g/C Ratio	0.06	0.27	0.59		0.19	0.19	0.39		0.28	0.28	0.28	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	111	950	944		307	321	1400		474	481	435	
v/s Ratio Prot	0.03	c0.26	0.25		c0.10	0.10	c0.25		c0.24	0.24		
v/s Ratio Perm											0.10	
v/c Ratio	0.48	0.96	0.42		0.55	0.53	0.63		0.88	0.87	0.34	
Uniform Delay, d1	54.4	43.5	13.4		43.9	43.7	29.3		41.3	41.1	34.5	
Progression Factor	1.05	0.90	1.88		0.80	0.80	1.65		0.80	0.80	1.45	
Incremental Delay, d2	0.5	12.3	0.2		0.9	0.6	1.9		11.5	10.6	0.4	
Delay (s)	57.6	51.3	25.3		36.1	35.6	50.2		44.6	43.6	50.5	
Level of Service	E	D	C		D	D	D		D	D	D	
Approach Delay (s)		43.6					46.3			46.6		
Approach LOS		D					D			D		
Intersection Summary												
HCM 2000 Control Delay			45.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.5		
Intersection Capacity Utilization			91.0%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR	SBR2
Lane Configurations	←→		
Traffic Volume (vph)	100	10	50
Future Volume (vph)	100	10	50
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.0		
Lane Util. Factor	0.95		
Frpb, ped/bikes	0.98		
Flpb, ped/bikes	1.00		
Frt	0.95		
Flt Protected	0.99		
Satd. Flow (prot)	3307		
Flt Permitted	0.99		
Satd. Flow (perm)	3307		
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	105	11	53
RTOR Reduction (vph)	33	0	0
Lane Group Flow (vph)	178	0	0
Confl. Peds. (#/hr)		25	
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	1%	1%	1%
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	11.2		
Effective Green, g (s)	11.2		
Actuated g/C Ratio	0.09		
Clearance Time (s)	5.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	308		
v/s Ratio Prot	c0.05		
v/s Ratio Perm			
v/c Ratio	0.58		
Uniform Delay, d1	52.1		
Progression Factor	1.00		
Incremental Delay, d2	1.6		
Delay (s)	53.8		
Level of Service	D		
Approach Delay (s)	53.8		
Approach LOS	D		
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1220	100	260	1050	80	60	60	280	40	50	20
Future Volume (vph)	40	1220	100	260	1050	80	60	60	280	40	50	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00			1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.88			0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1787	3524		1787	3529		1760	1649			1792	
Flt Permitted	0.95	1.00		0.95	1.00		0.64	1.00			0.36	
Satd. Flow (perm)	1787	3524		1787	3529		1177	1649			654	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	1298	106	277	1117	85	64	64	298	43	53	21
RTOR Reduction (vph)	0	5	0	0	4	0	0	150	0	0	7	0
Lane Group Flow (vph)	43	1399	0	277	1198	0	64	212	0	0	110	0
Confl. Peds. (#/hr)			7			4	17					17
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1 9	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.2	50.5		24.4	73.2		26.0	26.0			26.0	
Effective Green, g (s)	6.2	50.5		24.4	73.2		26.0	26.0			26.0	
Actuated g/C Ratio	0.05	0.42		0.20	0.61		0.22	0.22			0.22	
Clearance Time (s)	4.5	5.5			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	1.0	4.0			4.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	92	1483		363	2152		255	357			141	
v/s Ratio Prot	0.02	c0.40		c0.15	c0.34			0.13				
v/s Ratio Perm							0.05				c0.17	
v/c Ratio	0.47	0.94		0.76	0.56		0.25	0.59			0.78	
Uniform Delay, d1	55.3	33.4		45.1	13.8		38.9	42.3			44.3	
Progression Factor	1.45	0.67		1.77	0.07		1.00	1.00			1.00	
Incremental Delay, d2	0.7	8.1		3.8	0.5		0.2	1.8			21.5	
Delay (s)	81.0	30.5		83.5	1.4		39.1	44.0			65.8	
Level of Service	F	C		F	A		D	D			E	
Approach Delay (s)		32.0			16.8			43.3			65.8	
Approach LOS		C			B			D			E	
Intersection Summary												
HCM 2000 Control Delay			28.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			19.1			
Intersection Capacity Utilization			104.1%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (veh/h)	300	820	380	150	870	80	380	900	360	100	520	160
Future Volume (veh/h)	300	820	380	150	870	80	380	900	360	100	520	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	319	872	195	160	926	5	404	957	161	106	553	49
Adj No. of Lanes	1	3	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	276	1775	544	186	1057	467	362	1024	452	337	999	441
Arrive On Green	0.05	0.11	0.11	0.10	0.30	0.30	0.10	0.29	0.29	0.10	0.28	0.28
Sat Flow, veh/h	1792	5136	1575	1792	3574	1579	3476	3574	1579	3476	3574	1579
Grp Volume(v), veh/h	319	872	195	160	926	5	404	957	161	106	553	49
Grp Sat Flow(s),veh/h/ln	1792	1712	1575	1792	1787	1579	1738	1787	1579	1738	1787	1579
Q Serve(g_s), s	18.5	19.1	13.7	10.5	29.6	0.3	12.5	31.3	9.7	3.4	15.8	2.8
Cycle Q Clear(g_c), s	18.5	19.1	13.7	10.5	29.6	0.3	12.5	31.3	9.7	3.4	15.8	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	1775	544	186	1057	467	362	1024	452	337	999	441
V/C Ratio(X)	1.15	0.49	0.36	0.86	0.88	0.01	1.12	0.93	0.36	0.31	0.55	0.11
Avail Cap(c_a), veh/h	276	1775	544	202	1057	467	362	1028	454	362	1028	454
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.26	0.26	0.26	1.00	1.00	1.00	0.80	0.80	0.80	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	43.2	40.9	52.9	40.2	29.9	53.8	41.7	34.0	50.5	36.9	32.2
Incr Delay (d2), s/veh	80.5	0.3	0.5	25.8	10.2	0.0	77.7	12.7	0.5	0.2	0.8	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	15.4	9.1	6.1	6.6	16.0	0.1	9.9	17.2	4.3	1.6	7.9	1.2
LnGrp Delay(d),s/veh	137.5	43.5	41.3	78.7	50.4	29.9	131.4	54.4	34.6	50.7	37.7	32.3
LnGrp LOS	F	D	D	E	D	C	F	D	C	D	D	C
Approach Vol, veh/h	1386			1091			1522			708		
Approach Delay, s/veh	64.8			54.4			72.7			39.2		
Approach LOS	E			D			E			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	47.0	47.0	17.0	39.0	23.0	41.0	16.1	39.9				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	39.5	39.5	12.5	34.5	18.5	34.5	12.5	34.5				
Max Q Clear Time (g_c+1.2), s	21.1	21.1	14.5	17.8	20.5	31.6	5.4	33.3				
Green Ext Time (p_c), s	0.0	14.6	0.0	12.0	0.0	2.7	0.0	1.1				
Intersection Summary												
HCM 2010 Ctrl Delay	61.1											
HCM 2010 LOS	E											

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	160	1110	10	10	1000	40	0	0	10	10	0	0
Future Vol, veh/h	160	1110	10	10	1000	40	0	0	10	10	0	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	4	4	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	176	1220	11	11	1099	44	0	0	11	11	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1143	0	0	1232	0	0	2151	2744	621	2109	2727	572
Stage 1	-	-	-	-	-	-	1579	1579	-	1143	1143	-
Stage 2	-	-	-	-	-	-	572	1165	-	966	1584	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.52	6.52	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.51	4.01	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	613	-	-	567	-	-	27	20	433	30	21	466
Stage 1	-	-	-	-	-	-	115	169	-	215	275	-
Stage 2	-	-	-	-	-	-	475	269	-	275	168	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	613	-	-	566	-	-	21	14	431	22	15	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	21	14	-	22	15	-
Stage 1	-	-	-	-	-	-	82	120	-	153	270	-
Stage 2	-	-	-	-	-	-	466	264	-	190	120	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.1	13.6	278.4
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	431	613	-	-	566	-	-	22
HCM Lane V/C Ratio	0.025	0.287	-	-	0.019	-	-	0.5
HCM Control Delay (s)	13.6	13.2	-	-	11.5	-	-	278.4
HCM Lane LOS	B	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.1	1.2	-	-	0.1	-	-	1.5

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	180	1010	380	200	80	650		
Future Volume (veh/h)	180	1010	380	200	80	650		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	196	1098	413	63	87	275		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	1	1	1	1	1	1		
Cap, veh/h	248	2219	1459	639	375	334		
Arrive On Green	0.14	0.62	0.41	0.41	0.21	0.21		
Sat Flow, veh/h	1792	3668	3668	1566	1792	1599		
Grp Volume(v), veh/h	196	1098	413	63	87	275		
Grp Sat Flow(s),veh/h/ln	1792	1787	1787	1566	1792	1599		
Q Serve(g_s), s	6.0	9.5	4.4	1.4	2.3	9.3		
Cycle Q Clear(g_c), s	6.0	9.5	4.4	1.4	2.3	9.3		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	248	2219	1459	639	375	334		
V/C Ratio(X)	0.79	0.49	0.28	0.10	0.23	0.82		
Avail Cap(c_a), veh/h	761	2219	2213	970	983	877		
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	5.9	11.2	10.3	18.6	21.3		
Incr Delay (d2), s/veh	2.1	0.2	0.1	0.1	0.1	1.9		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.1	4.7	2.2	0.6	1.1	7.9		
LnGrp Delay(d),s/veh	25.7	6.1	11.3	10.4	18.7	23.3		
LnGrp LOS	C	A	B	B	B	C		
Approach Vol, veh/h		1294	476		362			
Approach Delay, s/veh		9.1	11.2		22.2			
Approach LOS		A	B		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		16.5	12.0	28.0		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		11.5		11.3	8.0	6.4		
Green Ext Time (p_c), s		14.9		0.6	0.2	16.7		
Intersection Summary								
HCM 2010 Ctrl Delay			11.8					
HCM 2010 LOS			B					
Notes								

Irvington BART 5:00 pm 09/26/2017 2040 No Project PM

Synchro 9 Report
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* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	410	500	120	40	430	360	60	170	20	10	10	30
Future Volume (veh/h)	410	500	120	40	430	360	60	170	20	10	10	30
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	423	515	110	41	443	239	62	175	17	10	10	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	476	1606	341	144	815	436	130	249	22	301	356	303
Arrive On Green	0.27	0.55	0.55	0.08	0.36	0.36	0.19	0.19	0.19	0.19	0.19	0.00
Sat Flow, veh/h	1792	2934	624	1792	2250	1204	321	1315	117	1197	1881	1599
Grp Volume(v), veh/h	423	313	312	41	351	331	254	0	0	10	10	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1770	1792	1787	1667	1753	0	0	1197	1881	1599
Q Serve(g_s), s	14.6	6.2	6.3	1.4	10.1	10.2	5.9	0.0	0.0	0.0	0.3	0.0
Cycle Q Clear(g_c), s	14.6	6.2	6.3	1.4	10.1	10.2	8.8	0.0	0.0	0.6	0.3	0.0
Prop In Lane	1.00		0.35	1.00		0.72	0.24		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	476	978	969	144	647	604	401	0	0	301	356	303
V/C Ratio(X)	0.89	0.32	0.32	0.28	0.54	0.55	0.63	0.00	0.00	0.03	0.03	0.00
Avail Cap(c_a), veh/h	805	978	969	444	969	904	1035	0	0	445	583	495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.8	8.0	8.0	27.9	16.3	16.4	24.7	0.0	0.0	21.4	21.3	0.0
Incr Delay (d2), s/veh	3.6	0.3	0.3	0.4	1.0	1.1	0.6	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	7.6	3.1	3.1	0.7	5.2	4.9	4.4	0.0	0.0	0.1	0.1	0.0
LnGrp Delay(d),s/veh	26.3	8.3	8.3	28.3	17.4	17.5	25.3	0.0	0.0	21.5	21.3	0.0
LnGrp LOS	C	A	A	C	B	B	C			C	C	
Approach Vol, veh/h	1048				723		254				20	
Approach Delay, s/veh	15.6				18.0		25.3				21.4	
Approach LOS	B				B		C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			4	5	6	8				
Phs Duration (G+Y+Rc), s	8.9	39.7			15.9	20.9	27.8	15.9				
Change Period (Y+Rc), s	3.7	4.4			3.7	3.7	4.4	3.7				
Max Green Setting (Gmax), s	10.0	35.0			20.0	29.0	35.0	36.0				
Max Q Clear Time (g_c+1.5), s	13.4	8.3			2.6	16.6	12.2	10.8				
Green Ext Time (p_c), s	0.0	12.5			1.0	0.5	11.2	1.1				
Intersection Summary												
HCM 2010 Ctrl Delay	17.7											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	350	110	70	420	280	270	310	150	280	200	160
Future Volume (veh/h)	90	350	110	70	420	280	270	310	150	280	200	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	98	380	49	76	457	238	293	337	124	304	217	38
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	182	578	491	172	686	355	324	554	200	335	420	355
Arrive On Green	0.10	0.31	0.31	0.10	0.30	0.30	0.18	0.22	0.22	0.19	0.22	0.22
Sat Flow, veh/h	1792	1881	1596	1792	2278	1177	1792	2553	921	1792	1881	1593
Grp Volume(v), veh/h	98	380	49	76	358	337	293	234	227	304	217	38
Grp Sat Flow(s),veh/h/ln	1792	1881	1596	1792	1787	1668	1792	1787	1687	1792	1881	1593
Q Serve(g_s), s	5.3	17.7	2.2	4.1	17.7	17.9	16.2	11.9	12.3	16.8	10.2	1.9
Cycle Q Clear(g_c), s	5.3	17.7	2.2	4.1	17.7	17.9	16.2	11.9	12.3	16.8	10.2	1.9
Prop In Lane	1.00		1.00	1.00		0.71	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	182	578	491	172	539	503	324	388	366	335	420	355
V/C Ratio(X)	0.54	0.66	0.10	0.44	0.66	0.67	0.90	0.60	0.62	0.91	0.52	0.11
Avail Cap(c_a), veh/h	443	837	710	443	795	742	531	795	751	531	837	709
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	30.4	25.0	43.2	30.9	30.9	40.6	35.7	35.8	40.3	34.5	31.3
Incr Delay (d2), s/veh	0.9	1.8	0.1	0.7	2.0	2.2	7.7	2.1	2.4	9.2	1.4	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	2.7	9.5	1.0	2.0	9.0	8.5	8.7	6.1	6.0	9.1	5.5	0.9
LnGrp Delay(d),s/veh	44.1	32.2	25.2	43.8	32.9	33.1	48.3	37.8	38.3	49.5	35.9	31.5
LnGrp LOS	D	C	C	D	C	C	D	D	D	D	D	C
Approach Vol, veh/h		527			771			754			559	
Approach Delay, s/veh		33.8			34.1			42.0			43.0	
Approach LOS		C			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.2	36.6	22.8	27.6	14.8	36.0	23.4	27.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+10), s	19.7	19.7	18.2	12.2	7.3	19.9	18.8	14.3				
Green Ext Time (p_c), s	0.0	10.2	0.1	6.6	0.0	10.2	0.1	6.5				
Intersection Summary												
HCM 2010 Ctrl Delay			38.2									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	230	240	60	220	40	200	1170	50	70	560	180
Future Volume (veh/h)	250	230	240	60	220	40	200	1170	50	70	560	180
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	258	237	63	62	227	30	206	1206	49	72	577	142
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	261	701	182	117	536	70	216	1533	62	136	1117	274
Arrive On Green	0.15	0.25	0.25	0.07	0.17	0.17	0.12	0.44	0.44	0.08	0.39	0.39
Sat Flow, veh/h	1792	2806	730	1792	3165	412	1792	3500	142	1792	2843	698
Grp Volume(v), veh/h	258	149	151	62	127	130	206	616	639	72	362	357
Grp Sat Flow(s),veh/h/ln	1792	1787	1748	1792	1787	1790	1792	1787	1854	1792	1787	1754
Q Serve(g_s), s	17.2	8.2	8.5	4.0	7.6	7.8	13.7	35.4	35.5	4.6	18.5	18.6
Cycle Q Clear(g_c), s	17.2	8.2	8.5	4.0	7.6	7.8	13.7	35.4	35.5	4.6	18.5	18.6
Prop In Lane	1.00		0.42	1.00		0.23	1.00		0.08	1.00		0.40
Lane Grp Cap(c), veh/h	261	446	437	117	303	303	216	783	812	136	702	689
V/C Ratio(X)	0.99	0.33	0.35	0.53	0.42	0.43	0.95	0.79	0.79	0.53	0.52	0.52
Avail Cap(c_a), veh/h	261	581	568	157	477	477	216	783	812	157	702	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	51.1	36.8	37.0	54.3	44.5	44.6	52.4	28.9	28.9	53.4	27.7	27.8
Incr Delay (d2), s/veh	51.9	0.6	0.7	1.4	1.3	1.4	47.1	7.8	7.6	1.0	2.3	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.3	4.1	4.2	2.0	3.9	4.0	9.6	19.1	19.8	2.3	9.6	9.5
LnGrp Delay(d),s/veh	103.1	37.5	37.6	55.6	45.9	46.0	99.5	36.7	36.5	54.4	30.0	30.1
LnGrp LOS	F	D	D	E	D	D	F	D	D	D	C	C
Approach Vol, veh/h		558			319			1461			791	
Approach Delay, s/veh		67.8			47.8			45.5			32.3	
Approach LOS		E			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	26.3	13.6	58.1	12.4	36.0	19.0	52.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	17.5	32.0	10.5	39.5	10.5	39.0	14.5	35.5				
Max Q Clear Time (g_c+1.9, s)	19.2	9.8	6.6	37.5	6.0	10.5	15.7	20.6				
Green Ext Time (p_c), s	0.0	4.3	0.0	1.9	0.0	4.7	0.0	12.1				
Intersection Summary												
HCM 2010 Ctrl Delay			46.4									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	0	40	0	0	0	30	1470	0	20	980	40
Future Volume (veh/h)	50	0	40	0	0	0	30	1470	0	20	980	40
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	1881				1881	1881	0	1881	1881	1881
Adj Flow Rate, veh/h	53	0	0				32	1564	0	21	1043	0
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	0	1				1	1	0	1	1	1
Cap, veh/h	124	0	111				80	2541	0	67	2515	1125
Arrive On Green	0.07	0.00	0.00				0.04	0.71	0.00	0.04	0.70	0.00
Sat Flow, veh/h	1792	0	1599				1792	3668	0	1792	3574	1599
Grp Volume(v), veh/h	53	0	0				32	1564	0	21	1043	0
Grp Sat Flow(s),veh/h/ln	1792	0	1599				1792	1787	0	1792	1787	1599
Q Serve(g_s), s	2.3	0.0	0.0				1.4	18.0	0.0	0.9	9.8	0.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0				1.4	18.0	0.0	0.9	9.8	0.0
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	124	0	111				80	2541	0	67	2515	1125
V/C Ratio(X)	0.43	0.00	0.00				0.40	0.62	0.00	0.31	0.41	0.00
Avail Cap(c_a), veh/h	627	0	560				213	2541	0	213	2515	1125
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.09	0.09	0.00	0.78	0.78	0.00
Uniform Delay (d), s/veh	35.7	0.0	0.0				37.2	5.9	0.0	37.5	5.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.0				0.1	0.1	0.0	0.8	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0				0.7	8.7	0.0	0.5	4.9	0.0
LnGrp Delay(d),s/veh	36.6	0.0	0.0				37.3	6.0	0.0	38.3	5.4	0.0
LnGrp LOS	D						D	A		D	A	
Approach Vol, veh/h		53						1596			1064	
Approach Delay, s/veh		36.6						6.7			6.0	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.1	61.8			7.5	62.4		10.1				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	9.5	27.5			9.5	27.5		28.0				
Max Q Clear Time (g_c+1.3), s	13.4	11.8			2.9	20.0		4.3				
Green Ext Time (p_c), s	0.0	14.7			0.0	7.2		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			7.0									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	 		 	 		 	 	
Traffic Volume (veh/h)	310	1250	140	240	950	280	180	1210	620	240	470	190
Future Volume (veh/h)	310	1250	140	240	950	280	180	1210	620	240	470	190
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	320	1289	0	247	979	201	186	1247	0	247	485	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	369	2048	638	296	1350	593	236	951	425	296	1013	453
Arrive On Green	0.11	0.40	0.00	0.09	0.38	0.38	0.07	0.27	0.00	0.09	0.29	0.00
Sat Flow, veh/h	3442	5085	1583	3442	3539	1555	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	320	1289	0	247	979	201	186	1247	0	247	485	0
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1555	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	12.3	27.2	0.0	9.5	31.7	12.3	7.1	36.0	0.0	9.5	15.2	0.0
Cycle Q Clear(g_c), s	12.3	27.2	0.0	9.5	31.7	12.3	7.1	36.0	0.0	9.5	15.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	369	2048	638	296	1350	593	236	951	425	296	1013	453
V/C Ratio(X)	0.87	0.63	0.00	0.84	0.73	0.34	0.79	1.31	0.00	0.84	0.48	0.00
Avail Cap(c_a), veh/h	501	2048	638	347	1350	593	347	951	425	347	1013	453
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	58.9	32.0	0.0	60.3	35.4	29.4	61.5	49.0	0.0	60.3	39.6	0.0
Incr Delay (d2), s/veh	9.2	1.5	0.0	12.5	3.4	1.5	4.0	147.7	0.0	12.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	12.9	0.0	5.0	16.1	5.6	3.5	37.1	0.0	5.0	7.5	0.0
LnGrp Delay(d),s/veh	68.0	33.5	0.0	72.8	38.9	31.0	65.5	196.7	0.0	72.8	40.1	0.0
LnGrp LOS	E	C		E	D	C	E	F		E	D	
Approach Vol, veh/h	1609			1427			1433			732		
Approach Delay, s/veh	40.4			43.6			179.7			51.1		
Approach LOS	D			D			F			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	60.0	13.7	44.3	18.9	57.1	16.0	42.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	13.5	50.0	13.5	36.0	19.5	44.0	13.5	36.0				
Max Q Clear Time (g_c+1), s	11.5	29.2	9.1	17.2	14.3	33.7	11.5	38.0				
Green Ext Time (p_c), s	0.0	18.1	0.0	13.8	0.1	9.5	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	81.2											
HCM 2010 LOS	F											

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑		↰↰	↑↑		↰↰	↑↑	↰↰	↰↰	↑↑	↰
Traffic Volume (veh/h)	490	1670	180	170	910	240	280	820	480	370	550	290
Future Volume (veh/h)	490	1670	180	170	910	240	280	820	480	370	550	290
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	505	1722	176	175	938	228	289	845	427	381	567	109
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	527	1978	202	256	970	235	337	806	842	424	895	399
Arrive On Green	0.15	0.42	0.42	0.07	0.34	0.34	0.10	0.23	0.23	0.12	0.25	0.25
Sat Flow, veh/h	3442	4691	478	3442	2825	686	3442	3539	2787	3442	3539	1578
Grp Volume(v), veh/h	505	1243	655	175	587	579	289	845	427	381	567	109
Grp Sat Flow(s),veh/h/ln	1721	1695	1778	1721	1770	1741	1721	1770	1393	1721	1770	1578
Q Serve(g_s), s	19.5	44.9	45.2	6.6	43.7	43.8	11.1	30.5	16.9	14.6	19.1	7.4
Cycle Q Clear(g_c), s	19.5	44.9	45.2	6.6	43.7	43.8	11.1	30.5	16.9	14.6	19.1	7.4
Prop In Lane	1.00		0.27	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	527	1430	750	256	607	598	337	806	842	424	895	399
V/C Ratio(X)	0.96	0.87	0.87	0.68	0.97	0.97	0.86	1.05	0.51	0.90	0.63	0.27
Avail Cap(c_a), veh/h	527	1430	750	295	607	598	372	806	842	424	895	399
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	0.82	0.82	0.82	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	56.3	35.4	35.5	60.5	43.2	43.3	59.5	51.8	38.5	57.9	44.5	40.2
Incr Delay (d2), s/veh	28.9	7.4	13.4	3.0	25.7	26.5	15.3	45.3	0.7	20.0	1.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.4	22.4	25.0	3.3	25.7	25.5	6.0	19.9	6.6	8.2	9.6	3.3
LnGrp Delay(d),s/veh	85.2	42.8	48.8	63.5	69.0	69.7	74.8	97.1	39.2	77.9	46.1	40.7
LnGrp LOS	F	D	D	E	E	E	E	F	D	E	D	D
Approach Vol, veh/h	2403						1341		1561		1057	
Approach Delay, s/veh	53.4						68.6		77.1		57.0	
Approach LOS	D						E		E		E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	52.0	17.6	39.4	14.5	62.5	21.0	36.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	20.5	46.0	14.5	32.5	11.5	55.0	16.5	30.5				
Max Q Clear Time (g_c+Q), s	21.5	45.8	13.1	21.1	8.6	47.2	16.6	32.5				
Green Ext Time (p_c), s	0.0	0.2	0.0	9.2	0.0	7.6	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			63.0									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↔	↑↔	↔	↑↑	↔↔	↔		
Traffic Volume (veh/h)	1360	1160	30	680	640	50		
Future Volume (veh/h)	1360	1160	30	680	640	50		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1798	833	31	701	660	0		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1975	1174	300	2593	727	334		
Arrive On Green	0.53	0.53	0.34	1.00	0.21	0.00		
Sat Flow, veh/h	3725	1583	1774	3632	3442	1583		
Grp Volume(v), veh/h	1798	833	31	701	660	0		
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1770	1721	1583		
Q Serve(g_s), s	57.0	1.8	1.6	0.0	24.3	0.0		
Cycle Q Clear(g_c), s	57.0	1.8	1.6	0.0	24.3	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1975	1174	300	2593	727	334		
V/C Ratio(X)	0.91	0.71	0.10	0.27	0.91	0.00		
Avail Cap(c_a), veh/h	2141	1244	300	2593	847	390		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.44	0.44	0.95	0.95	1.00	0.00		
Uniform Delay (d), s/veh	27.7	5.6	36.2	0.0	50.0	0.0		
Incr Delay (d2), s/veh	3.7	1.6	0.1	0.2	11.9	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	30.2	30.7	0.8	0.1	12.8	0.0		
LnGrp Delay(d),s/veh	31.4	7.2	36.3	0.2	62.0	0.0		
LnGrp LOS	C	A	D	A	E			
Approach Vol, veh/h	2631			732	660			
Approach Delay, s/veh	23.8			1.8	62.0			
Approach LOS	C			A	E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		99.5		30.5	26.3	73.2		
Change Period (Y+Rc), s		4.3		3.0	4.3	* 4.3		
Max Green Setting (Gmax), s		90.7		32.0	13.0	* 75		
Max Q Clear Time (g_c+I1), s		2.0		26.3	3.6	59.0		
Green Ext Time (p_c), s		3.0		1.1	2.1	10.0		
Intersection Summary								
HCM 2010 Ctrl Delay			26.0					
HCM 2010 LOS			C					
Notes								

Irvington BART 5:00 pm 09/26/2017 2040 No Project PM

Synchro 9 Report
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User approved volume balancing among the lanes for turning movement.

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

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	620	680	190	450	20	220	10	40	10	30	40
Future Volume (veh/h)	110	620	680	190	450	20	220	10	40	10	30	40
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	118	667	0	204	484	18	237	11	0	11	32	3
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	150	1724	771	246	1881	70	353	191	163	62	65	55
Arrive On Green	0.11	0.65	0.00	0.14	0.54	0.54	0.10	0.10	0.00	0.03	0.03	0.03
Sat Flow, veh/h	1774	3539	1583	1774	3477	129	3442	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	118	667	0	204	246	256	237	11	0	11	32	3
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1837	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.2	5.8	0.0	7.3	4.8	4.8	4.3	0.3	0.0	0.4	1.1	0.1
Cycle Q Clear(g_c), s	4.2	5.8	0.0	7.3	4.8	4.8	4.3	0.3	0.0	0.4	1.1	0.1
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	150	1724	771	246	957	994	353	191	163	62	65	55
V/C Ratio(X)	0.78	0.39	0.00	0.83	0.26	0.26	0.67	0.06	0.00	0.18	0.49	0.05
Avail Cap(c_a), veh/h	273	1724	771	246	957	994	847	459	390	191	201	171
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.50	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	6.9	0.0	27.3	8.0	8.0	28.1	26.3	0.0	30.5	30.8	30.3
Incr Delay (d2), s/veh	1.7	0.3	0.0	19.6	0.6	0.6	1.6	0.1	0.0	0.5	2.2	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	2.1	2.8	0.0	4.9	2.5	2.6	2.1	0.2	0.0	0.2	0.6	0.1
LnGrp Delay(d),s/veh	30.0	7.2	0.0	46.9	8.6	8.6	29.8	26.4	0.0	31.0	33.0	30.5
LnGrp LOS	C	A		D	A	A	C	C		C	C	C
Approach Vol, veh/h		785			706			248			46	
Approach Delay, s/veh		10.6			19.7			29.6			32.3	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	39.5		6.2	12.0	36.0		10.9				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	10.0	16.6		7.0	9.0	17.6		16.0				
Max Q Clear Time (g_c+10.0), s	10.0	6.8		3.1	9.3	7.8		6.3				
Green Ext Time (p_c), s	0.0	6.0		0.0	0.0	6.1		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay				17.4								
HCM 2010 LOS				B								

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	460	420	100	320	60	630	1080	270	100	530	210
Future Volume (veh/h)	190	460	420	100	320	60	630	1080	270	100	530	210
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	194	469	166	102	327	18	643	1102	260	102	541	109
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	587	488	276	507	431	629	1087	255	129	965	427
Arrive On Green	0.12	0.31	0.31	0.08	0.27	0.27	0.18	0.38	0.38	0.07	0.27	0.27
Sat Flow, veh/h	1774	1863	1549	3442	1863	1583	3442	2841	666	1774	3539	1564
Grp Volume(v), veh/h	194	469	166	102	327	18	643	684	678	102	541	109
Grp Sat Flow(s),veh/h/ln	1774	1863	1549	1721	1863	1583	1721	1770	1737	1774	1770	1564
Q Serve(g_s), s	14.4	30.9	11.0	3.8	20.8	1.1	24.5	51.3	51.3	7.6	17.6	7.3
Cycle Q Clear(g_c), s	14.4	30.9	11.0	3.8	20.8	1.1	24.5	51.3	51.3	7.6	17.6	7.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	218	587	488	276	507	431	629	677	665	129	965	427
V/C Ratio(X)	0.89	0.80	0.34	0.37	0.64	0.04	1.02	1.01	1.02	0.79	0.56	0.26
Avail Cap(c_a), veh/h	285	619	514	347	507	431	629	677	665	139	965	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.9	42.0	35.2	58.4	43.0	35.9	54.8	41.4	41.4	61.1	41.8	38.1
Incr Delay (d2), s/veh	19.8	7.5	0.6	0.3	6.2	0.2	41.5	37.0	40.3	21.5	2.4	1.4
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	8.3	17.1	4.8	1.8	11.6	0.5	15.3	32.0	32.0	4.5	8.9	3.3
LnGrp Delay(d),s/veh	77.7	49.5	35.8	58.7	49.2	36.1	96.3	78.4	81.6	82.6	44.2	39.5
LnGrp LOS	E	D	D	E	D	D	F	F	F	F	D	D
Approach Vol, veh/h	829				447		2005				752	
Approach Delay, s/veh	53.4				50.9		85.2				48.7	
Approach LOS	D				D		F				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.3	56.8	15.3	47.7	29.0	42.0	21.0	42.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	10.5	45.5	13.5	44.5	24.5	31.5	21.5	36.5				
Max Q Clear Time (g_c+1.9), s	19.6	53.3	5.8	32.9	26.5	19.6	16.4	22.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	5.5	0.0	10.2	0.0	6.2				
Intersection Summary												
HCM 2010 Ctrl Delay			68.1									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	510	500	170	680	240	260	370	80	170	670	270
Future Volume (veh/h)	250	510	500	170	680	240	260	370	80	170	670	270
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	278	567	0	189	756	0	289	411	0	189	744	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	1111	0	227	1053	0	273	1014	0	227	921	0
Arrive On Green	0.14	0.31	0.00	0.13	0.29	0.00	0.15	0.28	0.00	0.13	0.26	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	278	567	0	189	756	0	289	411	0	189	744	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	15.0	13.6	0.0	10.8	19.9	0.0	16.0	9.8	0.0	10.8	20.5	0.0
Cycle Q Clear(g_c), s	15.0	13.6	0.0	10.8	19.9	0.0	16.0	9.8	0.0	10.8	20.5	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	256	1111	0	227	1053	0	273	1014	0	227	921	0
V/C Ratio(X)	1.09	0.51	0.00	0.83	0.72	0.00	1.06	0.41	0.00	0.83	0.81	0.00
Avail Cap(c_a), veh/h	256	1111	0	256	1053	0	273	1014	0	273	987	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.0	29.6	0.0	44.8	33.1	0.0	44.5	30.4	0.0	44.8	36.5	0.0
Incr Delay (d2), s/veh	81.1	1.7	0.0	16.9	4.2	0.0	70.8	0.4	0.0	14.5	5.1	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	13.2	7.0	0.0	6.4	10.4	0.0	13.3	4.8	0.0	6.3	10.8	0.0
LnGrp Delay(d),s/veh	126.1	31.3	0.0	61.7	37.3	0.0	115.3	30.8	0.0	59.2	41.6	0.0
LnGrp LOS	F	C		E	D		F	C		E	D	
Approach Vol, veh/h		845			945			700			933	
Approach Delay, s/veh		62.5			42.2			65.7			45.2	
Approach LOS		E			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.3	36.7	17.3	33.8	19.0	34.9	20.0	31.1				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	14.5	28.0	15.5	27.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	12.8	15.6	12.8	11.8	17.0	21.9	18.0	22.5				
Green Ext Time (p_c), s	0.0	8.2	0.0	8.6	0.0	4.6	0.0	3.1				
Intersection Summary												
HCM 2010 Ctrl Delay				52.8								
HCM 2010 LOS				D								
Notes												

User approved ignoring U-Turning movement.

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	1260	400	230	850	100	250	370	190	160	530	220
Future Volume (veh/h)	100	1260	400	230	850	100	250	370	190	160	530	220
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	103	1299	278	237	876	97	258	381	155	165	546	120
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	130	1662	732	289	1541	171	317	551	221	176	819	360
Arrive On Green	0.07	0.47	0.47	0.17	0.97	0.94	0.09	0.23	0.22	0.10	0.23	0.23
Sat Flow, veh/h	1757	3505	1543	3408	3178	352	3408	2433	975	1757	3505	1543
Grp Volume(v), veh/h	103	1299	278	237	483	490	258	273	263	165	546	120
Grp Sat Flow(s),veh/h/ln	1757	1752	1543	1704	1752	1777	1704	1752	1655	1757	1752	1543
Q Serve(g_s), s	8.1	43.4	16.2	9.4	2.6	3.1	10.4	20.0	20.5	13.1	19.8	9.0
Cycle Q Clear(g_c), s	8.1	43.4	16.2	9.4	2.6	3.1	10.4	20.0	20.5	13.1	19.8	9.0
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.59	1.00		1.00
Lane Grp Cap(c), veh/h	130	1662	732	289	850	862	317	397	375	176	819	360
V/C Ratio(X)	0.79	0.78	0.38	0.82	0.57	0.57	0.81	0.69	0.70	0.94	0.67	0.33
Avail Cap(c_a), veh/h	151	1662	732	292	850	862	536	501	473	176	819	360
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.84	0.84	0.84	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.7	30.8	23.6	57.1	1.1	1.4	62.3	49.6	50.2	62.6	48.7	44.6
Incr Delay (d2), s/veh	18.2	3.7	1.5	13.3	2.3	2.3	1.9	3.6	4.2	49.8	2.3	0.8
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	4.6	21.8	7.1	4.9	1.3	1.7	5.0	10.1	9.8	8.8	9.8	3.9
LnGrp Delay(d),s/veh	81.9	34.5	25.1	70.4	3.5	3.6	64.2	53.2	54.4	112.4	51.0	45.3
LnGrp LOS	F	C	C	E	A	A	E	D	D	F	D	D
Approach Vol, veh/h	1680			1210			794			831		
Approach Delay, s/veh	35.8			16.6			57.2			62.4		
Approach LOS	D			B			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.9	70.4	17.0	36.7	14.4	71.9	18.0	35.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	11.5	56.0	21.5	30.5	11.5	56.0	13.5	38.5				
Max Q Clear Time (g_c+1), s	11.4	45.4	12.4	21.8	10.1	5.1	15.1	22.5				
Green Ext Time (p_c), s	0.0	9.9	0.1	5.5	0.0	39.9	0.0	7.7				
Intersection Summary												
HCM 2010 Ctrl Delay	39.3											
HCM 2010 LOS	D											

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	20	1050	510	10	500	60	880	10	280	50	410	40
Future Volume (vph)	20	1050	510	10	500	60	880	10	280	50	410	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (prot)	1752	3505	1568		1595	1665	3498		1665	1692	1540	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (perm)	1752	3505	1568		1595	1665	3498		1665	1692	1540	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	1167	567	11	556	67	978	11	311	56	456	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	355	0
Lane Group Flow (vph)	22	1167	578	0	322	301	989	0	174	193	101	0
Confl. Peds. (#/hr)	6		4			4		6	16		4	4
Confl. Bikes (#/hr)			4								1	
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	5.4	34.9	69.9		42.4	42.4	71.9		29.5	29.5	29.5	
Effective Green, g (s)	5.9	36.4	71.4		42.9	42.9	73.4		31.0	31.0	31.0	
Actuated g/C Ratio	0.04	0.26	0.51		0.31	0.31	0.52		0.22	0.22	0.22	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	73	911	799		488	510	1833		368	374	341	
v/s Ratio Prot	0.01	c0.33	c0.37		c0.20	0.18	0.28		0.10	0.11		
v/s Ratio Perm											0.07	
v/c Ratio	0.30	1.28	0.72		0.66	0.59	0.54		0.47	0.52	0.30	
Uniform Delay, d1	65.1	51.8	26.6		42.2	41.1	22.1		47.4	47.9	45.4	
Progression Factor	1.21	0.88	1.49		0.47	0.46	1.04		1.24	1.24	6.15	
Incremental Delay, d2	0.6	132.1	2.3		1.7	0.8	0.8		1.2	1.4	0.6	
Delay (s)	79.6	177.8	42.0		21.7	19.9	23.8		59.9	60.7	280.0	
Level of Service	E	F	D		C	B	C		E	E	F	
Approach Delay (s)		132.1					22.6			182.0		
Approach LOS		F					C			F		
Intersection Summary												
HCM 2000 Control Delay			98.1				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			84.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR	SBR2
Lane Configurations	←→		
Traffic Volume (vph)	110	10	30
Future Volume (vph)	110	10	30
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0		
Lane Util. Factor	0.95		
Frpb, ped/bikes	0.99		
Flpb, ped/bikes	1.00		
Frt	0.97		
Flt Protected	0.99		
Satd. Flow (prot)	3320		
Flt Permitted	0.99		
Satd. Flow (perm)	3320		
Peak-hour factor, PHF	0.90	0.90	0.90
Adj. Flow (vph)	122	11	33
RTOR Reduction (vph)	13	0	0
Lane Group Flow (vph)	197	0	0
Confl. Peds. (#/hr)		16	
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	3%	3%	3%
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	12.7		
Effective Green, g (s)	13.7		
Actuated g/C Ratio	0.10		
Clearance Time (s)	5.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	324		
v/s Ratio Prot	c0.06		
v/s Ratio Perm			
v/c Ratio	0.61		
Uniform Delay, d1	60.6		
Progression Factor	1.00		
Incremental Delay, d2	2.2		
Delay (s)	62.8		
Level of Service	E		
Approach Delay (s)	62.8		
Approach LOS	E		
Intersection Summary			

HCM 2010 Signalized Intersection Summary

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1390	50	230	1330	50	60	50	330	60	70	70
Future Volume (veh/h)	20	1390	50	230	1330	50	60	50	330	60	70	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	22	1544	54	256	1478	54	67	56	367	67	78	75
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	249	1591	55	269	1627	59	85	49	324	80	199	191
Arrive On Green	0.09	0.31	0.30	0.30	0.94	0.91	0.05	0.23	0.23	0.04	0.23	0.23
Sat Flow, veh/h	1774	3486	122	1774	3479	127	1774	211	1385	1774	862	829
Grp Volume(v), veh/h	22	782	816	256	750	782	67	0	423	67	0	153
Grp Sat Flow(s),veh/h/ln	1774	1770	1838	1774	1770	1836	1774	0	1597	1774	0	1691
Q Serve(g_s), s	1.6	61.0	61.5	19.8	25.2	26.4	5.2	0.0	32.7	5.2	0.0	10.7
Cycle Q Clear(g_c), s	1.6	61.0	61.5	19.8	25.2	26.4	5.2	0.0	32.7	5.2	0.0	10.7
Prop In Lane	1.00		0.07	1.00		0.07	1.00		0.87	1.00		0.49
Lane Grp Cap(c), veh/h	249	808	839	269	828	859	85	0	373	80	0	390
V/C Ratio(X)	0.09	0.97	0.97	0.95	0.91	0.91	0.79	0.00	1.13	0.84	0.00	0.39
Avail Cap(c_a), veh/h	249	808	839	269	981	1018	85	0	373	80	0	390
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	55.2	47.6	47.8	48.3	3.2	3.3	66.0	0.0	53.9	66.3	0.0	45.7
Incr Delay (d2), s/veh	0.0	4.6	5.0	41.7	15.4	15.4	37.9	0.0	88.3	51.5	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	0.8	30.8	32.4	12.8	13.5	14.5	3.5	0.0	23.5	3.7	0.0	5.0
LnGrp Delay(d),s/veh	55.3	52.2	52.7	90.0	18.6	18.8	103.9	0.0	142.2	117.8	0.0	45.9
LnGrp LOS	E	D	D	F	B	B	F		F	F		D
Approach Vol, veh/h	1620			1788			490			220		
Approach Delay, s/veh	52.5			28.9			137.0			67.8		
Approach LOS	D			C			F			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.2	67.9	10.6	36.3	29.4	63.7	10.2	36.7				
Change Period (Y+Rc), s	4.5	5.5	4.5	4.6	4.5	5.5	4.5	4.6				
Max Green Setting (Gmax), s	20.7	62.4	6.1	31.7	7.0	76.1	5.7	32.1				
Max Q Clear Time (g_c+21), s	21.8	63.5	7.2	12.7	3.6	28.4	7.2	34.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.7	0.1	24.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	53.1											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1190	350	430	970	120	320	300	160	180	940	250
Future Volume (veh/h)	110	1190	350	430	970	120	320	300	160	180	940	250
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	117	1266	210	457	1032	45	340	319	87	191	1000	72
Adj No. of Lanes	1	2	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	525	1470	649	405	1207	533	344	1049	842	307	986	439
Arrive On Green	0.59	0.83	0.83	0.23	0.34	0.34	0.10	0.30	0.30	0.09	0.28	0.28
Sat Flow, veh/h	1774	3539	1562	1774	3539	1563	3442	3539	1582	3442	3539	1575
Grp Volume(v), veh/h	117	1266	210	457	1032	45	340	319	87	191	1000	72
Grp Sat Flow(s),veh/h/ln	1774	1770	1562	1774	1770	1563	1721	1770	1582	1721	1770	1575
Q Serve(g_s), s	4.3	29.8	4.0	32.0	38.0	2.6	13.8	9.8	3.8	7.5	39.0	4.8
Cycle Q Clear(g_c), s	4.3	29.8	4.0	32.0	38.0	2.6	13.8	9.8	3.8	7.5	39.0	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	525	1470	649	405	1207	533	344	1049	842	307	986	439
V/C Ratio(X)	0.22	0.86	0.32	1.13	0.86	0.08	0.99	0.30	0.10	0.62	1.01	0.16
Avail Cap(c_a), veh/h	525	1470	649	405	1315	581	344	1049	842	320	986	439
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	9.5	6.3	54.0	42.9	29.1	62.9	38.1	16.2	61.5	50.5	38.2
Incr Delay (d2), s/veh	0.3	6.9	1.3	84.0	7.9	0.3	43.7	0.2	0.1	2.5	32.3	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	2.1	15.1	1.9	25.1	19.8	1.2	8.7	4.8	1.7	3.7	23.5	2.1
LnGrp Delay(d),s/veh	21.3	16.3	7.6	138.0	50.8	29.4	106.6	38.3	16.3	63.9	82.8	38.4
LnGrp LOS	C	B	A	F	D	C	F	D	B	E	F	D
Approach Vol, veh/h	1593			1534			746			1263		
Approach Delay, s/veh	15.5			76.1			66.9			77.4		
Approach LOS	B			E			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	36.0	62.1	19.0	43.0	46.4	51.7	16.5	45.5				
Change Period (Y+Rc), s	4.5	5.5	5.5	* 5.5	5.5	* 5.5	4.5	5.5				
Max Green Setting (Gmax), s	31.5	37.5	13.5	* 38	18.5	* 51	12.5	38.5				
Max Q Clear Time (g_c+Q), s	34.0	31.8	15.8	41.0	6.3	40.0	9.5	11.8				
Green Ext Time (p_c), s	0.0	4.7	0.0	0.0	9.1	6.3	0.0	2.9				
Intersection Summary												
HCM 2010 Ctrl Delay				56.3								
HCM 2010 LOS				E								
Notes												

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

HCM 2010 TWSC
6: Driveway/Olive Ave & Washington Blvd

03/06/2019

Intersection												
Int Delay, s/veh	57.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	100	1450	0	10	1390	60	0	0	0	40	0	0
Future Vol, veh/h	100	1450	0	10	1390	60	0	0	0	40	0	0
Conflicting Peds, #/hr	0	0	1	1	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	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	90	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	119	1726	0	12	1655	71	0	0	0	48	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1726	0	0	1727	0	0	2817	3715	864	2816	3680	863
Stage 1	-	-	-	-	-	-	1965	1965	-	1715	1715	-
Stage 2	-	-	-	-	-	-	852	1750	-	1101	1965	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	362	-	-	362	-	-	8	4	297	~ 8	5	298
Stage 1	-	-	-	-	-	-	65	107	-	94	144	-
Stage 2	-	-	-	-	-	-	321	138	-	226	107	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	362	-	-	362	-	-	6	3	297	~ 6	3	298
Mov Cap-2 Maneuver	-	-	-	-	-	-	6	3	-	~ 6	3	-
Stage 1	-	-	-	-	-	-	44	72	-	63	139	-
Stage 2	-	-	-	-	-	-	310	133	-	152	72	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.1	0	\$ 4305.5
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	362	-	-	362	-	-	6
HCM Lane V/C Ratio	-	0.329	-	-	0.033	-	-	7.937
HCM Control Delay (s)	0	19.7	-	-	15.3	-	-	\$ 4305.5
HCM Lane LOS	A	C	-	-	C	-	-	F
HCM 95th %tile Q(veh)	-	1.4	-	-	0.1	-	-	7.6

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

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	470	930	680	290	70	720		
Future Volume (veh/h)	470	930	680	290	70	720		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	522	1033	756	186	78	480		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	461	2084	1013	453	577	515		
Arrive On Green	0.26	0.59	0.29	0.29	0.33	0.33		
Sat Flow, veh/h	1774	3632	3632	1583	1774	1583		
Grp Volume(v), veh/h	522	1033	756	186	78	480		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1774	1583		
Q Serve(g_s), s	24.2	15.8	18.1	8.9	2.9	27.4		
Cycle Q Clear(g_c), s	24.2	15.8	18.1	8.9	2.9	27.4		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	461	2084	1013	453	577	515		
V/C Ratio(X)	1.13	0.50	0.75	0.41	0.14	0.93		
Avail Cap(c_a), veh/h	461	2084	1364	610	604	539		
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	34.5	11.1	30.2	26.9	22.2	30.4		
Incr Delay (d2), s/veh	83.6	0.3	2.0	0.8	0.0	22.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	22.5	7.7	9.1	4.0	1.4	24.0		
LnGrp Delay(d),s/veh	118.1	11.4	32.2	27.7	22.2	52.6		
LnGrp LOS	F	B	C	C	C	D		
Approach Vol, veh/h		1555	942		558			
Approach Delay, s/veh		47.2	31.3		48.4			
Approach LOS		D	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		58.9		34.3	28.2	30.7		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		17.8		29.4	26.2	20.1		
Green Ext Time (p_c), s		13.7		0.3	0.0	5.7		
Intersection Summary								
HCM 2010 Ctrl Delay			42.5					
HCM 2010 LOS			D					
Notes								

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

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	660	370	60	40	560	280	50	30	30	130	30	350
Future Volume (veh/h)	660	370	60	40	560	280	50	30	30	130	30	350
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	733	411	58	44	622	251	56	33	19	144	33	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	666	1980	277	135	831	335	163	90	39	295	260	221
Arrive On Green	0.37	0.63	0.63	0.08	0.33	0.33	0.14	0.14	0.14	0.14	0.14	0.00
Sat Flow, veh/h	1792	3137	439	1792	2482	1001	665	648	280	1360	1881	1599
Grp Volume(v), veh/h	733	233	236	44	448	425	108	0	0	144	33	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1790	1792	1787	1696	1593	0	0	1360	1881	1599
Q Serve(g_s), s	28.7	4.3	4.3	1.8	17.2	17.2	2.8	0.0	0.0	2.3	1.2	0.0
Cycle Q Clear(g_c), s	28.7	4.3	4.3	1.8	17.2	17.2	4.6	0.0	0.0	7.0	1.2	0.0
Prop In Lane	1.00		0.25	1.00		0.59	0.52		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	666	1128	1130	135	598	568	291	0	0	295	260	221
V/C Ratio(X)	1.10	0.21	0.21	0.33	0.75	0.75	0.37	0.00	0.00	0.49	0.13	0.00
Avail Cap(c_a), veh/h	666	1128	1130	364	819	777	792	0	0	454	480	408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.3	6.0	6.1	33.9	22.8	22.9	30.6	0.0	0.0	31.6	29.2	0.0
Incr Delay (d2), s/veh	65.8	0.1	0.1	0.5	3.2	3.4	0.3	0.0	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.2	2.1	2.1	0.9	9.0	8.6	2.2	0.0	0.0	3.0	0.6	0.0
LnGrp Delay(d),s/veh	90.1	6.2	6.2	34.4	26.0	26.3	30.9	0.0	0.0	32.0	29.3	0.0
LnGrp LOS	F	A	A	C	C	C	C			C	C	
Approach Vol, veh/h	1202				917		108				177	
Approach Delay, s/veh	57.4				26.6		30.9				31.5	
Approach LOS	E				C		C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			4	5	6	8				
Phs Duration (G+Y+Rc), s	9.8	52.8			14.7	32.7	29.9	14.7				
Change Period (Y+Rc), s	3.7	4.4			3.7	3.7	4.4	3.7				
Max Green Setting (Gmax), s	10.0	35.0			20.0	29.0	35.0	36.0				
Max Q Clear Time (g_c+1.35), s	13.8	6.3			9.0	30.7	19.2	6.6				
Green Ext Time (p_c), s	0.0	13.5			0.6	0.0	6.2	0.7				
Intersection Summary												
HCM 2010 Ctrl Delay	42.5											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	340	120	110	390	250	90	380	50	290	280	410
Future Volume (veh/h)	120	340	120	110	390	250	90	380	50	290	280	410
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	133	378	54	122	433	199	100	422	50	322	311	165
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	195	568	472	194	718	327	205	756	89	359	603	504
Arrive On Green	0.11	0.30	0.30	0.11	0.30	0.29	0.11	0.23	0.22	0.20	0.32	0.32
Sat Flow, veh/h	1792	1881	1562	1792	2386	1086	1792	3222	380	1792	1881	1571
Grp Volume(v), veh/h	133	378	54	122	323	309	100	233	239	322	311	165
Grp Sat Flow(s),veh/h/ln	1792	1881	1562	1792	1787	1684	1792	1787	1814	1792	1881	1571
Q Serve(g_s), s	7.4	18.1	2.6	6.7	15.9	16.3	5.4	11.9	12.0	18.1	13.9	8.2
Cycle Q Clear(g_c), s	7.4	18.1	2.6	6.7	15.9	16.3	5.4	11.9	12.0	18.1	13.9	8.2
Prop In Lane	1.00		1.00	1.00		0.64	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	195	568	472	194	538	507	205	419	426	359	603	504
V/C Ratio(X)	0.68	0.67	0.11	0.63	0.60	0.61	0.49	0.56	0.56	0.90	0.52	0.33
Avail Cap(c_a), veh/h	442	847	703	442	805	758	529	796	808	529	838	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.3	31.5	26.1	44.1	30.8	31.3	42.9	34.8	34.9	40.2	28.6	26.6
Incr Delay (d2), s/veh	1.6	1.9	0.2	1.3	1.5	1.7	0.7	1.6	1.7	10.0	1.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	9.6	1.1	3.4	8.0	7.8	2.7	6.0	6.2	9.9	7.3	3.7
LnGrp Delay(d),s/veh	45.8	33.4	26.2	45.3	32.3	33.0	43.6	36.4	36.6	50.3	29.5	27.2
LnGrp LOS	D	C	C	D	C	C	D	D	D	D	C	C
Approach Vol, veh/h	565			754			572			798		
Approach Delay, s/veh	35.6			34.7			37.7			37.4		
Approach LOS	D			C			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	35.2	15.8	37.1	15.3	35.1	24.7	28.2				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+1.7), s	19.7	20.1	7.4	15.9	9.4	18.3	20.1	14.0				
Green Ext Time (p_c), s	0.0	9.5	0.0	8.4	0.0	9.8	0.1	8.6				
Intersection Summary												
HCM 2010 Ctrl Delay	36.4											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	250	210	100	230	50	230	590	40	60	1070	240
Future Volume (veh/h)	230	250	210	100	230	50	230	590	40	60	1070	240
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	256	278	114	111	256	40	256	656	40	67	1189	253
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	518	207	169	603	92	369	851	52	582	1079	228
Arrive On Green	0.11	0.21	0.20	0.10	0.20	0.18	0.21	0.25	0.24	0.33	0.37	0.36
Sat Flow, veh/h	1774	2457	981	1774	3034	464	1774	3383	206	1774	2905	613
Grp Volume(v), veh/h	256	198	194	111	147	149	256	343	353	67	720	722
Grp Sat Flow(s),veh/h/ln	1774	1770	1668	1774	1770	1729	1774	1770	1819	1774	1770	1748
Q Serve(g_s), s	15.0	13.9	14.6	8.5	10.2	10.6	18.7	25.2	25.3	3.7	52.0	52.0
Cycle Q Clear(g_c), s	15.0	13.9	14.6	8.5	10.2	10.6	18.7	25.2	25.3	3.7	52.0	52.0
Prop In Lane	1.00		0.59	1.00		0.27	1.00		0.11	1.00		0.35
Lane Grp Cap(c), veh/h	190	373	352	169	352	344	369	445	457	582	657	649
V/C Ratio(X)	1.35	0.53	0.55	0.66	0.42	0.43	0.69	0.77	0.77	0.12	1.10	1.11
Avail Cap(c_a), veh/h	190	468	441	169	442	432	369	758	780	582	657	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Uniform Delay (d), s/veh	62.5	49.1	49.9	61.1	49.0	49.4	51.3	48.6	48.8	32.8	44.0	44.3
Incr Delay (d2), s/veh	186.8	1.7	1.9	7.3	1.1	1.2	4.6	12.2	11.9	0.0	58.5	64.6
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	17.2	7.0	6.9	4.5	5.1	5.2	9.6	13.8	14.2	1.8	36.1	36.7
LnGrp Delay(d),s/veh	249.3	50.7	51.8	68.4	50.1	50.6	55.9	60.8	60.7	32.9	102.5	108.9
LnGrp LOS	F	D	D	E	D	D	E	E	E	C	F	F
Approach Vol, veh/h		648			407			952			1509	
Approach Delay, s/veh		129.5			55.3			59.4			102.5	
Approach LOS		F			E			E			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	31.8	50.0	39.2	17.3	33.5	33.2	56.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	14.5	33.0	13.5	58.5	12.5	35.0	21.5	50.5				
Max Q Clear Time (g_c+17.0), s	17.0	12.6	5.7	27.3	10.5	16.6	20.7	54.0				
Green Ext Time (p_c), s	0.0	2.1	0.3	6.4	0.1	2.9	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			90.3									
HCM 2010 LOS			F									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	20	0	0	0	30	710	0	10	1630	30
Future Volume (veh/h)	20	0	20	0	0	0	30	710	0	10	1630	30
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	22	0	1				33	789	0	11	1811	23
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	87	0	77				95	2691	0	51	2604	1137
Arrive On Green	0.05	0.00	0.05				0.05	0.76	0.00	0.03	0.74	0.74
Sat Flow, veh/h	1774	0	1583				1774	3632	0	1774	3539	1546
Grp Volume(v), veh/h	22	0	1				33	789	0	11	1811	23
Grp Sat Flow(s),veh/h/ln	1774	0	1583				1774	1770	0	1774	1770	1546
Q Serve(g_s), s	0.9	0.0	0.0				1.3	5.1	0.0	0.4	20.5	0.3
Cycle Q Clear(g_c), s	0.9	0.0	0.0				1.3	5.1	0.0	0.4	20.5	0.3
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	87	0	77				95	2691	0	51	2604	1137
V/C Ratio(X)	0.25	0.00	0.01				0.35	0.29	0.00	0.22	0.70	0.02
Avail Cap(c_a), veh/h	686	0	612				216	2691	0	240	2604	1137
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.84	0.84	0.00	0.10	0.10	0.10
Uniform Delay (d), s/veh	33.9	0.0	33.5				33.8	2.7	0.0	35.1	5.3	2.6
Incr Delay (d2), s/veh	0.6	0.0	0.0				0.7	0.2	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0				0.7	2.5	0.0	0.2	9.9	0.1
LnGrp Delay(d),s/veh	34.5	0.0	33.5				34.5	3.0	0.0	35.2	5.5	2.6
LnGrp LOS	C		C				C	A		D	A	A
Approach Vol, veh/h		23						822			1845	
Approach Delay, s/veh		34.4						4.2			5.6	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.9	58.4			6.1	60.3		7.6				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	22.5				9.5	21.5		28.0				
Max Q Clear Time (g_c+1), s	13.3	22.5			2.4	7.1		2.9				
Green Ext Time (p_c), s	0.0	0.0			0.0	13.6		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			5.4									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	 		 	 		 	 	
Traffic Volume (veh/h)	110	660	130	530	1540	160	100	430	100	360	1100	230
Future Volume (veh/h)	110	660	130	530	1540	160	100	430	100	360	1100	230
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	116	695	0	558	1621	88	105	453	0	379	1158	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
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, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	203	1431	446	614	1419	633	225	998	447	436	1215	544
Arrive On Green	0.06	0.29	0.00	0.18	0.41	0.41	0.07	0.29	0.00	0.13	0.35	0.00
Sat Flow, veh/h	3375	4988	1553	3375	3471	1548	3375	3471	1553	3375	3471	1553
Grp Volume(v), veh/h	116	695	0	558	1621	88	105	453	0	379	1158	0
Grp Sat Flow(s),veh/h/ln	1688	1663	1553	1688	1736	1548	1688	1736	1553	1688	1736	1553
Q Serve(g_s), s	4.7	16.2	0.0	22.7	57.2	5.0	4.2	15.0	0.0	15.4	45.6	0.0
Cycle Q Clear(g_c), s	4.7	16.2	0.0	22.7	57.2	5.0	4.2	15.0	0.0	15.4	45.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	1431	446	614	1419	633	225	998	447	436	1215	544
V/C Ratio(X)	0.57	0.49	0.00	0.91	1.14	0.14	0.47	0.45	0.00	0.87	0.95	0.00
Avail Cap(c_a), veh/h	265	1431	446	796	1419	633	289	998	447	579	1215	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	64.0	41.4	0.0	56.1	41.4	25.9	62.9	40.9	0.0	59.8	44.4	0.0
Incr Delay (d2), s/veh	0.9	1.2	0.0	10.4	72.9	0.5	0.6	0.5	0.0	8.7	16.0	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	2.2	7.6	0.0	11.5	41.8	2.2	2.0	7.2	0.0	7.7	24.6	0.0
LnGrp Delay(d),s/veh	65.0	42.5	0.0	66.5	114.3	26.4	63.5	41.3	0.0	68.5	60.4	0.0
LnGrp LOS	E	D		E	F	C	E	D		E	E	
Approach Vol, veh/h	811			2267			558			1537		
Approach Delay, s/veh	45.7			99.1			45.5			62.4		
Approach LOS	D			F			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.5	44.2	13.3	53.0	12.4	61.2	22.1	44.3				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	32.5	28.0	11.5	47.0	10.5	50.0	23.5	35.0				
Max Q Clear Time (g_c+24.7), s	24.7	18.2	6.2	47.6	6.7	59.2	17.4	17.0				
Green Ext Time (p_c), s	0.3	9.1	0.0	0.0	0.0	0.0	0.2	12.7				
Intersection Summary												
HCM 2010 Ctrl Delay	74.1											
HCM 2010 LOS	E											

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	960	140	440	1650	230	210	430	280	260	960	360
Future Volume (veh/h)	140	960	140	440	1650	230	210	430	280	260	960	360
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	143	980	125	449	1684	228	214	439	214	265	980	220
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	300	1347	171	817	1432	190	301	820	1288	324	843	371
Arrive On Green	0.09	0.30	0.29	0.24	0.46	0.45	0.09	0.24	0.23	0.10	0.24	0.24
Sat Flow, veh/h	3375	4479	570	3375	3082	409	3375	3471	2733	3375	3471	1528
Grp Volume(v), veh/h	143	727	378	449	933	979	214	439	214	265	980	220
Grp Sat Flow(s),veh/h/ln	1688	1663	1724	1688	1736	1755	1688	1736	1367	1688	1736	1528
Q Serve(g_s), s	5.6	27.4	27.6	16.3	65.0	65.0	8.6	15.5	1.4	10.8	34.0	17.8
Cycle Q Clear(g_c), s	5.6	27.4	27.6	16.3	65.0	65.0	8.6	15.5	1.4	10.8	34.0	17.8
Prop In Lane	1.00		0.33	1.00		0.23	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	1000	519	817	806	815	301	820	1288	324	843	371
V/C Ratio(X)	0.48	0.73	0.73	0.55	1.16	1.20	0.71	0.54	0.17	0.82	1.16	0.59
Avail Cap(c_a), veh/h	338	1330	690	817	806	815	338	820	1288	579	843	371
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	0.59	0.59	0.59	1.00	1.00	1.00	0.73	0.73	0.73
Uniform Delay (d), s/veh	60.7	43.8	44.2	46.4	37.5	37.7	62.0	46.7	9.2	62.1	53.0	46.9
Incr Delay (d2), s/veh	0.4	4.6	8.7	0.3	79.1	97.6	4.6	0.9	0.1	1.5	83.0	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	2.7	13.3	14.4	7.6	48.9	53.6	4.2	7.5	1.4	5.1	26.0	7.7
LnGrp Delay(d),s/veh	61.1	48.4	52.9	46.6	116.6	135.3	66.6	47.6	9.3	63.5	136.0	49.1
LnGrp LOS	E	D	D	D	F	F	E	D	A	E	F	D
Approach Vol, veh/h	1248			2361			867			1465		
Approach Delay, s/veh	51.2			111.0			42.8			109.9		
Approach LOS	D			F			D			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	69.0	16.5	38.0	39.4	46.1	17.4	37.1				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	6.0	* 6	4.5	5.5				
Max Green Setting (Gmax), s	13.5	60.0	13.5	32.5	19.5	* 54	23.5	22.5				
Max Q Clear Time (g_c+1), s	17.6	67.0	10.6	36.0	18.3	29.6	12.8	17.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	1.2	10.3	0.1	4.3				
Intersection Summary												
HCM 2010 Ctrl Delay			88.2									
HCM 2010 LOS			F									
Notes												

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

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	↑↑↔	↗	↖	↑↑	↖↗	↗			
Traffic Volume (veh/h)	880	620	90	1400	930	20			
Future Volume (veh/h)	880	620	90	1400	930	20			
Number	6	16	5	2	7	14			
Initial Q (Qb), veh	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810			
Adj Flow Rate, veh/h	998	481	91	1414	939	0			
Adj No. of Lanes	2	1	1	2	2	1			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	5	5	5	5	5	5			
Cap, veh/h	1997	1296	99	2198	1007	463			
Arrive On Green	0.55	0.54	0.12	1.00	0.30	0.00			
Sat Flow, veh/h	3619	1537	1723	3529	3343	1538			
Grp Volume(v), veh/h	998	481	91	1414	939	0			
Grp Sat Flow(s),veh/h/ln	1810	1537	1723	1719	1672	1538			
Q Serve(g_s), s	22.9	9.6	7.0	0.0	36.6	0.0			
Cycle Q Clear(g_c), s	22.9	9.6	7.0	0.0	36.6	0.0			
Prop In Lane		1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	1997	1296	99	2198	1007	463			
V/C Ratio(X)	0.50	0.37	0.92	0.64	0.93	0.00			
Avail Cap(c_a), veh/h	1997	1296	180	2198	1340	616			
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00			
Upstream Filter(I)	0.74	0.74	0.59	0.59	1.00	0.00			
Uniform Delay (d), s/veh	18.6	2.4	59.0	0.0	45.5	0.0			
Incr Delay (d2), s/veh	0.7	0.6	8.5	0.9	9.4	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	11.6	20.8	3.6	0.3	18.1	0.0			
LnGrp Delay(d),s/veh	19.3	3.0	67.5	0.9	54.9	0.0			
LnGrp LOS	B	A	E	A	D				
Approach Vol, veh/h	1479			1505	939				
Approach Delay, s/veh	14.0			4.9	54.9				
Approach LOS	B			A	D				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4	5	6			
Phs Duration (G+Y+Rc), s		89.6		44.4	11.7	77.9			
Change Period (Y+Rc), s		4.3		3.0	3.0	4.3			
Max Green Setting (Gmax), s		72.0		54.7	15.0	54.0			
Max Q Clear Time (g_c+I1), s		2.0		38.6	9.0	24.9			
Green Ext Time (p_c), s		22.1		2.8	0.0	16.1			
Intersection Summary									
HCM 2010 Ctrl Delay				20.3					
HCM 2010 LOS				C					
Notes									

Irvington BART 8:00 am 09/26/2017 2040 Plus Project AM

Synchro 9 Report
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User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	330	550	50	390	0	1000	10	20	0	10	90
Future Volume (veh/h)	20	330	550	50	390	0	1000	10	20	0	10	90
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	21	351	0	53	415	0	1064	11	0	0	11	6
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	8	1363	610	39	1426	0	1118	605	515	26	27	23
Arrive On Green	0.00	0.13	0.00	0.02	0.41	0.00	0.33	0.33	0.00	0.00	0.01	0.01
Sat Flow, veh/h	1740	3471	1553	1740	3563	0	3375	1827	1553	1740	1827	1553
Grp Volume(v), veh/h	21	351	0	53	415	0	1064	11	0	0	11	6
Grp Sat Flow(s),veh/h/ln	1740	1736	1553	1740	1736	0	1688	1827	1553	1740	1827	1553
Q Serve(g_s), s	0.3	6.1	0.0	1.5	5.4	0.0	20.6	0.3	0.0	0.0	0.4	0.3
Cycle Q Clear(g_c), s	0.3	6.1	0.0	1.5	5.4	0.0	20.6	0.3	0.0	0.0	0.4	0.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	8	1363	610	39	1426	0	1118	605	515	26	27	23
V/C Ratio(X)	2.75	0.26	0.00	1.35	0.29	0.00	0.95	0.02	0.00	0.00	0.41	0.26
Avail Cap(c_a), veh/h	208	1363	610	234	1426	0	1118	605	515	205	215	183
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	20.4	0.0	32.7	13.2	0.0	21.9	15.1	0.0	0.0	32.7	32.6
Incr Delay (d2), s/veh	807.9	0.3	0.0	171.9	0.5	0.0	16.5	0.0	0.0	0.0	3.7	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	1.9	3.0	0.0	2.6	2.6	0.0	12.0	0.1	0.0	0.0	0.2	0.1
LnGrp Delay(d),s/veh	841.4	20.7	0.0	204.7	13.7	0.0	38.4	15.1	0.0	0.0	36.4	34.9
LnGrp LOS	F	C		F	B		D	B			D	C
Approach Vol, veh/h		372			468			1075			17	
Approach Delay, s/veh		67.0			35.4			38.1			35.9	
Approach LOS		E			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.3	31.5		5.0	5.5	30.3		26.2				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	9.0	12.6		8.0	10.0	11.6		22.0				
Max Q Clear Time (g_c+1/3), s	12.3	7.4		2.4	3.5	8.1		22.6				
Green Ext Time (p_c), s	0.0	2.7		0.0	0.0	1.9		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			43.0									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	200	480	440	560	160	320	610	90	80	890	370
Future Volume (veh/h)	160	200	480	440	560	160	320	610	90	80	890	370
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	172	215	314	473	602	112	344	656	89	86	957	233
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	176	514	435	511	606	506	401	1192	162	127	1190	510
Arrive On Green	0.10	0.28	0.28	0.15	0.33	0.33	0.12	0.38	0.37	0.07	0.34	0.34
Sat Flow, veh/h	1757	1845	1561	3408	1845	1541	3408	3100	420	1757	3505	1502
Grp Volume(v), veh/h	172	215	314	473	602	112	344	371	374	86	957	233
Grp Sat Flow(s),veh/h/ln	1757	1845	1561	1704	1845	1541	1704	1752	1767	1757	1752	1502
Q Serve(g_s), s	13.7	13.3	25.4	19.2	45.5	7.4	13.9	23.1	23.2	6.7	34.7	17.0
Cycle Q Clear(g_c), s	13.7	13.3	25.4	19.2	45.5	7.4	13.9	23.1	23.2	6.7	34.7	17.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	176	514	435	511	606	506	401	674	680	127	1190	510
V/C Ratio(X)	0.98	0.42	0.72	0.93	0.99	0.22	0.86	0.55	0.55	0.68	0.80	0.46
Avail Cap(c_a), veh/h	176	514	435	511	606	506	487	674	680	251	1190	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.9	41.2	45.6	58.7	46.8	34.0	60.6	33.6	33.8	63.3	42.0	36.2
Incr Delay (d2), s/veh	61.3	0.8	6.3	22.5	34.9	1.0	10.6	3.2	3.2	2.3	5.8	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	6.9	11.8	10.7	29.1	3.3	7.1	11.8	12.0	3.3	17.7	7.4
LnGrp Delay(d),s/veh	124.2	42.0	51.9	81.2	81.8	35.0	71.2	36.8	37.0	65.6	47.9	39.1
LnGrp LOS	F	D	D	F	F	D	E	D	D	E	D	D
Approach Vol, veh/h		701			1187			1089			1276	
Approach Delay, s/veh		66.6			77.2			47.8			47.5	
Approach LOS		E			E			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	34.1	57.9	25.0	43.0	20.5	51.5	18.0	50.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	19.5	42.5	20.5	37.5	19.5	42.5	13.5	44.5				
Max Q Clear Time (g_c+1.7), s	19.5	25.2	21.2	27.4	15.9	36.7	15.7	47.5				
Green Ext Time (p_c), s	0.0	13.4	0.0	6.0	0.1	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			59.0									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

17: Osgood Rd & North BART Access

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	0	20	0	0	0	20	710	0	0	1650	70
Future Volume (veh/h)	70	0	20	0	0	0	20	710	0	0	1650	70
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.73				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900				1863	1863	1900	0	1863	1900
Adj Flow Rate, veh/h	78	0	22				22	789	0	0	1833	78
Adj No. of Lanes	1	1	0				1	2	0	0	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				2	2	2	0	2	2
Cap, veh/h	112	0	73				42	2962	0	0	2641	112
Arrive On Green	0.06	0.00	0.06				0.02	0.84	0.00	0.00	0.76	0.76
Sat Flow, veh/h	1774	0	1163				1774	3632	0	0	3553	146
Grp Volume(v), veh/h	78	0	22				22	789	0	0	931	980
Grp Sat Flow(s),veh/h/ln	1774	0	1163				1774	1770	0	0	1770	1837
Q Serve(g_s), s	3.9	0.0	1.6				1.1	4.2	0.0	0.0	23.7	24.3
Cycle Q Clear(g_c), s	3.9	0.0	1.6				1.1	4.2	0.0	0.0	23.7	24.3
Prop In Lane	1.00		1.00				1.00		0.00	0.00		0.08
Lane Grp Cap(c), veh/h	112	0	73				42	2962	0	0	1351	1402
V/C Ratio(X)	0.70	0.00	0.30				0.53	0.27	0.00	0.00	0.69	0.70
Avail Cap(c_a), veh/h	609	0	399				365	2962	0	0	1351	1402
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.97	0.97	0.00	0.00	0.17	0.17
Uniform Delay (d), s/veh	41.3	0.0	40.3				43.4	1.5	0.0	0.0	5.3	5.4
Incr Delay (d2), s/veh	7.5	0.0	2.2				9.7	0.2	0.0	0.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.6				0.7	2.1	0.0	0.0	11.6	12.2
LnGrp Delay(d),s/veh	48.8	0.0	42.5				53.2	1.8	0.0	0.0	5.8	5.9
LnGrp LOS	D		D				D	A			A	A
Approach Vol, veh/h		100						811			1911	
Approach Delay, s/veh		47.4						3.2			5.9	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		79.8		10.2	6.6	73.2						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		50.1		30.9	18.5	27.1						
Max Q Clear Time (g_c+I1), s		6.2		5.9	3.1	26.3						
Green Ext Time (p_c), s		32.2		0.3	0.0	0.7						
Intersection Summary												
HCM 2010 Ctrl Delay	6.6											
HCM 2010 LOS	A											

Intersection

Int Delay, s/veh 0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1690	90	0	1610	0	10
Future Vol, veh/h	1690	90	0	1610	0	10
Conflicting Peds, #/hr	0	10	0	0	0	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1878	100	0	1789	0	11

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 959
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.32
Pot Cap-1 Maneuver	-	-	0 - 0 257
Stage 1	-	-	0 - 0
Stage 2	-	-	0 - 0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 252
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	252	-	-	-
HCM Lane V/C Ratio	0.044	-	-	-
HCM Control Delay (s)	19.9	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Intersection

Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	20	0	0	0	100	10	0	0	20	0
Future Vol, veh/h	0	0	20	0	0	0	100	10	0	0	20	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	22	0	0	0	111	11	0	0	22	0
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	6.7	0	7.9	7.2
HCM LOS	A	-	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	0%	0%
Vol Thru, %	9%	0%	100%	100%
Vol Right, %	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	20	0	20
LT Vol	100	0	0	0
Through Vol	10	0	0	20
RT Vol	0	20	0	0
Lane Flow Rate	122	22	0	22
Geometry Grp	1	1	1	1
Degree of Util (X)	0.142	0.022	0	0.025
Departure Headway (Hd)	4.172	3.583	4.203	4.065
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	863	985	0	879
Service Time	2.18	1.656	2.279	2.097
HCM Lane V/C Ratio	0.141	0.022	0	0.025
HCM Control Delay	7.9	6.7	7.3	7.2
HCM Lane LOS	A	A	N	A
HCM 95th-tile Q	0.5	0.1	0	0.1

HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	590	300	80	510	160	260	900	70	100	450	180
Future Volume (veh/h)	240	590	300	80	510	160	260	900	70	100	450	180
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	245	602	0	82	520	0	265	918	0	102	459	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	247	1232	0	155	1048	0	264	1046	0	162	841	0
Arrive On Green	0.14	0.34	0.00	0.09	0.29	0.00	0.15	0.29	0.00	0.09	0.24	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	245	602	0	82	520	0	265	918	0	102	459	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	14.3	13.9	0.0	4.6	12.6	0.0	15.5	25.7	0.0	5.8	11.8	0.0
Cycle Q Clear(g_c), s	14.3	13.9	0.0	4.6	12.6	0.0	15.5	25.7	0.0	5.8	11.8	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	247	1232	0	155	1048	0	264	1046	0	162	841	0
V/C Ratio(X)	0.99	0.49	0.00	0.53	0.50	0.00	1.00	0.88	0.00	0.63	0.55	0.00
Avail Cap(c_a), veh/h	247	1232	0	230	1048	0	264	1072	0	196	936	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.2	27.1	0.0	45.9	30.7	0.0	44.8	35.4	0.0	46.1	35.2	0.0
Incr Delay (d2), s/veh	54.3	1.4	0.0	1.0	1.7	0.0	55.8	8.6	0.0	2.2	0.8	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	10.8	7.1	0.0	2.3	6.5	0.0	11.7	13.9	0.0	3.0	5.9	0.0
LnGrp Delay(d),s/veh	99.5	28.5	0.0	46.9	32.4	0.0	100.6	43.9	0.0	48.2	36.0	0.0
LnGrp LOS	F	C		D	C		F	D		D	D	
Approach Vol, veh/h		847			602			1183			561	
Approach Delay, s/veh		49.0			34.4			56.6			38.2	
Approach LOS		D			C			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	41.2	14.0	36.2	19.0	35.8	20.0	30.2				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	13.5	29.0	11.5	31.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	6.6	15.9	7.8	27.7	16.3	14.6	17.5	13.8				
Green Ext Time (p_c), s	0.0	7.5	0.0	3.0	0.0	7.6	0.0	9.1				
Intersection Summary												
HCM 2010 Ctrl Delay				47.2								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	1130	330	130	1140	160	400	610	160	140	320	130
Future Volume (veh/h)	160	1130	330	130	1140	160	400	610	160	140	320	130
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	167	1177	195	135	1188	157	417	635	150	146	333	30
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	1162	512	496	1030	136	474	758	179	172	804	355
Arrive On Green	0.14	0.32	0.32	0.29	0.65	0.65	0.14	0.27	0.27	0.10	0.22	0.22
Sat Flow, veh/h	1792	3574	1575	3476	3171	418	3476	2856	674	1792	3574	1578
Grp Volume(v), veh/h	167	1177	195	135	668	677	417	397	388	146	333	30
Grp Sat Flow(s),veh/h/ln	1792	1787	1575	1738	1787	1801	1738	1787	1743	1792	1787	1578
Q Serve(g_s), s	10.6	39.0	7.6	3.6	39.0	39.0	14.1	25.2	25.3	9.6	9.6	1.3
Cycle Q Clear(g_c), s	10.6	39.0	7.6	3.6	39.0	39.0	14.1	25.2	25.3	9.6	9.6	1.3
Prop In Lane	1.00		1.00	1.00		0.23	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	256	1162	512	496	581	585	474	475	463	172	804	355
V/C Ratio(X)	0.65	1.01	0.38	0.27	1.15	1.16	0.88	0.84	0.84	0.85	0.41	0.08
Avail Cap(c_a), veh/h	256	1162	512	496	581	585	797	573	559	172	804	355
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.64	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.6	40.5	13.9	38.0	21.0	21.0	50.8	41.6	41.6	53.4	39.7	18.4
Incr Delay (d2), s/veh	4.6	29.7	2.1	0.1	80.1	82.9	3.2	9.8	10.2	29.9	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	5.6	24.0	3.6	1.7	31.6	32.3	7.0	13.8	13.5	6.2	4.8	0.6
LnGrp Delay(d),s/veh	53.2	70.2	16.1	38.1	101.1	103.9	54.1	51.4	51.9	83.3	40.2	18.6
LnGrp LOS	D	F	B	D	F	F	D	D	D	F	D	B
Approach Vol, veh/h	1539			1480			1202			509		
Approach Delay, s/veh	61.5			96.6			52.5			51.3		
Approach LOS	E			F			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.6	45.0	20.9	32.5	21.6	45.0	16.0	37.4				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	10.5	39.0	27.5	22.5	10.5	39.0	11.5	38.5				
Max Q Clear Time (g_c+1.5), s	15.6	41.0	16.1	11.6	12.6	41.0	11.6	27.3				
Green Ext Time (p_c), s	0.1	0.0	0.2	6.4	0.0	0.0	0.0	4.6				
Intersection Summary												
HCM 2010 Ctrl Delay	69.1											
HCM 2010 LOS	E											

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	50	880	390	10	320	30	830	20	700	110	540	40
Future Volume (vph)	50	880	390	10	320	30	830	20	700	110	540	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5		4.5	4.5	5.5		5.5	5.5	5.5	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.96	1.00	
Satd. Flow (prot)	1787	3574	1599		1610	1684	3553		1698	1724	1556	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.96	1.00	
Satd. Flow (perm)	1787	3574	1599		1610	1684	3553		1698	1724	1556	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	926	411	11	337	32	874	21	737	116	568	42
RTOR Reduction (vph)	0	0	25	0	0	0	1	0	0	0	397	0
Lane Group Flow (vph)	53	926	397	0	185	184	894	0	420	433	171	0
Confl. Peds. (#/hr)			14					35			14	
Confl. Bikes (#/hr)			4									
Heavy Vehicles (%)	1%	1%	1%	2%	2%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	7.5	29.9	68.9		24.9	24.9	47.3		33.5	33.5	33.5	
Effective Green, g (s)	7.5	29.9	68.9		24.9	24.9	47.3		33.5	33.5	33.5	
Actuated g/C Ratio	0.06	0.25	0.57		0.21	0.21	0.39		0.28	0.28	0.28	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	111	890	918		334	349	1400		474	481	434	
v/s Ratio Prot	0.03	c0.26	0.25		c0.11	0.11	c0.25		0.25	c0.25		
v/s Ratio Perm											0.11	
v/c Ratio	0.48	1.04	0.43		0.55	0.53	0.64		0.89	0.90	0.39	
Uniform Delay, d1	54.4	45.0	14.5		42.6	42.3	29.4		41.4	41.6	35.0	
Progression Factor	1.06	0.88	1.85		1.04	1.04	1.71		0.82	0.82	1.39	
Incremental Delay, d2	0.5	31.3	0.2		0.1	0.1	0.2		12.1	13.6	0.5	
Delay (s)	58.3	71.0	27.0		44.2	43.9	50.6		46.1	47.7	49.2	
Level of Service	E	E	C		D	D	D		D	D	D	
Approach Delay (s)		57.3					48.7			47.8		
Approach LOS		E					D			D		
Intersection Summary												
HCM 2000 Control Delay			51.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.5		
Intersection Capacity Utilization			93.9%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR	SBR2
Lane Configurations	4T		
Traffic Volume (vph)	100	10	50
Future Volume (vph)	100	10	50
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.0		
Lane Util. Factor	0.95		
Frpb, ped/bikes	0.98		
Flpb, ped/bikes	1.00		
Frt	0.95		
Flt Protected	0.99		
Satd. Flow (prot)	3297		
Flt Permitted	0.99		
Satd. Flow (perm)	3297		
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	105	11	53
RTOR Reduction (vph)	33	0	0
Lane Group Flow (vph)	178	0	0
Confl. Peds. (#/hr)		30	
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	1%	1%	1%
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	11.2		
Effective Green, g (s)	11.2		
Actuated g/C Ratio	0.09		
Clearance Time (s)	5.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	307		
v/s Ratio Prot	c0.05		
v/s Ratio Perm			
v/c Ratio	0.58		
Uniform Delay, d1	52.2		
Progression Factor	1.00		
Incremental Delay, d2	1.8		
Delay (s)	54.0		
Level of Service	D		
Approach Delay (s)	54.0		
Approach LOS	D		
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1270	100	260	1020	120	60	70	290	40	110	90
Future Volume (vph)	40	1270	100	260	1020	120	60	70	290	40	110	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5		4.5	4.6			4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.88			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1787	3525		1787	3506		1787	1654			1748	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.88	
Satd. Flow (perm)	1787	3525		1787	3506		1787	1654			1551	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	1351	106	277	1085	128	64	74	309	43	117	96
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	0	0	14	0
Lane Group Flow (vph)	43	1452	0	277	1206	0	64	383	0	0	242	0
Confl. Peds. (#/hr)			8			5	20					20
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	5.6	42.6		20.6	57.6		5.8	42.2			31.9	
Effective Green, g (s)	5.6	42.6		20.6	57.6		5.8	42.2			31.9	
Actuated g/C Ratio	0.05	0.36		0.17	0.48		0.05	0.35			0.27	
Clearance Time (s)	4.5	5.5		4.5	5.5		4.5	4.6			4.6	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		3.0	2.0			2.0	
Lane Grp Cap (vph)	83	1251		306	1682		86	581			412	
v/s Ratio Prot	0.02	c0.41		c0.15	0.34		0.04	c0.23				
v/s Ratio Perm											0.16	
v/c Ratio	0.52	1.16		0.91	0.72		0.74	0.66			0.59	
Uniform Delay, d1	55.9	38.7		48.7	24.7		56.4	32.8			38.3	
Progression Factor	1.41	0.49		0.65	0.51		1.00	1.00			1.00	
Incremental Delay, d2	1.0	76.5		16.5	1.3		29.0	2.1			1.4	
Delay (s)	79.6	95.7		48.3	13.9		85.4	34.9			39.7	
Level of Service	E	F		D	B		F	C			D	
Approach Delay (s)		95.2			20.3			42.1			39.7	
Approach LOS		F			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			54.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			19.1			
Intersection Capacity Utilization			110.2%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	840	370	200	900	80	350	930	400	100	530	160
Future Volume (veh/h)	320	840	370	200	900	80	350	930	400	100	530	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	340	894	185	213	957	5	372	989	204	106	564	49
Adj No. of Lanes	1	2	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	276	1202	529	202	1053	465	362	1028	634	337	1002	443
Arrive On Green	0.15	0.34	0.34	0.11	0.29	0.29	0.10	0.29	0.29	0.10	0.28	0.28
Sat Flow, veh/h	1792	3574	1573	1792	3574	1579	3476	3574	1579	3476	3574	1579
Grp Volume(v), veh/h	340	894	185	213	957	5	372	989	204	106	564	49
Grp Sat Flow(s),veh/h/ln	1792	1787	1573	1792	1787	1579	1738	1787	1579	1738	1787	1579
Q Serve(g_s), s	18.5	26.6	10.6	13.5	31.0	0.3	12.5	32.7	10.7	3.4	16.2	2.8
Cycle Q Clear(g_c), s	18.5	26.6	10.6	13.5	31.0	0.3	12.5	32.7	10.7	3.4	16.2	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	1202	529	202	1053	465	362	1028	634	337	1002	443
V/C Ratio(X)	1.23	0.74	0.35	1.06	0.91	0.01	1.03	0.96	0.32	0.31	0.56	0.11
Avail Cap(c_a), veh/h	276	1202	529	202	1053	465	362	1028	634	362	1028	454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.46	0.46	0.46	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.8	35.3	30.0	53.3	40.8	30.0	53.8	42.1	24.8	50.5	36.9	32.1
Incr Delay (d2), s/veh	131.4	4.2	1.8	79.2	13.0	0.0	39.3	11.6	0.2	0.2	0.9	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	19.2	13.7	4.9	11.1	17.2	0.1	8.0	17.7	4.7	1.6	8.1	1.2
LnGrp Delay(d),s/veh	182.2	39.4	31.8	132.4	53.7	30.0	93.0	53.7	25.0	50.7	37.8	32.2
LnGrp LOS	F	D	C	F	D	C	F	D	C	D	D	C
Approach Vol, veh/h	1419				1175				1565		719	
Approach Delay, s/veh	72.6				67.9				59.3		39.3	
Approach LOS	E				E				E		D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	45.9	17.0	39.1	23.0	40.9	16.1	40.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	13.5	39.5	12.5	34.5	18.5	34.5	12.5	34.5				
Max Q Clear Time (g_c+1.5), s	15.5	28.6	14.5	18.2	20.5	33.0	5.4	34.7				
Green Ext Time (p_c), s	0.0	9.4	0.0	12.2	0.0	1.5	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			62.3									
HCM 2010 LOS			E									

HCM 2010 TWSC
6: Driveway/Olive Ave & Washington Blvd

03/06/2019

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	170	1150	10	10	1050	30	0	0	10	10	0	0
Future Vol, veh/h	170	1150	10	10	1050	30	0	0	10	10	0	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	187	1264	11	11	1154	33	0	0	11	11	0	0
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	1187	0	0	1276	0	0	2244	2854	644	2204	2843	594
Stage 1	-	-	-	-	-	-	1645	1645	-	1193	1193	-
Stage 2	-	-	-	-	-	-	599	1209	-	1011	1650	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.52	6.52	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.51	4.01	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	590	-	-	545	-	-	23	17	418	25	17	451
Stage 1	-	-	-	-	-	-	105	157	-	200	260	-
Stage 2	-	-	-	-	-	-	458	256	-	258	156	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	590	-	-	544	-	-	17	11	416	18	11	451
Mov Cap-2 Maneuver	-	-	-	-	-	-	17	11	-	18	11	-
Stage 1	-	-	-	-	-	-	72	107	-	137	255	-
Stage 2	-	-	-	-	-	-	449	251	-	171	106	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	1.8		0.1			13.9			\$ 367.6			
HCM LOS						B			F			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	416	590	-	-	544	-	-	18				
HCM Lane V/C Ratio	0.026	0.317	-	-	0.02	-	-	0.611				
HCM Control Delay (s)	13.9	13.9	-	-	11.8	-	-	\$ 367.6				
HCM Lane LOS	B	B	-	-	B	-	-	F				
HCM 95th %tile Q(veh)	0.1	1.4	-	-	0.1	-	-	1.6				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	200	1040	420	200	80	660		
Future Volume (veh/h)	200	1040	420	200	80	660		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	217	1130	457	63	87	285		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	1	1	1	1	1	1		
Cap, veh/h	271	2213	1413	619	385	343		
Arrive On Green	0.15	0.62	0.40	0.40	0.21	0.21		
Sat Flow, veh/h	1792	3668	3668	1566	1792	1599		
Grp Volume(v), veh/h	217	1130	457	63	87	285		
Grp Sat Flow(s),veh/h/ln	1792	1787	1787	1566	1792	1599		
Q Serve(g_s), s	6.8	10.2	5.1	1.5	2.3	9.8		
Cycle Q Clear(g_c), s	6.8	10.2	5.1	1.5	2.3	9.8		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	271	2213	1413	619	385	343		
V/C Ratio(X)	0.80	0.51	0.32	0.10	0.23	0.83		
Avail Cap(c_a), veh/h	744	2213	2166	949	961	858		
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	6.1	12.1	11.0	18.7	21.7		
Incr Delay (d2), s/veh	2.1	0.3	0.2	0.1	0.1	2.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.5	4.9	2.5	0.6	1.1	8.3		
LnGrp Delay(d),s/veh	25.8	6.4	12.3	11.1	18.8	23.7		
LnGrp LOS	C	A	B	B	B	C		
Approach Vol, veh/h		1347	520		372			
Approach Delay, s/veh		9.5	12.2		22.5			
Approach LOS		A	B		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.7		17.1	12.9	27.7		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		12.2		11.8	8.8	7.1		
Green Ext Time (p_c), s		15.3		0.6	0.2	15.7		
Intersection Summary								
HCM 2010 Ctrl Delay			12.3					
HCM 2010 LOS			B					
Notes								

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

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	550	120	40	470	350	60	170	10	10	10	30
Future Volume (veh/h)	390	550	120	40	470	350	60	170	10	10	10	30
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	402	567	110	41	485	229	62	175	6	10	10	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	456	1650	319	145	895	420	133	251	8	302	343	292
Arrive On Green	0.25	0.55	0.55	0.08	0.38	0.38	0.18	0.18	0.18	0.18	0.18	0.00
Sat Flow, veh/h	1792	2988	578	1792	2362	1109	339	1377	43	1209	1881	1599
Grp Volume(v), veh/h	402	338	339	41	366	348	243	0	0	10	10	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1779	1792	1787	1684	1760	0	0	1209	1881	1599
Q Serve(g_s), s	13.8	6.7	6.7	1.4	10.2	10.3	5.6	0.0	0.0	0.0	0.3	0.0
Cycle Q Clear(g_c), s	13.8	6.7	6.7	1.4	10.2	10.3	8.3	0.0	0.0	0.5	0.3	0.0
Prop In Lane	1.00		0.32	1.00		0.66	0.26		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	456	987	982	145	677	638	392	0	0	302	343	292
V/C Ratio(X)	0.88	0.34	0.34	0.28	0.54	0.55	0.62	0.00	0.00	0.03	0.03	0.00
Avail Cap(c_a), veh/h	812	987	982	448	978	921	1048	0	0	460	588	500
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.9	7.9	7.9	27.7	15.5	15.6	24.7	0.0	0.0	21.6	21.5	0.0
Incr Delay (d2), s/veh	2.3	0.3	0.3	0.4	1.0	1.0	0.6	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	7.1	3.4	3.4	0.7	5.2	4.9	4.1	0.0	0.0	0.1	0.1	0.0
LnGrp Delay(d),s/veh	25.2	8.2	8.2	28.1	16.5	16.6	25.3	0.0	0.0	21.6	21.5	0.0
LnGrp LOS	C	A	A	C	B	B	C			C	C	
Approach Vol, veh/h	1079			755			243			20		
Approach Delay, s/veh	14.5			17.2			25.3			21.6		
Approach LOS	B			B			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	39.7		15.4	20.0	28.6		15.4				
Change Period (Y+Rc), s	3.7	4.4		3.7	3.7	4.4		3.7				
Max Green Setting (Gmax), s	10.0	35.0		20.0	29.0	35.0		36.0				
Max Q Clear Time (g_c+1.5), s	13.4	8.7		2.5	15.8	12.3		10.3				
Green Ext Time (p_c), s	0.0	13.3		0.9	0.5	11.9		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay	16.8											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	380	120	70	450	280	270	300	140	250	190	160
Future Volume (veh/h)	90	380	120	70	450	280	270	300	140	250	190	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	98	413	59	76	489	238	293	326	113	272	207	38
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	186	608	516	175	740	358	325	549	186	304	375	318
Arrive On Green	0.10	0.32	0.32	0.10	0.32	0.32	0.18	0.21	0.21	0.17	0.20	0.20
Sat Flow, veh/h	1792	1881	1597	1792	2334	1130	1792	2599	883	1792	1881	1592
Grp Volume(v), veh/h	98	413	59	76	374	353	293	222	217	272	207	38
Grp Sat Flow(s),veh/h/ln	1792	1881	1597	1792	1787	1677	1792	1787	1695	1792	1881	1592
Q Serve(g_s), s	5.1	18.7	2.6	3.9	17.8	17.9	15.8	11.0	11.4	14.6	9.7	1.9
Cycle Q Clear(g_c), s	5.1	18.7	2.6	3.9	17.8	17.9	15.8	11.0	11.4	14.6	9.7	1.9
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	186	608	516	175	567	532	325	377	358	304	375	318
V/C Ratio(X)	0.53	0.68	0.11	0.43	0.66	0.66	0.90	0.59	0.61	0.89	0.55	0.12
Avail Cap(c_a), veh/h	455	859	729	455	816	766	546	816	774	546	859	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	28.9	23.4	41.9	29.0	29.1	39.5	35.0	35.2	40.0	35.5	32.3
Incr Delay (d2), s/veh	0.9	1.9	0.1	0.6	1.9	2.0	6.6	2.1	2.4	3.7	1.8	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	2.6	10.1	1.1	2.0	9.0	8.5	8.4	5.6	5.6	7.6	5.2	0.9
LnGrp Delay(d),s/veh	42.7	30.8	23.5	42.5	30.9	31.1	46.0	37.1	37.5	43.7	37.3	32.6
LnGrp LOS	D	C	C	D	C	C	D	D	D	D	D	C
Approach Vol, veh/h		570			803			732			517	
Approach Delay, s/veh		32.1			32.1			40.8			40.3	
Approach LOS		C			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.1	37.4	22.4	24.7	14.7	36.7	21.2	25.8				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+1.5), s	15.9	20.7	17.8	11.7	7.1	19.9	16.6	13.4				
Green Ext Time (p_c), s	0.0	10.8	0.1	6.3	0.0	11.0	0.1	6.2				
Intersection Summary												
HCM 2010 Ctrl Delay			36.1									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	230	240	60	240	40	190	1200	50	70	590	180
Future Volume (veh/h)	250	230	240	60	240	40	190	1200	50	70	590	180
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	258	237	63	62	247	30	196	1237	49	72	608	142
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	261	732	190	117	578	69	216	1495	59	136	1098	256
Arrive On Green	0.15	0.26	0.26	0.07	0.18	0.18	0.12	0.43	0.43	0.08	0.38	0.38
Sat Flow, veh/h	1792	2805	730	1792	3198	383	1792	3503	139	1792	2875	670
Grp Volume(v), veh/h	258	149	151	62	137	140	196	631	655	72	377	373
Grp Sat Flow(s),veh/h/ln	1792	1787	1747	1792	1787	1794	1792	1787	1855	1792	1787	1758
Q Serve(g_s), s	17.2	8.1	8.4	4.0	8.1	8.3	13.0	37.5	37.6	4.6	19.9	19.9
Cycle Q Clear(g_c), s	17.2	8.1	8.4	4.0	8.1	8.3	13.0	37.5	37.6	4.6	19.9	19.9
Prop In Lane	1.00		0.42	1.00		0.21	1.00		0.07	1.00		0.38
Lane Grp Cap(c), veh/h	261	466	456	117	323	324	216	763	792	136	682	671
V/C Ratio(X)	0.99	0.32	0.33	0.53	0.42	0.43	0.91	0.83	0.83	0.53	0.55	0.56
Avail Cap(c_a), veh/h	261	581	568	157	477	478	216	763	792	157	682	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	51.1	35.7	35.9	54.3	43.6	43.7	52.1	30.5	30.5	53.4	29.1	29.1
Incr Delay (d2), s/veh	51.9	0.6	0.6	1.4	1.3	1.3	35.7	10.0	9.7	1.0	2.7	2.8
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	12.3	4.0	4.1	2.0	4.1	4.3	8.6	20.5	21.3	2.3	10.3	10.1
LnGrp Delay(d),s/veh	103.1	36.3	36.5	55.6	44.9	45.0	87.8	40.4	40.2	54.4	31.8	31.9
LnGrp LOS	F	D	D	E	D	D	F	D	D	D	C	C
Approach Vol, veh/h	558					339		1482		822		
Approach Delay, s/veh	67.2					46.9		46.6		33.8		
Approach LOS	E					D		D		C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	27.7	13.6	56.7	12.4	37.3	19.0	51.3				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	17.5	32.0	10.5	39.5	10.5	39.0	14.5	35.5				
Max Q Clear Time (g_c+1.9), s	19.2	10.3	6.6	39.6	6.0	10.4	15.0	21.9				
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.0	4.9	0.0	11.4				
Intersection Summary												
HCM 2010 Ctrl Delay			46.9									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	0	40	0	0	0	30	1470	0	20	1000	30
Future Volume (veh/h)	50	0	40	0	0	0	30	1470	0	20	1000	30
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	1881				1881	1881	0	1881	1881	1881
Adj Flow Rate, veh/h	53	0	33				32	1564	0	21	1064	32
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	0	1				1	1	0	1	1	1
Cap, veh/h	153	0	136				80	2484	0	67	2458	1077
Arrive On Green	0.09	0.00	0.09				0.04	0.70	0.00	0.04	0.69	0.69
Sat Flow, veh/h	1792	0	1599				1792	3668	0	1792	3574	1566
Grp Volume(v), veh/h	53	0	33				32	1564	0	21	1064	32
Grp Sat Flow(s),veh/h/ln	1792	0	1599				1792	1787	0	1792	1787	1566
Q Serve(g_s), s	2.2	0.0	1.5				1.4	19.0	0.0	0.9	10.6	0.5
Cycle Q Clear(g_c), s	2.2	0.0	1.5				1.4	19.0	0.0	0.9	10.6	0.5
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	0	136				80	2484	0	67	2458	1077
V/C Ratio(X)	0.35	0.00	0.24				0.40	0.63	0.00	0.31	0.43	0.03
Avail Cap(c_a), veh/h	627	0	560				213	2484	0	213	2458	1077
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.09	0.09	0.00	0.72	0.72	0.72
Uniform Delay (d), s/veh	34.5	0.0	34.2				37.2	6.6	0.0	37.5	5.6	4.0
Incr Delay (d2), s/veh	0.5	0.0	0.3				0.1	0.1	0.0	0.7	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.7				0.7	9.2	0.0	0.5	5.3	0.2
LnGrp Delay(d),s/veh	35.0	0.0	34.5				37.3	6.7	0.0	38.2	6.0	4.0
LnGrp LOS	C		C				D	A		D	A	A
Approach Vol, veh/h		86						1596			1117	
Approach Delay, s/veh		34.8						7.3			6.5	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.1	60.5			7.5	61.1		11.4				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	9.5	27.5			9.5	27.5		28.0				
Max Q Clear Time (g_c+1/4), s	13.4	12.6			2.9	21.0		4.2				
Green Ext Time (p_c), s	0.0	14.0			0.0	6.3		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			7.9									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	  	  		  	 		  	 		  	 	
Traffic Volume (veh/h)	310	1250	140	240	950	290	180	1200	620	240	480	190
Future Volume (veh/h)	310	1250	140	240	950	290	180	1200	620	240	480	190
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	320	1289	0	247	979	211	186	1237	0	247	495	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	369	2048	638	296	1350	593	236	951	425	296	1013	453
Arrive On Green	0.11	0.40	0.00	0.09	0.38	0.38	0.07	0.27	0.00	0.09	0.29	0.00
Sat Flow, veh/h	3442	5085	1583	3442	3539	1555	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	320	1289	0	247	979	211	186	1237	0	247	495	0
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1555	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	12.3	27.2	0.0	9.5	31.7	13.0	7.1	36.0	0.0	9.5	15.6	0.0
Cycle Q Clear(g_c), s	12.3	27.2	0.0	9.5	31.7	13.0	7.1	36.0	0.0	9.5	15.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	369	2048	638	296	1350	593	236	951	425	296	1013	453
V/C Ratio(X)	0.87	0.63	0.00	0.84	0.73	0.36	0.79	1.30	0.00	0.84	0.49	0.00
Avail Cap(c_a), veh/h	501	2048	638	347	1350	593	347	951	425	347	1013	453
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	58.9	32.0	0.0	60.3	35.4	29.7	61.5	49.0	0.0	60.3	39.7	0.0
Incr Delay (d2), s/veh	9.2	1.5	0.0	12.5	3.4	1.7	4.0	143.2	0.0	12.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	12.9	0.0	5.0	16.1	5.8	3.5	36.5	0.0	5.0	7.7	0.0
LnGrp Delay(d),s/veh	68.0	33.5	0.0	72.8	38.9	31.3	65.5	192.2	0.0	72.8	40.2	0.0
LnGrp LOS	E	C		E	D	C	E	F		E	D	
Approach Vol, veh/h	1609				1437				1423		742	
Approach Delay, s/veh	40.4				43.6				175.6		51.1	
Approach LOS	D				D				F		D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	60.0	13.7	44.3	18.9	57.1	16.0	42.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	13.5	50.0	13.5	36.0	19.5	44.0	13.5	36.0				
Max Q Clear Time (g_c+1), s	11.5	29.2	9.1	17.6	14.3	33.7	11.5	38.0				
Green Ext Time (p_c), s	0.0	18.1	0.0	13.6	0.1	9.5	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	79.7											
HCM 2010 LOS	E											

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	480	1670	180	170	920	230	270	820	470	380	550	290
Future Volume (veh/h)	480	1670	180	170	920	230	270	820	470	380	550	290
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	495	1722	176	175	948	218	278	845	417	392	567	109
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	527	1978	202	256	982	225	326	806	842	424	906	404
Arrive On Green	0.15	0.42	0.42	0.07	0.34	0.34	0.09	0.23	0.23	0.12	0.26	0.26
Sat Flow, veh/h	3442	4691	478	3442	2859	657	3442	3539	2787	3442	3539	1578
Grp Volume(v), veh/h	495	1243	655	175	586	580	278	845	417	392	567	109
Grp Sat Flow(s),veh/h/ln	1721	1695	1778	1721	1770	1746	1721	1770	1393	1721	1770	1578
Q Serve(g_s), s	19.1	44.9	45.2	6.6	43.6	43.7	10.7	30.5	16.5	15.1	19.0	7.4
Cycle Q Clear(g_c), s	19.1	44.9	45.2	6.6	43.6	43.7	10.7	30.5	16.5	15.1	19.0	7.4
Prop In Lane	1.00		0.27	1.00		0.38	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	527	1430	750	256	607	599	326	806	842	424	906	404
V/C Ratio(X)	0.94	0.87	0.87	0.68	0.96	0.97	0.85	1.05	0.50	0.92	0.63	0.27
Avail Cap(c_a), veh/h	527	1430	750	295	607	599	372	806	842	424	906	404
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	0.82	0.82	0.82	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	56.1	35.4	35.5	60.5	43.2	43.3	59.7	51.8	38.4	58.1	44.2	39.8
Incr Delay (d2), s/veh	24.9	7.4	13.4	3.0	25.5	26.1	14.0	45.3	0.6	24.4	1.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	22.4	25.0	3.3	25.6	25.4	5.7	19.9	6.4	8.6	9.5	3.3
LnGrp Delay(d),s/veh	81.0	42.8	48.8	63.5	68.7	69.4	73.7	97.1	39.0	82.5	45.6	40.3
LnGrp LOS	F	D	D	E	E	E	E	F	D	F	D	D
Approach Vol, veh/h	2393				1341		1540				1068	
Approach Delay, s/veh	52.4				68.3		77.1				58.6	
Approach LOS	D				E		E				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	52.0	17.2	39.8	14.5	62.5	21.0	36.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	20.5	46.0	14.5	32.5	11.5	55.0	16.5	30.5				
Max Q Clear Time (g_c+1), s	21.5	45.7	12.7	21.0	8.6	47.2	17.1	32.5				
Green Ext Time (p_c), s	0.0	0.3	0.0	9.3	0.0	7.6	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			62.8									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↱	↱	↱	↑↑	↱↱	↱		
Traffic Volume (veh/h)	1370	1160	30	680	640	50		
Future Volume (veh/h)	1370	1160	30	680	640	50		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1803	836	31	701	660	0		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1979	1176	299	2593	727	334		
Arrive On Green	0.53	0.53	0.34	1.00	0.21	0.00		
Sat Flow, veh/h	3725	1583	1774	3632	3442	1583		
Grp Volume(v), veh/h	1803	836	31	701	660	0		
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1770	1721	1583		
Q Serve(g_s), s	57.1	1.8	1.6	0.0	24.3	0.0		
Cycle Q Clear(g_c), s	57.1	1.8	1.6	0.0	24.3	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1979	1176	299	2593	727	334		
V/C Ratio(X)	0.91	0.71	0.10	0.27	0.91	0.00		
Avail Cap(c_a), veh/h	2141	1244	299	2593	847	390		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.43	0.43	0.95	0.95	1.00	0.00		
Uniform Delay (d), s/veh	27.7	5.6	36.4	0.0	50.0	0.0		
Incr Delay (d2), s/veh	3.7	1.6	0.1	0.2	11.9	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	30.3	30.9	0.8	0.1	12.8	0.0		
LnGrp Delay(d),s/veh	31.4	7.2	36.4	0.2	62.0	0.0		
LnGrp LOS	C	A	D	A	E			
Approach Vol, veh/h	2639			732	660			
Approach Delay, s/veh	23.7			1.8	62.0			
Approach LOS	C			A	E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		99.5		30.5	26.2	73.4		
Change Period (Y+Rc), s		4.3		3.0	4.3	* 4.3		
Max Green Setting (Gmax), s		90.7		32.0	13.0	* 75		
Max Q Clear Time (g_c+I1), s		2.0		26.3	3.6	59.1		
Green Ext Time (p_c), s		3.0		1.1	2.1	9.9		
Intersection Summary								
HCM 2010 Ctrl Delay			26.0					
HCM 2010 LOS			C					
Notes								

Irvington BART 5:00 pm 09/26/2017 2040 Plus Project PM

Synchro 9 Report
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User approved volume balancing among the lanes for turning movement.

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

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	620	680	190	460	20	210	10	40	10	30	40
Future Volume (veh/h)	110	620	680	190	460	20	210	10	40	10	30	40
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	118	667	0	204	495	18	226	11	0	11	32	3
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	150	1737	777	246	1895	69	341	185	157	62	65	55
Arrive On Green	0.11	0.65	0.00	0.14	0.54	0.54	0.10	0.10	0.00	0.03	0.03	0.03
Sat Flow, veh/h	1774	3539	1583	1774	3481	126	3442	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	118	667	0	204	251	262	226	11	0	11	32	3
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1837	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.2	5.7	0.0	7.3	4.9	4.9	4.1	0.3	0.0	0.4	1.1	0.1
Cycle Q Clear(g_c), s	4.2	5.7	0.0	7.3	4.9	4.9	4.1	0.3	0.0	0.4	1.1	0.1
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	150	1737	777	246	964	1000	341	185	157	62	65	55
V/C Ratio(X)	0.78	0.38	0.00	0.83	0.26	0.26	0.66	0.06	0.00	0.18	0.49	0.05
Avail Cap(c_a), veh/h	273	1737	777	246	964	1000	847	459	390	191	201	171
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.50	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	6.7	0.0	27.3	7.9	7.9	28.2	26.5	0.0	30.5	30.8	30.3
Incr Delay (d2), s/veh	1.7	0.3	0.0	19.6	0.7	0.6	1.6	0.1	0.0	0.5	2.2	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	2.1	2.8	0.0	4.9	2.5	2.6	2.0	0.2	0.0	0.2	0.6	0.1
LnGrp Delay(d),s/veh	30.0	7.1	0.0	46.9	8.5	8.5	29.9	26.6	0.0	31.0	33.0	30.5
LnGrp LOS	C	A		D	A	A	C	C		C	C	C
Approach Vol, veh/h	785			717			237			46		
Approach Delay, s/veh	10.5			19.4			29.7			32.3		
Approach LOS	B			B			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	39.7		6.2	12.0	36.2		10.6				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	10.0	16.6		7.0	9.0	17.6		16.0				
Max Q Clear Time (g_c+10.0), s	10.0	6.9		3.1	9.3	7.7		6.1				
Green Ext Time (p_c), s	0.0	6.1		0.0	0.0	6.2		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay	17.2											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	460	420	100	320	60	630	1070	270	100	530	210
Future Volume (veh/h)	190	460	420	100	320	60	630	1070	270	100	530	210
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	194	469	166	102	327	18	643	1092	260	102	541	109
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	587	488	276	507	431	629	1085	257	129	965	427
Arrive On Green	0.12	0.31	0.31	0.08	0.27	0.27	0.18	0.38	0.38	0.07	0.27	0.27
Sat Flow, veh/h	1774	1863	1549	3442	1863	1583	3442	2835	671	1774	3539	1564
Grp Volume(v), veh/h	194	469	166	102	327	18	643	679	673	102	541	109
Grp Sat Flow(s),veh/h/ln	1774	1863	1549	1721	1863	1583	1721	1770	1736	1774	1770	1564
Q Serve(g_s), s	14.4	30.9	11.0	3.8	20.8	1.1	24.5	51.3	51.3	7.6	17.6	7.3
Cycle Q Clear(g_c), s	14.4	30.9	11.0	3.8	20.8	1.1	24.5	51.3	51.3	7.6	17.6	7.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	218	587	488	276	507	431	629	677	664	129	965	427
V/C Ratio(X)	0.89	0.80	0.34	0.37	0.64	0.04	1.02	1.00	1.01	0.79	0.56	0.26
Avail Cap(c_a), veh/h	285	619	514	347	507	431	629	677	664	139	965	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.9	42.0	35.2	58.4	43.0	35.9	54.8	41.4	41.4	61.1	41.8	38.1
Incr Delay (d2), s/veh	19.8	7.5	0.6	0.3	6.2	0.2	41.5	35.3	38.3	21.5	2.4	1.4
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	8.3	17.1	4.8	1.8	11.6	0.5	15.3	31.6	31.6	4.5	8.9	3.3
LnGrp Delay(d),s/veh	77.7	49.5	35.8	58.7	49.2	36.1	96.3	76.7	79.6	82.6	44.2	39.5
LnGrp LOS	E	D	D	E	D	D	F	F	F	F	D	D
Approach Vol, veh/h		829			447			1995			752	
Approach Delay, s/veh		53.4			50.9			84.0			48.7	
Approach LOS		D			D			F			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.3	56.8	15.3	47.7	29.0	42.0	21.0	42.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	10.5	45.5	13.5	44.5	24.5	31.5	21.5	36.5				
Max Q Clear Time (g_c+1.6), s	19.6	53.3	5.8	32.9	26.5	19.6	16.4	22.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	5.5	0.0	10.2	0.0	6.2				
Intersection Summary												
HCM 2010 Ctrl Delay			67.4									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

17: Osgood Rd & North BART Access

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	0	20	0	0	0	20	1620	0	0	1030	70
Future Volume (veh/h)	60	0	20	0	0	0	20	1620	0	0	1030	70
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.70				1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900				1863	1863	0	0	1863	1900
Adj Flow Rate, veh/h	67	0	22				22	1800	0	0	1144	78
Adj No. of Lanes	1	1	0				1	2	0	0	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				2	2	0	0	2	2
Cap, veh/h	99	0	62				42	2988	0	0	2587	176
Arrive On Green	0.06	0.00	0.06				0.02	0.84	0.00	0.00	0.77	0.77
Sat Flow, veh/h	1774	0	1112				1774	3632	0	0	3450	229
Grp Volume(v), veh/h	67	0	22				22	1800	0	0	603	619
Grp Sat Flow(s),veh/h/ln	1774	0	1112				1774	1770	0	0	1770	1816
Q Serve(g_s), s	3.3	0.0	1.7				1.1	14.5	0.0	0.0	10.7	10.7
Cycle Q Clear(g_c), s	3.3	0.0	1.7				1.1	14.5	0.0	0.0	10.7	10.7
Prop In Lane	1.00		1.00				1.00		0.00	0.00		0.13
Lane Grp Cap(c), veh/h	99	0	62				42	2988	0	0	1364	1399
V/C Ratio(X)	0.68	0.00	0.35				0.53	0.60	0.00	0.00	0.44	0.44
Avail Cap(c_a), veh/h	609	0	382				365	2988	0	0	1364	1399
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.80	0.80	0.00	0.00	0.72	0.72
Uniform Delay (d), s/veh	41.7	0.0	40.9				43.4	2.2	0.0	0.0	3.6	3.6
Incr Delay (d2), s/veh	7.8	0.0	3.4				8.0	0.7	0.0	0.0	0.8	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
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.6				0.6	7.1	0.0	0.0	5.3	5.4
LnGrp Delay(d),s/veh	49.5	0.0	44.3				51.4	2.9	0.0	0.0	4.3	4.3
LnGrp LOS	D		D				D	A			A	A
Approach Vol, veh/h		89						1822			1222	
Approach Delay, s/veh		48.2						3.5			4.3	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		80.5		9.5	6.6	73.9						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		50.1		30.9	18.5	27.1						
Max Q Clear Time (g_c+I1), s		16.5		5.3	3.1	12.7						
Green Ext Time (p_c), s		28.1		0.3	0.0	13.2						
Intersection Summary												
HCM 2010 Ctrl Delay			5.1									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1500	100	0	1400	0	80
Future Vol, veh/h	1500	100	0	1400	0	80
Conflicting Peds, #/hr	0	10	0	0	0	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1667	111	0	1556	0	89

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 854
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.32
Pot Cap-1 Maneuver	-	-	0 - 0 302
Stage 1	-	-	0 - 0
Stage 2	-	-	0 - 0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 296
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	22.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	296	-	-	-
HCM Lane V/C Ratio	0.3	-	-	-
HCM Control Delay (s)	22.3	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.2	-	-	-

Intersection

Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	40	0	0	0	140	10	0	0	20	0
Future Vol, veh/h	0	0	40	0	0	0	140	10	0	0	20	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	44	0	0	0	156	11	0	0	22	0
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	6.9	0	8.3	7.3
HCM LOS	A	-	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	0%	0%	0%
Vol Thru, %	7%	0%	100%	100%
Vol Right, %	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	40	0	20
LT Vol	140	0	0	0
Through Vol	10	0	0	20
RT Vol	0	40	0	0
Lane Flow Rate	167	44	0	22
Geometry Grp	1	1	1	1
Degree of Util (X)	0.195	0.046	0	0.026
Departure Headway (Hd)	4.217	3.76	4.406	4.139
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	853	958	0	859
Service Time	2.234	1.76	2.407	2.191
HCM Lane V/C Ratio	0.196	0.046	0	0.026
HCM Control Delay	8.3	6.9	7.4	7.3
HCM Lane LOS	A	A	N	A
HCM 95th-tile Q	0.7	0.1	0	0.1

HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	510	500	170	680	240	260	370	80	170	670	270
Future Volume (veh/h)	250	510	500	170	680	240	260	370	80	170	670	270
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	278	567	0	189	756	0	289	411	0	189	744	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	1111	0	227	1053	0	273	1014	0	227	921	0
Arrive On Green	0.14	0.31	0.00	0.13	0.29	0.00	0.15	0.28	0.00	0.13	0.26	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	278	567	0	189	756	0	289	411	0	189	744	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	15.0	13.6	0.0	10.8	19.9	0.0	16.0	9.8	0.0	10.8	20.5	0.0
Cycle Q Clear(g_c), s	15.0	13.6	0.0	10.8	19.9	0.0	16.0	9.8	0.0	10.8	20.5	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	256	1111	0	227	1053	0	273	1014	0	227	921	0
V/C Ratio(X)	1.09	0.51	0.00	0.83	0.72	0.00	1.06	0.41	0.00	0.83	0.81	0.00
Avail Cap(c_a), veh/h	256	1111	0	256	1053	0	273	1014	0	273	987	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.0	29.6	0.0	44.8	33.1	0.0	44.5	30.4	0.0	44.8	36.5	0.0
Incr Delay (d2), s/veh	81.1	1.7	0.0	16.9	4.2	0.0	70.8	0.4	0.0	14.5	5.1	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	13.2	7.0	0.0	6.4	10.4	0.0	13.3	4.8	0.0	6.3	10.8	0.0
LnGrp Delay(d),s/veh	126.1	31.3	0.0	61.7	37.3	0.0	115.3	30.8	0.0	59.2	41.6	0.0
LnGrp LOS	F	C		E	D		F	C		E	D	
Approach Vol, veh/h		845			945			700			933	
Approach Delay, s/veh		62.5			42.2			65.7			45.2	
Approach LOS		E			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.3	36.7	17.3	33.8	19.0	34.9	20.0	31.1				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	14.5	28.0	15.5	27.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	12.8	15.6	12.8	11.8	17.0	21.9	18.0	22.5				
Green Ext Time (p_c), s	0.0	8.2	0.0	8.6	0.0	4.6	0.0	3.1				
Intersection Summary												
HCM 2010 Ctrl Delay				52.8								
HCM 2010 LOS				D								
Notes												

User approved ignoring U-Turning movement.

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

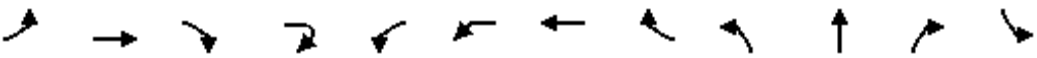
03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	1260	400	230	850	100	250	370	190	160	530	220
Future Volume (veh/h)	100	1260	400	230	850	100	250	370	190	160	530	220
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	103	1299	278	237	876	97	258	381	155	165	546	120
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	130	1659	731	292	1541	171	317	551	221	176	819	360
Arrive On Green	0.07	0.47	0.47	0.03	0.16	0.16	0.09	0.23	0.22	0.10	0.23	0.23
Sat Flow, veh/h	1757	3505	1543	3408	3178	352	3408	2433	975	1757	3505	1543
Grp Volume(v), veh/h	103	1299	278	237	483	490	258	273	263	165	546	120
Grp Sat Flow(s),veh/h/ln	1757	1752	1543	1704	1752	1777	1704	1752	1655	1757	1752	1543
Q Serve(g_s), s	8.1	43.4	16.2	9.7	35.7	35.7	10.4	20.0	20.5	13.1	19.8	9.0
Cycle Q Clear(g_c), s	8.1	43.4	16.2	9.7	35.7	35.7	10.4	20.0	20.5	13.1	19.8	9.0
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.59	1.00		1.00
Lane Grp Cap(c), veh/h	130	1659	731	292	850	862	317	397	375	176	819	360
V/C Ratio(X)	0.79	0.78	0.38	0.81	0.57	0.57	0.81	0.69	0.70	0.94	0.67	0.33
Avail Cap(c_a), veh/h	151	1659	731	292	850	862	536	501	473	176	819	360
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.84	0.84	0.84	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.7	30.8	23.7	66.9	45.3	45.3	62.3	49.6	50.2	62.6	48.7	44.6
Incr Delay (d2), s/veh	18.2	3.8	1.5	12.7	2.3	2.3	1.9	3.6	4.2	49.8	2.3	0.8
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	4.6	21.8	7.2	5.1	17.9	18.1	5.0	10.1	9.8	8.8	9.8	3.9
LnGrp Delay(d),s/veh	81.9	34.6	25.2	79.6	47.6	47.6	64.2	53.2	54.4	112.4	51.0	45.3
LnGrp LOS	F	C	C	E	D	D	E	D	D	F	D	D
Approach Vol, veh/h	1680			1210			794			831		
Approach Delay, s/veh	36.0			53.9			57.2			62.4		
Approach LOS	D			D			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	70.3	17.0	36.7	14.4	71.9	18.0	35.7				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	11.5	56.0	21.5	30.5	11.5	56.0	13.5	38.5				
Max Q Clear Time (g_c+1), s	11.7	45.4	12.4	21.8	10.1	37.7	15.1	22.5				
Green Ext Time (p_c), s	0.0	9.9	0.1	5.5	0.0	16.5	0.0	7.7				
Intersection Summary												
HCM 2010 Ctrl Delay	49.4											
HCM 2010 LOS	D											

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	20	1050	510	10	500	60	880	10	280	50	410	40
Future Volume (vph)	20	1050	510	10	500	60	880	10	280	50	410	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (prot)	1752	3505	1568		1595	1665	3498		1665	1692	1540	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.97	1.00	
Satd. Flow (perm)	1752	3505	1568		1595	1665	3498		1665	1692	1540	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	1167	567	11	556	67	978	11	311	56	456	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	355	0
Lane Group Flow (vph)	22	1167	578	0	322	301	989	0	174	193	101	0
Confl. Peds. (#/hr)	6		4			4		6	16		4	4
Confl. Bikes (#/hr)			4								1	
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	5.4	34.9	69.9		42.4	42.4	71.9		29.5	29.5	29.5	
Effective Green, g (s)	5.9	36.4	71.4		42.9	42.9	73.4		31.0	31.0	31.0	
Actuated g/C Ratio	0.04	0.26	0.51		0.31	0.31	0.52		0.22	0.22	0.22	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	73	911	799		488	510	1833		368	374	341	
v/s Ratio Prot	0.01	c0.33	c0.37		c0.20	0.18	0.28		0.10	0.11		
v/s Ratio Perm											0.07	
v/c Ratio	0.30	1.28	0.72		0.66	0.59	0.54		0.47	0.52	0.30	
Uniform Delay, d1	65.1	51.8	26.6		42.2	41.1	22.1		47.4	47.9	45.4	
Progression Factor	0.96	0.88	0.53		1.33	1.34	0.36		0.38	0.38	1.56	
Incremental Delay, d2	0.6	132.1	2.3		1.7	0.8	0.8		1.2	1.4	0.6	
Delay (s)	63.2	177.6	16.3		57.8	55.8	8.8		19.1	19.8	71.4	
Level of Service	E	F	B		E	E	A		B	B	E	
Approach Delay (s)		123.4					27.3			48.2		
Approach LOS		F					C			D		
Intersection Summary												
HCM 2000 Control Delay			71.4				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			84.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR	SBR2
Lane Configurations	←→		
Traffic Volume (vph)	110	10	30
Future Volume (vph)	110	10	30
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0		
Lane Util. Factor	0.95		
Frpb, ped/bikes	0.99		
Flpb, ped/bikes	1.00		
Frt	0.97		
Flt Protected	0.99		
Satd. Flow (prot)	3320		
Flt Permitted	0.99		
Satd. Flow (perm)	3320		
Peak-hour factor, PHF	0.90	0.90	0.90
Adj. Flow (vph)	122	11	33
RTOR Reduction (vph)	13	0	0
Lane Group Flow (vph)	197	0	0
Confl. Peds. (#/hr)		16	
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	3%	3%	3%
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	12.7		
Effective Green, g (s)	13.7		
Actuated g/C Ratio	0.10		
Clearance Time (s)	5.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	324		
v/s Ratio Prot	c0.06		
v/s Ratio Perm			
v/c Ratio	0.61		
Uniform Delay, d1	60.6		
Progression Factor	1.00		
Incremental Delay, d2	2.2		
Delay (s)	62.8		
Level of Service	E		
Approach Delay (s)	62.8		
Approach LOS	E		
Intersection Summary			

HCM 2010 Signalized Intersection Summary

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1390	50	230	1330	50	60	50	330	60	70	70
Future Volume (veh/h)	20	1390	50	230	1330	50	60	50	330	60	70	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	22	1544	54	256	1478	54	67	56	367	67	78	75
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	249	1590	55	269	1627	59	85	49	324	80	199	191
Arrive On Green	0.19	0.61	0.59	0.30	0.94	0.91	0.05	0.23	0.23	0.04	0.23	0.23
Sat Flow, veh/h	1774	3486	122	1774	3479	127	1774	211	1385	1774	862	829
Grp Volume(v), veh/h	22	782	816	256	750	782	67	0	423	67	0	153
Grp Sat Flow(s),veh/h/ln	1774	1770	1838	1774	1770	1836	1774	0	1597	1774	0	1691
Q Serve(g_s), s	1.4	59.0	59.8	19.8	25.2	26.4	5.2	0.0	32.7	5.2	0.0	10.7
Cycle Q Clear(g_c), s	1.4	59.0	59.8	19.8	25.2	26.4	5.2	0.0	32.7	5.2	0.0	10.7
Prop In Lane	1.00		0.07	1.00		0.07	1.00		0.87	1.00		0.49
Lane Grp Cap(c), veh/h	249	807	838	269	828	859	85	0	373	80	0	390
V/C Ratio(X)	0.09	0.97	0.97	0.95	0.91	0.91	0.79	0.00	1.13	0.84	0.00	0.39
Avail Cap(c_a), veh/h	249	808	839	269	981	1018	85	0	373	80	0	390
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.5	26.6	26.8	48.2	3.2	3.3	66.0	0.0	53.9	66.3	0.0	45.7
Incr Delay (d2), s/veh	0.0	4.7	5.1	41.1	15.4	15.4	37.9	0.0	88.3	51.5	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	0.7	29.4	31.1	12.7	13.5	14.5	3.5	0.0	23.5	3.7	0.0	5.0
LnGrp Delay(d),s/veh	49.5	31.2	31.9	89.3	18.6	18.8	103.9	0.0	142.2	117.8	0.0	45.9
LnGrp LOS	D	C	C	F	B	B	F		F	F		D
Approach Vol, veh/h	1620			1788			490			220		
Approach Delay, s/veh	31.8			28.8			137.0			67.8		
Approach LOS	C			C			F			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.3	67.8	10.6	36.3	29.4	63.7	10.2	36.7				
Change Period (Y+Rc), s	4.5	5.5	4.5	4.6	4.5	5.5	4.5	4.6				
Max Green Setting (Gmax), s	20.7	62.4	6.1	31.7	7.0	76.1	5.7	32.1				
Max Q Clear Time (g_c+1), s	21.8	61.8	7.2	12.7	3.4	28.4	7.2	34.7				
Green Ext Time (p_c), s	0.0	0.5	0.0	2.7	0.1	24.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	44.9											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1190	350	430	970	120	320	300	160	180	940	250
Future Volume (veh/h)	110	1190	350	430	970	120	320	300	160	180	940	250
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	117	1266	210	457	1032	45	340	319	87	191	1000	72
Adj No. of Lanes	1	2	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	525	1470	649	405	1207	533	344	1049	842	307	986	439
Arrive On Green	0.59	0.83	0.83	0.23	0.34	0.34	0.10	0.30	0.30	0.09	0.28	0.28
Sat Flow, veh/h	1774	3539	1562	1774	3539	1563	3442	3539	1582	3442	3539	1575
Grp Volume(v), veh/h	117	1266	210	457	1032	45	340	319	87	191	1000	72
Grp Sat Flow(s),veh/h/ln	1774	1770	1562	1774	1770	1563	1721	1770	1582	1721	1770	1575
Q Serve(g_s), s	4.3	29.8	4.0	32.0	38.0	2.6	13.8	9.8	3.8	7.5	39.0	4.8
Cycle Q Clear(g_c), s	4.3	29.8	4.0	32.0	38.0	2.6	13.8	9.8	3.8	7.5	39.0	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	525	1470	649	405	1207	533	344	1049	842	307	986	439
V/C Ratio(X)	0.22	0.86	0.32	1.13	0.86	0.08	0.99	0.30	0.10	0.62	1.01	0.16
Avail Cap(c_a), veh/h	525	1470	649	405	1315	581	344	1049	842	320	986	439
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	9.5	6.3	54.0	42.9	29.1	62.9	38.1	16.2	61.5	50.5	38.2
Incr Delay (d2), s/veh	0.3	6.9	1.3	84.0	7.9	0.3	43.7	0.2	0.1	2.5	32.3	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	2.1	15.1	1.9	25.1	19.8	1.2	8.7	4.8	1.7	3.7	23.5	2.1
LnGrp Delay(d),s/veh	21.3	16.3	7.6	138.0	50.8	29.4	106.6	38.3	16.3	63.9	82.8	38.4
LnGrp LOS	C	B	A	F	D	C	F	D	B	E	F	D
Approach Vol, veh/h	1593			1534			746			1263		
Approach Delay, s/veh	15.5			76.1			66.9			77.4		
Approach LOS	B			E			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	36.0	62.1	19.0	43.0	46.4	51.7	16.5	45.5				
Change Period (Y+Rc), s	4.5	5.5	5.5	* 5.5	5.5	* 5.5	4.5	5.5				
Max Green Setting (Gmax), s	31.5	37.5	13.5	* 38	18.5	* 51	12.5	38.5				
Max Q Clear Time (g_c+Q_c), s	34.0	31.8	15.8	41.0	6.3	40.0	9.5	11.8				
Green Ext Time (p_c), s	0.0	4.7	0.0	0.0	9.1	6.3	0.0	2.9				
Intersection Summary												
HCM 2010 Ctrl Delay	56.3											
HCM 2010 LOS	E											
Notes												

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

HCM 2010 TWSC
6: Driveway/Olive Ave & Washington Blvd

03/06/2019

Intersection												
Int Delay, s/veh	57.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	100	1450	0	10	1390	60	0	0	0	40	0	0
Future Vol, veh/h	100	1450	0	10	1390	60	0	0	0	40	0	0
Conflicting Peds, #/hr	0	0	1	1	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	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	90	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	119	1726	0	12	1655	71	0	0	0	48	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1726	0	0	1727	0	0	2817	3715	864	2816	3680	863
Stage 1	-	-	-	-	-	-	1965	1965	-	1715	1715	-
Stage 2	-	-	-	-	-	-	852	1750	-	1101	1965	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	362	-	-	362	-	-	8	4	297	~ 8	5	298
Stage 1	-	-	-	-	-	-	65	107	-	94	144	-
Stage 2	-	-	-	-	-	-	321	138	-	226	107	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	362	-	-	362	-	-	6	3	297	~ 6	3	298
Mov Cap-2 Maneuver	-	-	-	-	-	-	6	3	-	~ 6	3	-
Stage 1	-	-	-	-	-	-	44	72	-	63	139	-
Stage 2	-	-	-	-	-	-	310	133	-	152	72	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.1			0			\$ 4305.5		
HCM LOS							A			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	362	-	-	362	-	-	6
HCM Lane V/C Ratio	-	0.329	-	-	0.033	-	-	7.937
HCM Control Delay (s)	0	19.7	-	-	15.3	-	-	\$ 4305.5
HCM Lane LOS	A	C	-	-	C	-	-	F
HCM 95th %tile Q(veh)	-	1.4	-	-	0.1	-	-	7.6

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

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	470	930	680	290	70	720		
Future Volume (veh/h)	470	930	680	290	70	720		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	522	1033	756	186	78	480		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	461	2084	1013	453	577	515		
Arrive On Green	0.26	0.59	0.29	0.29	0.33	0.33		
Sat Flow, veh/h	1774	3632	3632	1583	1774	1583		
Grp Volume(v), veh/h	522	1033	756	186	78	480		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1774	1583		
Q Serve(g_s), s	24.2	15.8	18.1	8.9	2.9	27.4		
Cycle Q Clear(g_c), s	24.2	15.8	18.1	8.9	2.9	27.4		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	461	2084	1013	453	577	515		
V/C Ratio(X)	1.13	0.50	0.75	0.41	0.14	0.93		
Avail Cap(c_a), veh/h	461	2084	1364	610	604	539		
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	34.5	11.1	30.2	26.9	22.2	30.4		
Incr Delay (d2), s/veh	83.6	0.3	2.0	0.8	0.0	22.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	22.5	7.7	9.1	4.0	1.4	24.0		
LnGrp Delay(d),s/veh	118.1	11.4	32.2	27.7	22.2	52.6		
LnGrp LOS	F	B	C	C	C	D		
Approach Vol, veh/h		1555	942		558			
Approach Delay, s/veh		47.2	31.3		48.4			
Approach LOS		D	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		58.9		34.3	28.2	30.7		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		17.8		29.4	26.2	20.1		
Green Ext Time (p_c), s		13.7		0.3	0.0	5.7		
Intersection Summary								
HCM 2010 Ctrl Delay			42.5					
HCM 2010 LOS			D					
Notes								

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

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	660	370	60	40	560	280	50	30	30	130	30	350
Future Volume (veh/h)	660	370	60	40	560	280	50	30	30	130	30	350
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	733	411	58	44	622	251	56	33	19	144	33	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	666	1980	277	135	831	335	163	90	39	295	260	221
Arrive On Green	0.37	0.63	0.63	0.08	0.33	0.33	0.14	0.14	0.14	0.14	0.14	0.00
Sat Flow, veh/h	1792	3137	439	1792	2482	1001	665	648	280	1360	1881	1599
Grp Volume(v), veh/h	733	233	236	44	448	425	108	0	0	144	33	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1790	1792	1787	1696	1593	0	0	1360	1881	1599
Q Serve(g_s), s	28.7	4.3	4.3	1.8	17.2	17.2	2.8	0.0	0.0	2.3	1.2	0.0
Cycle Q Clear(g_c), s	28.7	4.3	4.3	1.8	17.2	17.2	4.6	0.0	0.0	7.0	1.2	0.0
Prop In Lane	1.00		0.25	1.00		0.59	0.52		0.18	1.00		1.00
Lane Grp Cap(c), veh/h	666	1128	1130	135	598	568	291	0	0	295	260	221
V/C Ratio(X)	1.10	0.21	0.21	0.33	0.75	0.75	0.37	0.00	0.00	0.49	0.13	0.00
Avail Cap(c_a), veh/h	666	1128	1130	364	819	777	792	0	0	454	480	408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.3	6.0	6.1	33.9	22.8	22.9	30.6	0.0	0.0	31.6	29.2	0.0
Incr Delay (d2), s/veh	65.8	0.1	0.1	0.5	3.2	3.4	0.3	0.0	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.2	2.1	2.1	0.9	9.0	8.6	2.2	0.0	0.0	3.0	0.6	0.0
LnGrp Delay(d),s/veh	90.1	6.2	6.2	34.4	26.0	26.3	30.9	0.0	0.0	32.0	29.3	0.0
LnGrp LOS	F	A	A	C	C	C	C			C	C	
Approach Vol, veh/h	1202			917			108			177		
Approach Delay, s/veh	57.4			26.6			30.9			31.5		
Approach LOS	E			C			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	52.8		14.7	32.7	29.9		14.7				
Change Period (Y+Rc), s	3.7	4.4		3.7	3.7	4.4		3.7				
Max Green Setting (Gmax), s	10.0	35.0		20.0	29.0	35.0		36.0				
Max Q Clear Time (g_c+1.3), s	13.8	6.3		9.0	30.7	19.2		6.6				
Green Ext Time (p_c), s	0.0	13.5		0.6	0.0	6.2		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay	42.5											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	340	120	110	390	250	90	380	50	290	280	410
Future Volume (veh/h)	120	340	120	110	390	250	90	380	50	290	280	410
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	133	378	54	122	433	199	100	422	50	322	311	165
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	195	568	472	194	718	327	205	756	89	359	603	504
Arrive On Green	0.11	0.30	0.30	0.11	0.30	0.29	0.11	0.23	0.22	0.20	0.32	0.32
Sat Flow, veh/h	1792	1881	1562	1792	2386	1086	1792	3222	380	1792	1881	1571
Grp Volume(v), veh/h	133	378	54	122	323	309	100	233	239	322	311	165
Grp Sat Flow(s),veh/h/ln	1792	1881	1562	1792	1787	1684	1792	1787	1814	1792	1881	1571
Q Serve(g_s), s	7.4	18.1	2.6	6.7	15.9	16.3	5.4	11.9	12.0	18.1	13.9	8.2
Cycle Q Clear(g_c), s	7.4	18.1	2.6	6.7	15.9	16.3	5.4	11.9	12.0	18.1	13.9	8.2
Prop In Lane	1.00		1.00	1.00		0.64	1.00		0.21	1.00		1.00
Lane Grp Cap(c), veh/h	195	568	472	194	538	507	205	419	426	359	603	504
V/C Ratio(X)	0.68	0.67	0.11	0.63	0.60	0.61	0.49	0.56	0.56	0.90	0.52	0.33
Avail Cap(c_a), veh/h	442	847	703	442	805	758	529	796	808	529	838	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.3	31.5	26.1	44.1	30.8	31.3	42.9	34.8	34.9	40.2	28.6	26.6
Incr Delay (d2), s/veh	1.6	1.9	0.2	1.3	1.5	1.7	0.7	1.6	1.7	10.0	1.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	9.6	1.1	3.4	8.0	7.8	2.7	6.0	6.2	9.9	7.3	3.7
LnGrp Delay(d),s/veh	45.8	33.4	26.2	45.3	32.3	33.0	43.6	36.4	36.6	50.3	29.5	27.2
LnGrp LOS	D	C	C	D	C	C	D	D	D	D	C	C
Approach Vol, veh/h		565			754			572			798	
Approach Delay, s/veh		35.6			34.7			37.7			37.4	
Approach LOS		D			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	35.2	15.8	37.1	15.3	35.1	24.7	28.2				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+1.7), s	19.7	20.1	7.4	15.9	9.4	18.3	20.1	14.0				
Green Ext Time (p_c), s	0.0	9.5	0.0	8.4	0.0	9.8	0.1	8.6				
Intersection Summary												
HCM 2010 Ctrl Delay			36.4									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	250	210	100	230	50	230	590	40	60	1070	240
Future Volume (veh/h)	230	250	210	100	230	50	230	590	40	60	1070	240
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	256	278	114	111	256	40	256	656	40	67	1189	253
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	228	518	207	207	603	92	306	851	52	544	1121	236
Arrive On Green	0.13	0.21	0.20	0.12	0.20	0.18	0.17	0.25	0.24	0.31	0.39	0.38
Sat Flow, veh/h	1774	2457	981	1774	3034	464	1774	3383	206	1774	2905	613
Grp Volume(v), veh/h	256	198	194	111	147	149	256	343	353	67	720	722
Grp Sat Flow(s),veh/h/ln	1774	1770	1668	1774	1770	1729	1774	1770	1819	1774	1770	1748
Q Serve(g_s), s	18.0	13.9	14.6	8.3	10.2	10.6	19.5	25.2	25.3	3.8	54.0	54.0
Cycle Q Clear(g_c), s	18.0	13.9	14.6	8.3	10.2	10.6	19.5	25.2	25.3	3.8	54.0	54.0
Prop In Lane	1.00		0.59	1.00		0.27	1.00		0.11	1.00		0.35
Lane Grp Cap(c), veh/h	228	373	352	207	352	344	306	445	458	544	683	674
V/C Ratio(X)	1.12	0.53	0.55	0.54	0.42	0.43	0.84	0.77	0.77	0.12	1.06	1.07
Avail Cap(c_a), veh/h	228	451	425	207	430	420	306	761	782	544	683	674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Uniform Delay (d), s/veh	61.0	49.1	49.9	58.3	49.0	49.4	56.0	48.6	48.7	35.0	43.0	43.3
Incr Delay (d2), s/veh	96.4	1.7	1.9	1.5	1.1	1.2	17.0	12.1	11.9	0.0	43.9	49.2
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	14.9	7.0	6.9	4.1	5.1	5.2	11.0	13.8	14.2	1.9	34.7	35.3
LnGrp Delay(d),s/veh	157.4	50.8	51.8	59.7	50.1	50.6	73.0	60.8	60.7	35.0	86.9	92.4
LnGrp LOS	F	D	D	E	D	D	E	E	E	C	F	F
Approach Vol, veh/h		648			407			952			1509	
Approach Delay, s/veh		93.2			52.9			64.0			87.2	
Approach LOS		F			D			E			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	32.0	31.8	47.0	39.2	20.3	33.5	28.2	58.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	17.5	32.0	11.3	58.7	15.8	33.7	17.5	52.5				
Max Q Clear Time (g_c+20), s	20.0	12.6	5.8	27.3	10.3	16.6	21.5	56.0				
Green Ext Time (p_c), s	0.0	2.1	0.2	6.5	0.3	2.8	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			78.1									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	20	0	0	0	30	710	0	10	1630	30
Future Volume (veh/h)	20	0	20	0	0	0	30	710	0	10	1630	30
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0	1863				1863	1863	0	1863	1863	1863
Adj Flow Rate, veh/h	22	0	1				33	789	0	11	1811	23
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	0	2				2	2	0	2	2	2
Cap, veh/h	87	0	77				95	2691	0	51	2604	1137
Arrive On Green	0.05	0.00	0.05				0.05	0.76	0.00	0.03	0.74	0.74
Sat Flow, veh/h	1774	0	1583				1774	3632	0	1774	3539	1546
Grp Volume(v), veh/h	22	0	1				33	789	0	11	1811	23
Grp Sat Flow(s),veh/h/ln	1774	0	1583				1774	1770	0	1774	1770	1546
Q Serve(g_s), s	0.9	0.0	0.0				1.3	5.1	0.0	0.4	20.5	0.3
Cycle Q Clear(g_c), s	0.9	0.0	0.0				1.3	5.1	0.0	0.4	20.5	0.3
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	87	0	77				95	2691	0	51	2604	1137
V/C Ratio(X)	0.25	0.00	0.01				0.35	0.29	0.00	0.22	0.70	0.02
Avail Cap(c_a), veh/h	686	0	612				216	2691	0	240	2604	1137
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.84	0.84	0.00	0.10	0.10	0.10
Uniform Delay (d), s/veh	33.9	0.0	33.5				33.8	2.7	0.0	35.1	5.3	2.6
Incr Delay (d2), s/veh	0.6	0.0	0.0				0.7	0.2	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0				0.7	2.5	0.0	0.2	9.9	0.1
LnGrp Delay(d),s/veh	34.5	0.0	33.5				34.5	3.0	0.0	35.2	5.5	2.6
LnGrp LOS	C		C				C	A		D	A	A
Approach Vol, veh/h		23						822			1845	
Approach Delay, s/veh		34.4						4.2			5.6	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.9	58.4			6.1	60.3		7.6				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	22.5	22.5			9.5	21.5		28.0				
Max Q Clear Time (g_c+1/3), s	13.3	22.5			2.4	7.1		2.9				
Green Ext Time (p_c), s	0.0	0.0			0.0	13.6		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			5.4									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

	           											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	660	130	530	1540	160	100	430	100	360	1100	230
Future Volume (veh/h)	110	660	130	530	1540	160	100	430	100	360	1100	230
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	116	695	0	558	1621	88	105	453	0	379	1158	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
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, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	203	1431	446	614	1419	633	225	998	447	436	1215	544
Arrive On Green	0.06	0.29	0.00	0.18	0.41	0.41	0.07	0.29	0.00	0.13	0.35	0.00
Sat Flow, veh/h	3375	4988	1553	3375	3471	1548	3375	3471	1553	3375	3471	1553
Grp Volume(v), veh/h	116	695	0	558	1621	88	105	453	0	379	1158	0
Grp Sat Flow(s),veh/h/ln	1688	1663	1553	1688	1736	1548	1688	1736	1553	1688	1736	1553
Q Serve(g_s), s	4.7	16.2	0.0	22.7	57.2	5.0	4.2	15.0	0.0	15.4	45.6	0.0
Cycle Q Clear(g_c), s	4.7	16.2	0.0	22.7	57.2	5.0	4.2	15.0	0.0	15.4	45.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	1431	446	614	1419	633	225	998	447	436	1215	544
V/C Ratio(X)	0.57	0.49	0.00	0.91	1.14	0.14	0.47	0.45	0.00	0.87	0.95	0.00
Avail Cap(c_a), veh/h	265	1431	446	796	1419	633	289	998	447	579	1215	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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	64.0	41.4	0.0	56.1	41.4	25.9	62.9	40.9	0.0	59.8	44.4	0.0
Incr Delay (d2), s/veh	0.9	1.2	0.0	10.4	72.9	0.5	0.6	0.5	0.0	8.7	16.0	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	2.2	7.6	0.0	11.5	41.8	2.2	2.0	7.2	0.0	7.7	24.6	0.0
LnGrp Delay(d),s/veh	65.0	42.5	0.0	66.5	114.3	26.4	63.5	41.3	0.0	68.5	60.4	0.0
LnGrp LOS	E	D		E	F	C	E	D		E	E	
Approach Vol, veh/h	811					2267		558		1537		
Approach Delay, s/veh	45.7					99.1		45.5		62.4		
Approach LOS	D					F		D		E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.5	44.2	13.3	53.0	12.4	61.2	22.1	44.3				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	32.5	28.0	11.5	47.0	10.5	50.0	23.5	35.0				
Max Q Clear Time (g_c+24.7), s	24.7	18.2	6.2	47.6	6.7	59.2	17.4	17.0				
Green Ext Time (p_c), s	0.3	9.1	0.0	0.0	0.0	0.0	0.2	12.7				
Intersection Summary												
HCM 2010 Ctrl Delay			74.1									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	  	  		 	 		 	 	 	 	 	
Traffic Volume (veh/h)	140	960	140	440	1650	230	210	430	280	260	960	360
Future Volume (veh/h)	140	960	140	440	1650	230	210	430	280	260	960	360
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1900	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	143	980	125	449	1684	228	214	439	214	265	980	220
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	300	1347	171	817	1432	190	301	820	1288	324	843	371
Arrive On Green	0.09	0.30	0.29	0.24	0.46	0.45	0.09	0.24	0.23	0.10	0.24	0.24
Sat Flow, veh/h	3375	4479	570	3375	3082	409	3375	3471	2733	3375	3471	1528
Grp Volume(v), veh/h	143	727	378	449	933	979	214	439	214	265	980	220
Grp Sat Flow(s),veh/h/ln	1688	1663	1724	1688	1736	1755	1688	1736	1367	1688	1736	1528
Q Serve(g_s), s	5.6	27.4	27.6	16.3	65.0	65.0	8.6	15.5	1.4	10.8	34.0	17.8
Cycle Q Clear(g_c), s	5.6	27.4	27.6	16.3	65.0	65.0	8.6	15.5	1.4	10.8	34.0	17.8
Prop In Lane	1.00		0.33	1.00		0.23	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	1000	519	817	806	815	301	820	1288	324	843	371
V/C Ratio(X)	0.48	0.73	0.73	0.55	1.16	1.20	0.71	0.54	0.17	0.82	1.16	0.59
Avail Cap(c_a), veh/h	338	1330	690	817	806	815	338	820	1288	579	843	371
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	0.59	0.59	0.59	1.00	1.00	1.00	0.73	0.73	0.73
Uniform Delay (d), s/veh	60.7	43.8	44.2	46.4	37.5	37.7	62.0	46.7	9.2	62.1	53.0	46.9
Incr Delay (d2), s/veh	0.4	4.6	8.7	0.3	79.1	97.6	4.6	0.9	0.1	1.5	83.0	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	2.7	13.3	14.4	7.6	48.9	53.6	4.2	7.5	1.4	5.1	26.0	7.7
LnGrp Delay(d),s/veh	61.1	48.4	52.9	46.6	116.6	135.3	66.6	47.6	9.3	63.5	136.0	49.1
LnGrp LOS	E	D	D	D	F	F	E	D	A	E	F	D
Approach Vol, veh/h	1248			2361			867			1465		
Approach Delay, s/veh	51.2			111.0			42.8			109.9		
Approach LOS	D			F			D			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	69.0	16.5	38.0	39.4	46.1	17.4	37.1				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	6.0	* 6	4.5	5.5				
Max Green Setting (Gmax), s	13.5	60.0	13.5	32.5	19.5	* 54	23.5	22.5				
Max Q Clear Time (g_c+1), s	17.6	67.0	10.6	36.0	18.3	29.6	12.8	17.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	1.2	10.3	0.1	4.3				
Intersection Summary												
HCM 2010 Ctrl Delay			88.2									
HCM 2010 LOS			F									
Notes												

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

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↱	↱	↱	↑↑	↱↱	↱		
Traffic Volume (veh/h)	880	620	90	1400	930	20		
Future Volume (veh/h)	880	620	90	1400	930	20		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810		
Adj Flow Rate, veh/h	998	481	91	1414	939	0		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99		
Percent Heavy Veh, %	5	5	5	5	5	5		
Cap, veh/h	1997	1296	99	2198	1007	463		
Arrive On Green	0.55	0.54	0.12	1.00	0.30	0.00		
Sat Flow, veh/h	3619	1537	1723	3529	3343	1538		
Grp Volume(v), veh/h	998	481	91	1414	939	0		
Grp Sat Flow(s),veh/h/ln	1810	1537	1723	1719	1672	1538		
Q Serve(g_s), s	22.9	9.6	7.0	0.0	36.6	0.0		
Cycle Q Clear(g_c), s	22.9	9.6	7.0	0.0	36.6	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1997	1296	99	2198	1007	463		
V/C Ratio(X)	0.50	0.37	0.92	0.64	0.93	0.00		
Avail Cap(c_a), veh/h	1997	1296	180	2198	1340	616		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.74	0.74	0.59	0.59	1.00	0.00		
Uniform Delay (d), s/veh	18.6	2.4	59.0	0.0	45.5	0.0		
Incr Delay (d2), s/veh	0.7	0.6	8.5	0.9	9.4	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	11.6	20.8	3.6	0.3	18.1	0.0		
LnGrp Delay(d),s/veh	19.3	3.0	67.5	0.9	54.9	0.0		
LnGrp LOS	B	A	E	A	D			
Approach Vol, veh/h	1479			1505	939			
Approach Delay, s/veh	14.0			4.9	54.9			
Approach LOS	B			A	D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		89.6		44.4	11.7	77.9		
Change Period (Y+Rc), s		4.3		3.0	3.0	4.3		
Max Green Setting (Gmax), s		72.0		54.7	15.0	54.0		
Max Q Clear Time (g_c+I1), s		2.0		38.6	9.0	24.9		
Green Ext Time (p_c), s		22.1		2.8	0.0	16.1		
Intersection Summary								
HCM 2010 Ctrl Delay			20.3					
HCM 2010 LOS			C					
Notes								

User approved volume balancing among the lanes for turning movement.

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	330	550	50	390	0	1000	10	20	0	10	90
Future Volume (veh/h)	20	330	550	50	390	0	1000	10	20	0	10	90
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1900	1827	1827	1827	1827	1827	1827
Adj Flow Rate, veh/h	21	351	0	53	415	0	1064	11	0	0	11	6
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	8	1363	610	39	1426	0	1118	605	515	26	27	23
Arrive On Green	0.00	0.13	0.00	0.02	0.41	0.00	0.33	0.33	0.00	0.00	0.01	0.01
Sat Flow, veh/h	1740	3471	1553	1740	3563	0	3375	1827	1553	1740	1827	1553
Grp Volume(v), veh/h	21	351	0	53	415	0	1064	11	0	0	11	6
Grp Sat Flow(s),veh/h/ln	1740	1736	1553	1740	1736	0	1688	1827	1553	1740	1827	1553
Q Serve(g_s), s	0.3	6.1	0.0	1.5	5.4	0.0	20.6	0.3	0.0	0.0	0.4	0.3
Cycle Q Clear(g_c), s	0.3	6.1	0.0	1.5	5.4	0.0	20.6	0.3	0.0	0.0	0.4	0.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	8	1363	610	39	1426	0	1118	605	515	26	27	23
V/C Ratio(X)	2.75	0.26	0.00	1.35	0.29	0.00	0.95	0.02	0.00	0.00	0.41	0.26
Avail Cap(c_a), veh/h	208	1363	610	234	1426	0	1118	605	515	205	215	183
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	20.4	0.0	32.7	13.2	0.0	21.9	15.1	0.0	0.0	32.7	32.6
Incr Delay (d2), s/veh	807.9	0.3	0.0	171.9	0.5	0.0	16.5	0.0	0.0	0.0	3.7	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	1.9	3.0	0.0	2.6	2.6	0.0	12.0	0.1	0.0	0.0	0.2	0.1
LnGrp Delay(d),s/veh	841.4	20.7	0.0	204.7	13.7	0.0	38.4	15.1	0.0	0.0	36.4	34.9
LnGrp LOS	F	C		F	B		D	B			D	C
Approach Vol, veh/h		372			468			1075			17	
Approach Delay, s/veh		67.0			35.4			38.1			35.9	
Approach LOS		E			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.3	31.5		5.0	5.5	30.3		26.2				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	9.0	12.6		8.0	10.0	11.6		22.0				
Max Q Clear Time (g_c+1/3), s	12.3	7.4		2.4	3.5	8.1		22.6				
Green Ext Time (p_c), s	0.0	2.7		0.0	0.0	1.9		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			43.0									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	200	480	440	560	160	320	610	90	80	890	370
Future Volume (veh/h)	160	200	480	440	560	160	320	610	90	80	890	370
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	172	215	314	473	602	112	344	656	89	86	957	233
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	176	514	435	511	606	506	401	1192	162	127	1190	510
Arrive On Green	0.10	0.28	0.28	0.15	0.33	0.33	0.12	0.38	0.37	0.07	0.34	0.34
Sat Flow, veh/h	1757	1845	1561	3408	1845	1541	3408	3100	420	1757	3505	1502
Grp Volume(v), veh/h	172	215	314	473	602	112	344	371	374	86	957	233
Grp Sat Flow(s),veh/h/ln	1757	1845	1561	1704	1845	1541	1704	1752	1767	1757	1752	1502
Q Serve(g_s), s	13.7	13.3	25.4	19.2	45.5	7.4	13.9	23.1	23.2	6.7	34.7	17.0
Cycle Q Clear(g_c), s	13.7	13.3	25.4	19.2	45.5	7.4	13.9	23.1	23.2	6.7	34.7	17.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	176	514	435	511	606	506	401	674	680	127	1190	510
V/C Ratio(X)	0.98	0.42	0.72	0.93	0.99	0.22	0.86	0.55	0.55	0.68	0.80	0.46
Avail Cap(c_a), veh/h	176	514	435	511	606	506	487	674	680	251	1190	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.9	41.2	45.6	58.7	46.8	34.0	60.6	33.6	33.8	63.3	42.0	36.2
Incr Delay (d2), s/veh	61.3	0.8	6.3	22.5	34.9	1.0	10.6	3.2	3.2	2.3	5.8	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	6.9	11.8	10.7	29.1	3.3	7.1	11.8	12.0	3.3	17.7	7.4
LnGrp Delay(d),s/veh	124.2	42.0	51.9	81.2	81.8	35.0	71.2	36.8	37.0	65.6	47.9	39.1
LnGrp LOS	F	D	D	F	F	D	E	D	D	E	D	D
Approach Vol, veh/h		701			1187			1089			1276	
Approach Delay, s/veh		66.6			77.2			47.8			47.5	
Approach LOS		E			E			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	34.1	57.9	25.0	43.0	20.5	51.5	18.0	50.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	19.5	42.5	20.5	37.5	19.5	42.5	13.5	44.5				
Max Q Clear Time (g_c+19.7), s	19.7	25.2	21.2	27.4	15.9	36.7	15.7	47.5				
Green Ext Time (p_c), s	0.0	13.4	0.0	6.0	0.1	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			59.0									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

17: Osgood Rd & North BART Access

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	0	20	0	0	0	20	710	0	0	1650	70
Future Volume (veh/h)	70	0	20	0	0	0	20	710	0	0	1650	70
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.73				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900				1863	1863	1900	0	1863	1900
Adj Flow Rate, veh/h	78	0	22				22	789	0	0	1833	78
Adj No. of Lanes	1	1	0				1	2	0	0	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				2	2	2	0	2	2
Cap, veh/h	112	0	73				42	2962	0	0	2641	112
Arrive On Green	0.06	0.00	0.06				0.02	0.84	0.00	0.00	0.76	0.76
Sat Flow, veh/h	1774	0	1163				1774	3632	0	0	3553	146
Grp Volume(v), veh/h	78	0	22				22	789	0	0	931	980
Grp Sat Flow(s),veh/h/ln	1774	0	1163				1774	1770	0	0	1770	1837
Q Serve(g_s), s	3.9	0.0	1.6				1.1	4.2	0.0	0.0	23.7	24.3
Cycle Q Clear(g_c), s	3.9	0.0	1.6				1.1	4.2	0.0	0.0	23.7	24.3
Prop In Lane	1.00		1.00				1.00		0.00	0.00		0.08
Lane Grp Cap(c), veh/h	112	0	73				42	2962	0	0	1351	1402
V/C Ratio(X)	0.70	0.00	0.30				0.53	0.27	0.00	0.00	0.69	0.70
Avail Cap(c_a), veh/h	609	0	399				365	2962	0	0	1351	1402
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.97	0.97	0.00	0.00	0.17	0.17
Uniform Delay (d), s/veh	41.3	0.0	40.3				43.4	1.5	0.0	0.0	5.3	5.4
Incr Delay (d2), s/veh	7.5	0.0	2.2				9.7	0.2	0.0	0.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.6				0.7	2.1	0.0	0.0	11.6	12.2
LnGrp Delay(d),s/veh	48.8	0.0	42.5				53.2	1.8	0.0	0.0	5.8	5.9
LnGrp LOS	D		D				D	A			A	A
Approach Vol, veh/h		100						811			1911	
Approach Delay, s/veh		47.4						3.2			5.9	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		79.8		10.2	6.6	73.2						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		50.1		30.9	18.5	27.1						
Max Q Clear Time (g_c+I1), s		6.2		5.9	3.1	26.3						
Green Ext Time (p_c), s		32.2		0.3	0.0	0.7						
Intersection Summary												
HCM 2010 Ctrl Delay			6.6									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1690	90	0	1610	0	10
Future Vol, veh/h	1690	90	0	1610	0	10
Conflicting Peds, #/hr	0	10	0	0	0	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1878	100	0	1789	0	11

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 959
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.32
Pot Cap-1 Maneuver	-	-	0 - 0 257
Stage 1	-	-	0 - 0
Stage 2	-	-	0 - 0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 252
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	252	-	-	-
HCM Lane V/C Ratio	0.044	-	-	-
HCM Control Delay (s)	19.9	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Intersection

Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	20	0	0	0	100	10	0	0	20	0
Future Vol, veh/h	0	0	20	0	0	0	100	10	0	0	20	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	22	0	0	0	111	11	0	0	22	0
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	6.7	0	7.9	7.2
HCM LOS	A	-	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	0%	0%
Vol Thru, %	9%	0%	100%	100%
Vol Right, %	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	20	0	20
LT Vol	100	0	0	0
Through Vol	10	0	0	20
RT Vol	0	20	0	0
Lane Flow Rate	122	22	0	22
Geometry Grp	1	1	1	1
Degree of Util (X)	0.142	0.022	0	0.025
Departure Headway (Hd)	4.172	3.583	4.203	4.065
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	863	985	0	879
Service Time	2.18	1.656	2.279	2.097
HCM Lane V/C Ratio	0.141	0.022	0	0.025
HCM Control Delay	7.9	6.7	7.3	7.2
HCM Lane LOS	A	A	N	A
HCM 95th-tile Q	0.5	0.1	0	0.1

HCM 2010 Signalized Intersection Summary

1: Driscoll Rd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	590	300	80	510	160	260	900	70	100	450	180
Future Volume (veh/h)	240	590	300	80	510	160	260	900	70	100	450	180
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	245	602	0	82	520	0	265	918	0	102	459	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	247	1232	0	155	1048	0	264	1046	0	162	841	0
Arrive On Green	0.14	0.34	0.00	0.09	0.29	0.00	0.15	0.29	0.00	0.09	0.24	0.00
Sat Flow, veh/h	1792	3668	0	1792	3668	0	1792	3668	0	1792	3668	0
Grp Volume(v), veh/h	245	602	0	82	520	0	265	918	0	102	459	0
Grp Sat Flow(s),veh/h/ln	1792	1787	0	1792	1787	0	1792	1787	0	1792	1787	0
Q Serve(g_s), s	14.3	13.9	0.0	4.6	12.6	0.0	15.5	25.7	0.0	5.8	11.8	0.0
Cycle Q Clear(g_c), s	14.3	13.9	0.0	4.6	12.6	0.0	15.5	25.7	0.0	5.8	11.8	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	247	1232	0	155	1048	0	264	1046	0	162	841	0
V/C Ratio(X)	0.99	0.49	0.00	0.53	0.50	0.00	1.00	0.88	0.00	0.63	0.55	0.00
Avail Cap(c_a), veh/h	247	1232	0	230	1048	0	264	1072	0	196	936	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.2	27.1	0.0	45.9	30.7	0.0	44.8	35.4	0.0	46.1	35.2	0.0
Incr Delay (d2), s/veh	54.3	1.4	0.0	1.0	1.7	0.0	55.8	8.6	0.0	2.2	0.8	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	10.8	7.1	0.0	2.3	6.5	0.0	11.7	13.9	0.0	3.0	5.9	0.0
LnGrp Delay(d),s/veh	99.5	28.5	0.0	46.9	32.4	0.0	100.6	43.9	0.0	48.2	36.0	0.0
LnGrp LOS	F	C		D	C		F	D		D	D	
Approach Vol, veh/h		847			602			1183			561	
Approach Delay, s/veh		49.0			34.4			56.6			38.2	
Approach LOS		D			C			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	41.2	14.0	36.2	19.0	35.8	20.0	30.2				
Change Period (Y+Rc), s	4.5	5.0	4.5	5.5	4.5	5.0	4.5	5.5				
Max Green Setting (Gmax), s	13.5	29.0	11.5	31.5	14.5	28.0	15.5	27.5				
Max Q Clear Time (g_c+I1), s	6.6	15.9	7.8	27.7	16.3	14.6	17.5	13.8				
Green Ext Time (p_c), s	0.0	7.5	0.0	3.0	0.0	7.6	0.0	9.1				
Intersection Summary												
HCM 2010 Ctrl Delay				47.2								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary

2: Grimmer Blvd & Fremont Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	1130	330	130	1140	160	400	610	160	140	320	130
Future Volume (veh/h)	160	1130	330	130	1140	160	400	610	160	140	320	130
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	167	1177	195	135	1188	157	417	635	150	146	333	30
Adj No. of Lanes	1	2	1	2	2	0	2	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	1162	512	496	1030	136	474	758	179	172	804	355
Arrive On Green	0.14	0.32	0.32	0.29	0.65	0.65	0.14	0.27	0.27	0.10	0.22	0.22
Sat Flow, veh/h	1792	3574	1575	3476	3171	418	3476	2856	674	1792	3574	1578
Grp Volume(v), veh/h	167	1177	195	135	668	677	417	397	388	146	333	30
Grp Sat Flow(s),veh/h/ln	1792	1787	1575	1738	1787	1801	1738	1787	1743	1792	1787	1578
Q Serve(g_s), s	10.6	39.0	7.6	3.6	39.0	39.0	14.1	25.2	25.3	9.6	9.6	1.3
Cycle Q Clear(g_c), s	10.6	39.0	7.6	3.6	39.0	39.0	14.1	25.2	25.3	9.6	9.6	1.3
Prop In Lane	1.00		1.00	1.00		0.23	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	256	1162	512	496	581	585	474	475	463	172	804	355
V/C Ratio(X)	0.65	1.01	0.38	0.27	1.15	1.16	0.88	0.84	0.84	0.85	0.41	0.08
Avail Cap(c_a), veh/h	256	1162	512	496	581	585	797	573	559	172	804	355
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.64	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.6	40.5	13.9	38.0	21.0	21.0	50.8	41.6	41.6	53.4	39.7	18.4
Incr Delay (d2), s/veh	4.6	29.7	2.1	0.1	80.1	82.9	3.2	9.8	10.2	29.9	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	5.6	24.0	3.6	1.7	31.6	32.3	7.0	13.8	13.5	6.2	4.8	0.6
LnGrp Delay(d),s/veh	53.2	70.2	16.1	38.1	101.1	103.9	54.1	51.4	51.9	83.3	40.2	18.6
LnGrp LOS	D	F	B	D	F	F	D	D	D	F	D	B
Approach Vol, veh/h	1539			1480			1202			509		
Approach Delay, s/veh	61.5			96.6			52.5			51.3		
Approach LOS	E			F			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.6	45.0	20.9	32.5	21.6	45.0	16.0	37.4				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	10.5	39.0	27.5	22.5	10.5	39.0	11.5	38.5				
Max Q Clear Time (g_c+1.5), s	15.6	41.0	16.1	11.6	12.6	41.0	11.6	27.3				
Green Ext Time (p_c), s	0.1	0.0	0.2	6.4	0.0	0.0	0.0	4.6				
Intersection Summary												
HCM 2010 Ctrl Delay	69.1											
HCM 2010 LOS	E											

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	50	880	390	10	320	30	830	20	700	110	540	40
Future Volume (vph)	50	880	390	10	320	30	830	20	700	110	540	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5		4.5	4.5	5.5		5.5	5.5	5.5	
Lane Util. Factor	1.00	0.95	1.00		0.91	0.95	0.95		0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.96	1.00	
Satd. Flow (prot)	1787	3574	1599		1610	1684	3553		1698	1724	1556	
Flt Permitted	0.95	1.00	1.00		0.95	0.95	1.00		0.95	0.96	1.00	
Satd. Flow (perm)	1787	3574	1599		1610	1684	3553		1698	1724	1556	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	926	411	11	337	32	874	21	737	116	568	42
RTOR Reduction (vph)	0	0	25	0	0	0	1	0	0	0	397	0
Lane Group Flow (vph)	53	926	397	0	185	184	894	0	420	433	171	0
Confl. Peds. (#/hr)			14					35			14	
Confl. Bikes (#/hr)			4									
Heavy Vehicles (%)	1%	1%	1%	2%	2%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	pt+ov		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	5	2	2 4		1	1	6		4	4		8
Permitted Phases											4	
Actuated Green, G (s)	7.5	29.9	68.9		24.9	24.9	47.3		33.5	33.5	33.5	
Effective Green, g (s)	7.5	29.9	68.9		24.9	24.9	47.3		33.5	33.5	33.5	
Actuated g/C Ratio	0.06	0.25	0.57		0.21	0.21	0.39		0.28	0.28	0.28	
Clearance Time (s)	4.5	5.5			4.5	4.5	5.5		5.5	5.5	5.5	
Vehicle Extension (s)	1.0	4.0			1.0	1.0	4.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	111	890	918		334	349	1400		474	481	434	
v/s Ratio Prot	0.03	c0.26	0.25		c0.11	0.11	c0.25		0.25	c0.25		
v/s Ratio Perm											0.11	
v/c Ratio	0.48	1.04	0.43		0.55	0.53	0.64		0.89	0.90	0.39	
Uniform Delay, d1	54.4	45.0	14.5		42.6	42.3	29.4		41.4	41.6	35.0	
Progression Factor	1.06	0.88	1.85		1.04	1.04	1.71		0.82	0.82	1.39	
Incremental Delay, d2	0.5	31.3	0.2		0.1	0.1	0.2		12.1	13.6	0.5	
Delay (s)	58.3	71.0	27.0		44.2	43.9	50.6		46.1	47.7	49.2	
Level of Service	E	E	C		D	D	D		D	D	D	
Approach Delay (s)		57.3					48.7			47.8		
Approach LOS		E					D			D		
Intersection Summary												
HCM 2000 Control Delay			51.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.5		
Intersection Capacity Utilization			93.9%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Bay St & Fremont Blvd & Washington Blvd & Union St

03/06/2019



Movement	SBT	SBR	SBR2
Lane Configurations	4T		
Traffic Volume (vph)	100	10	50
Future Volume (vph)	100	10	50
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	5.0		
Lane Util. Factor	0.95		
Frpb, ped/bikes	0.98		
Flpb, ped/bikes	1.00		
Frt	0.95		
Flt Protected	0.99		
Satd. Flow (prot)	3297		
Flt Permitted	0.99		
Satd. Flow (perm)	3297		
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	105	11	53
RTOR Reduction (vph)	33	0	0
Lane Group Flow (vph)	178	0	0
Confl. Peds. (#/hr)		30	
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	1%	1%	1%
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	11.2		
Effective Green, g (s)	11.2		
Actuated g/C Ratio	0.09		
Clearance Time (s)	5.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	307		
v/s Ratio Prot	c0.05		
v/s Ratio Perm			
v/c Ratio	0.58		
Uniform Delay, d1	52.2		
Progression Factor	1.00		
Incremental Delay, d2	1.8		
Delay (s)	54.0		
Level of Service	D		
Approach Delay (s)	54.0		
Approach LOS	D		
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

4: Roberts Ave & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1270	100	260	1020	120	60	70	290	40	110	90
Future Volume (vph)	40	1270	100	260	1020	120	60	70	290	40	110	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5		4.5	4.6			4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.88			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1787	3525		1787	3506		1787	1654			1748	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.88	
Satd. Flow (perm)	1787	3525		1787	3506		1787	1654			1551	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	1351	106	277	1085	128	64	74	309	43	117	96
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	0	0	14	0
Lane Group Flow (vph)	43	1452	0	277	1206	0	64	383	0	0	242	0
Confl. Peds. (#/hr)			8			5	20					20
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	5.6	42.6		20.6	57.6		5.8	42.2			31.9	
Effective Green, g (s)	5.6	42.6		20.6	57.6		5.8	42.2			31.9	
Actuated g/C Ratio	0.05	0.36		0.17	0.48		0.05	0.35			0.27	
Clearance Time (s)	4.5	5.5		4.5	5.5		4.5	4.6			4.6	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		3.0	2.0			2.0	
Lane Grp Cap (vph)	83	1251		306	1682		86	581			412	
v/s Ratio Prot	0.02	c0.41		c0.15	0.34		0.04	c0.23				
v/s Ratio Perm											0.16	
v/c Ratio	0.52	1.16		0.91	0.72		0.74	0.66			0.59	
Uniform Delay, d1	55.9	38.7		48.7	24.7		56.4	32.8			38.3	
Progression Factor	1.41	0.49		0.65	0.51		1.00	1.00			1.00	
Incremental Delay, d2	1.0	76.5		16.5	1.3		29.0	2.1			1.4	
Delay (s)	79.6	95.7		48.3	13.9		85.4	34.9			39.7	
Level of Service	E	F		D	B		F	C			D	
Approach Delay (s)		95.2			20.3			42.1			39.7	
Approach LOS		F			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			54.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			19.1			
Intersection Capacity Utilization			110.2%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

5: Osgood Rd/Driscoll Rd & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	840	370	200	900	80	350	930	400	100	530	160
Future Volume (veh/h)	320	840	370	200	900	80	350	930	400	100	530	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	340	894	185	213	957	5	372	989	204	106	564	49
Adj No. of Lanes	1	2	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	276	1202	529	202	1053	465	362	1028	634	337	1002	443
Arrive On Green	0.15	0.34	0.34	0.11	0.29	0.29	0.10	0.29	0.29	0.10	0.28	0.28
Sat Flow, veh/h	1792	3574	1573	1792	3574	1579	3476	3574	1579	3476	3574	1579
Grp Volume(v), veh/h	340	894	185	213	957	5	372	989	204	106	564	49
Grp Sat Flow(s),veh/h/ln	1792	1787	1573	1792	1787	1579	1738	1787	1579	1738	1787	1579
Q Serve(g_s), s	18.5	26.6	10.6	13.5	31.0	0.3	12.5	32.7	10.7	3.4	16.2	2.8
Cycle Q Clear(g_c), s	18.5	26.6	10.6	13.5	31.0	0.3	12.5	32.7	10.7	3.4	16.2	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	276	1202	529	202	1053	465	362	1028	634	337	1002	443
V/C Ratio(X)	1.23	0.74	0.35	1.06	0.91	0.01	1.03	0.96	0.32	0.31	0.56	0.11
Avail Cap(c_a), veh/h	276	1202	529	202	1053	465	362	1028	634	362	1028	454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.46	0.46	0.46	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.8	35.3	30.0	53.3	40.8	30.0	53.8	42.1	24.8	50.5	36.9	32.1
Incr Delay (d2), s/veh	131.4	4.2	1.8	79.2	13.0	0.0	39.3	11.6	0.2	0.2	0.9	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	19.2	13.7	4.9	11.1	17.2	0.1	8.0	17.7	4.7	1.6	8.1	1.2
LnGrp Delay(d),s/veh	182.2	39.4	31.8	132.4	53.7	30.0	93.0	53.7	25.0	50.7	37.8	32.2
LnGrp LOS	F	D	C	F	D	C	F	D	C	D	D	C
Approach Vol, veh/h	1419				1175				1565		719	
Approach Delay, s/veh	72.6				67.9				59.3		39.3	
Approach LOS	E				E				E		D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	45.9	17.0	39.1	23.0	40.9	16.1	40.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	13.5	39.5	12.5	34.5	18.5	34.5	12.5	34.5				
Max Q Clear Time (g_c+1.5), s	15.5	28.6	14.5	18.2	20.5	33.0	5.4	34.7				
Green Ext Time (p_c), s	0.0	9.4	0.0	12.2	0.0	1.5	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			62.3									
HCM 2010 LOS			E									

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	170	1150	10	10	1050	30	0	0	10	10	0	0
Future Vol, veh/h	170	1150	10	10	1050	30	0	0	10	10	0	0
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	130	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	187	1264	11	11	1154	33	0	0	11	11	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1187	0	0	1276	0	0	2244	2854	644	2204	2843	594
Stage 1	-	-	-	-	-	-	1645	1645	-	1193	1193	-
Stage 2	-	-	-	-	-	-	599	1209	-	1011	1650	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.52	6.52	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.52	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	3.51	4.01	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	590	-	-	545	-	-	23	17	418	25	17	451
Stage 1	-	-	-	-	-	-	105	157	-	200	260	-
Stage 2	-	-	-	-	-	-	458	256	-	258	156	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	590	-	-	544	-	-	17	11	416	18	11	451
Mov Cap-2 Maneuver	-	-	-	-	-	-	17	11	-	18	11	-
Stage 1	-	-	-	-	-	-	72	107	-	137	255	-
Stage 2	-	-	-	-	-	-	449	251	-	171	106	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0.1	13.9	\$ 367.6
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	416	590	-	-	544	-	-	18
HCM Lane V/C Ratio	0.026	0.317	-	-	0.02	-	-	0.611
HCM Control Delay (s)	13.9	13.9	-	-	11.8	-	-	\$ 367.6
HCM Lane LOS	B	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.1	1.4	-	-	0.1	-	-	1.6

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

HCM 2010 Signalized Intersection Summary

7: Washington Blvd & I-680 SB Ramps

03/06/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	200	1040	420	200	80	660		
Future Volume (veh/h)	200	1040	420	200	80	660		
Number	5	2	6	16	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	217	1130	457	63	87	285		
Adj No. of Lanes	1	2	2	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	1	1	1	1	1	1		
Cap, veh/h	271	2213	1413	619	385	343		
Arrive On Green	0.15	0.62	0.40	0.40	0.21	0.21		
Sat Flow, veh/h	1792	3668	3668	1566	1792	1599		
Grp Volume(v), veh/h	217	1130	457	63	87	285		
Grp Sat Flow(s),veh/h/ln	1792	1787	1787	1566	1792	1599		
Q Serve(g_s), s	6.8	10.2	5.1	1.5	2.3	9.8		
Cycle Q Clear(g_c), s	6.8	10.2	5.1	1.5	2.3	9.8		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	271	2213	1413	619	385	343		
V/C Ratio(X)	0.80	0.51	0.32	0.10	0.23	0.83		
Avail Cap(c_a), veh/h	744	2213	2166	949	961	858		
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	6.1	12.1	11.0	18.7	21.7		
Incr Delay (d2), s/veh	2.1	0.3	0.2	0.1	0.1	2.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.5	4.9	2.5	0.6	1.1	8.3		
LnGrp Delay(d),s/veh	25.8	6.4	12.3	11.1	18.8	23.7		
LnGrp LOS	C	A	B	B	B	C		
Approach Vol, veh/h		1347	520		372			
Approach Delay, s/veh		9.5	12.2		22.5			
Approach LOS		A	B		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.7		17.1	12.9	27.7		
Change Period (Y+Rc), s		4.9		* 4.7	* 4.2	4.9		
Max Green Setting (Gmax), s		35.0		* 31	* 24	35.0		
Max Q Clear Time (g_c+I1), s		12.2		11.8	8.8	7.1		
Green Ext Time (p_c), s		15.3		0.6	0.2	15.7		
Intersection Summary								
HCM 2010 Ctrl Delay			12.3					
HCM 2010 LOS			B					
Notes								

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

HCM 2010 Signalized Intersection Summary

8: Luzon Dr/I-680 NB Ramps & Washington Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	550	120	40	470	350	60	170	10	10	10	30
Future Volume (veh/h)	390	550	120	40	470	350	60	170	10	10	10	30
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	402	567	110	41	485	229	62	175	6	10	10	0
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	456	1650	319	145	895	420	133	251	8	302	343	292
Arrive On Green	0.25	0.55	0.55	0.08	0.38	0.38	0.18	0.18	0.18	0.18	0.18	0.00
Sat Flow, veh/h	1792	2988	578	1792	2362	1109	339	1377	43	1209	1881	1599
Grp Volume(v), veh/h	402	338	339	41	366	348	243	0	0	10	10	0
Grp Sat Flow(s),veh/h/ln	1792	1787	1779	1792	1787	1684	1760	0	0	1209	1881	1599
Q Serve(g_s), s	13.8	6.7	6.7	1.4	10.2	10.3	5.6	0.0	0.0	0.0	0.3	0.0
Cycle Q Clear(g_c), s	13.8	6.7	6.7	1.4	10.2	10.3	8.3	0.0	0.0	0.5	0.3	0.0
Prop In Lane	1.00		0.32	1.00		0.66	0.26		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	456	987	982	145	677	638	392	0	0	302	343	292
V/C Ratio(X)	0.88	0.34	0.34	0.28	0.54	0.55	0.62	0.00	0.00	0.03	0.03	0.00
Avail Cap(c_a), veh/h	812	987	982	448	978	921	1048	0	0	460	588	500
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.9	7.9	7.9	27.7	15.5	15.6	24.7	0.0	0.0	21.6	21.5	0.0
Incr Delay (d2), s/veh	2.3	0.3	0.3	0.4	1.0	1.0	0.6	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	7.1	3.4	3.4	0.7	5.2	4.9	4.1	0.0	0.0	0.1	0.1	0.0
LnGrp Delay(d),s/veh	25.2	8.2	8.2	28.1	16.5	16.6	25.3	0.0	0.0	21.6	21.5	0.0
LnGrp LOS	C	A	A	C	B	B	C			C	C	
Approach Vol, veh/h	1079				755		243				20	
Approach Delay, s/veh	14.5				17.2		25.3				21.6	
Approach LOS	B				B		C				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			4	5	6	8				
Phs Duration (G+Y+Rc), s	8.9	39.7			15.4	20.0	28.6	15.4				
Change Period (Y+Rc), s	3.7	4.4			3.7	3.7	4.4	3.7				
Max Green Setting (Gmax), s	10.0	35.0			20.0	29.0	35.0	36.0				
Max Q Clear Time (g_c+1.5), s	13.4	8.7			2.5	15.8	12.3	10.3				
Green Ext Time (p_c), s	0.0	13.3			0.9	0.5	11.9	1.0				
Intersection Summary												
HCM 2010 Ctrl Delay	16.8											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

9: Washington Blvd & Paseo Padre Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	380	120	70	450	280	270	300	140	250	190	160
Future Volume (veh/h)	90	380	120	70	450	280	270	300	140	250	190	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	98	413	59	76	489	238	293	326	113	272	207	38
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	1	1
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	186	608	516	175	740	358	325	549	186	304	375	318
Arrive On Green	0.10	0.32	0.32	0.10	0.32	0.32	0.18	0.21	0.21	0.17	0.20	0.20
Sat Flow, veh/h	1792	1881	1597	1792	2334	1130	1792	2599	883	1792	1881	1592
Grp Volume(v), veh/h	98	413	59	76	374	353	293	222	217	272	207	38
Grp Sat Flow(s),veh/h/ln	1792	1881	1597	1792	1787	1677	1792	1787	1695	1792	1881	1592
Q Serve(g_s), s	5.1	18.7	2.6	3.9	17.8	17.9	15.8	11.0	11.4	14.6	9.7	1.9
Cycle Q Clear(g_c), s	5.1	18.7	2.6	3.9	17.8	17.9	15.8	11.0	11.4	14.6	9.7	1.9
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	186	608	516	175	567	532	325	377	358	304	375	318
V/C Ratio(X)	0.53	0.68	0.11	0.43	0.66	0.66	0.90	0.59	0.61	0.89	0.55	0.12
Avail Cap(c_a), veh/h	455	859	729	455	816	766	546	816	774	546	859	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	28.9	23.4	41.9	29.0	29.1	39.5	35.0	35.2	40.0	35.5	32.3
Incr Delay (d2), s/veh	0.9	1.9	0.1	0.6	1.9	2.0	6.6	2.1	2.4	3.7	1.8	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	2.6	10.1	1.1	2.0	9.0	8.5	8.4	5.6	5.6	7.6	5.2	0.9
LnGrp Delay(d),s/veh	42.7	30.8	23.5	42.5	30.9	31.1	46.0	37.1	37.5	43.7	37.3	32.6
LnGrp LOS	D	C	C	D	C	C	D	D	D	D	D	C
Approach Vol, veh/h	570			803			732			517		
Approach Delay, s/veh	32.1			32.1			40.8			40.3		
Approach LOS	C			C			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.1	37.4	22.4	24.7	14.7	36.7	21.2	25.8				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.0	4.5	5.5	4.5	5.0				
Max Green Setting (Gmax), s	25.0	45.0	30.0	45.0	25.0	45.0	30.0	45.0				
Max Q Clear Time (g_c+1.5), s	15.9	20.7	17.8	11.7	7.1	19.9	16.6	13.4				
Green Ext Time (p_c), s	0.0	10.8	0.1	6.3	0.0	11.0	0.1	6.2				
Intersection Summary												
HCM 2010 Ctrl Delay	36.1											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

10: Fremont Blvd & Blacow Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	230	240	60	240	40	190	1200	50	70	590	180
Future Volume (veh/h)	250	230	240	60	240	40	190	1200	50	70	590	180
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	258	237	63	62	247	30	196	1237	49	72	608	142
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	261	732	190	117	578	69	216	1495	59	136	1098	256
Arrive On Green	0.15	0.26	0.26	0.07	0.18	0.18	0.12	0.43	0.43	0.08	0.38	0.38
Sat Flow, veh/h	1792	2805	730	1792	3198	383	1792	3503	139	1792	2875	670
Grp Volume(v), veh/h	258	149	151	62	137	140	196	631	655	72	377	373
Grp Sat Flow(s),veh/h/ln	1792	1787	1747	1792	1787	1794	1792	1787	1855	1792	1787	1758
Q Serve(g_s), s	17.2	8.1	8.4	4.0	8.1	8.3	13.0	37.5	37.6	4.6	19.9	19.9
Cycle Q Clear(g_c), s	17.2	8.1	8.4	4.0	8.1	8.3	13.0	37.5	37.6	4.6	19.9	19.9
Prop In Lane	1.00		0.42	1.00		0.21	1.00		0.07	1.00		0.38
Lane Grp Cap(c), veh/h	261	466	456	117	323	324	216	763	792	136	682	671
V/C Ratio(X)	0.99	0.32	0.33	0.53	0.42	0.43	0.91	0.83	0.83	0.53	0.55	0.56
Avail Cap(c_a), veh/h	261	581	568	157	477	478	216	763	792	157	682	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	51.1	35.7	35.9	54.3	43.6	43.7	52.1	30.5	30.5	53.4	29.1	29.1
Incr Delay (d2), s/veh	51.9	0.6	0.6	1.4	1.3	1.3	35.7	10.0	9.7	1.0	2.7	2.8
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	12.3	4.0	4.1	2.0	4.1	4.3	8.6	20.5	21.3	2.3	10.3	10.1
LnGrp Delay(d),s/veh	103.1	36.3	36.5	55.6	44.9	45.0	87.8	40.4	40.2	54.4	31.8	31.9
LnGrp LOS	F	D	D	E	D	D	F	D	D	D	C	C
Approach Vol, veh/h	558				339		1482				822	
Approach Delay, s/veh	67.2				46.9		46.6				33.8	
Approach LOS	E				D		D				C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	27.7	13.6	56.7	12.4	37.3	19.0	51.3				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	17.5	32.0	10.5	39.5	10.5	39.0	14.5	35.5				
Max Q Clear Time (g_c+1.9, s)	19.2	10.3	6.6	39.6	6.0	10.4	15.0	21.9				
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.0	4.9	0.0	11.4				
Intersection Summary												
HCM 2010 Ctrl Delay			46.9									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

11: Osgood Rd & Blacow Rd/Dummy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	0	40	0	0	0	30	1470	0	20	1000	30
Future Volume (veh/h)	50	0	40	0	0	0	30	1470	0	20	1000	30
Number	3	8	18				1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	1881				1881	1881	0	1881	1881	1881
Adj Flow Rate, veh/h	53	0	33				32	1564	0	21	1064	32
Adj No. of Lanes	1	0	1				1	2	0	1	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	0	1				1	1	0	1	1	1
Cap, veh/h	153	0	136				80	2484	0	67	2458	1077
Arrive On Green	0.09	0.00	0.09				0.04	0.70	0.00	0.04	0.69	0.69
Sat Flow, veh/h	1792	0	1599				1792	3668	0	1792	3574	1566
Grp Volume(v), veh/h	53	0	33				32	1564	0	21	1064	32
Grp Sat Flow(s),veh/h/ln	1792	0	1599				1792	1787	0	1792	1787	1566
Q Serve(g_s), s	2.2	0.0	1.5				1.4	19.0	0.0	0.9	10.6	0.5
Cycle Q Clear(g_c), s	2.2	0.0	1.5				1.4	19.0	0.0	0.9	10.6	0.5
Prop In Lane	1.00		1.00				1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	0	136				80	2484	0	67	2458	1077
V/C Ratio(X)	0.35	0.00	0.24				0.40	0.63	0.00	0.31	0.43	0.03
Avail Cap(c_a), veh/h	627	0	560				213	2484	0	213	2458	1077
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.09	0.09	0.00	0.72	0.72	0.72
Uniform Delay (d), s/veh	34.5	0.0	34.2				37.2	6.6	0.0	37.5	5.6	4.0
Incr Delay (d2), s/veh	0.5	0.0	0.3				0.1	0.1	0.0	0.7	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.7				0.7	9.2	0.0	0.5	5.3	0.2
LnGrp Delay(d),s/veh	35.0	0.0	34.5				37.3	6.7	0.0	38.2	6.0	4.0
LnGrp LOS	C		C				D	A		D	A	A
Approach Vol, veh/h		86						1596			1117	
Approach Delay, s/veh		34.8						7.3			6.5	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	60.5				7.5	61.1		11.4				
Change Period (Y+Rc), s	4.5	5.5			4.5	5.5		4.6				
Max Green Setting (Gmax), s	27.5				9.5	27.5		28.0				
Max Q Clear Time (g_c+1/4), s	12.6				2.9	21.0		4.2				
Green Ext Time (p_c), s	0.0	14.0			0.0	6.3		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			7.9									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Fremont Blvd & Auto Mall Pkwy

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	 		 	 		 	 	
Traffic Volume (veh/h)	310	1250	140	240	950	290	180	1200	620	240	480	190
Future Volume (veh/h)	310	1250	140	240	950	290	180	1200	620	240	480	190
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	320	1289	0	247	979	211	186	1237	0	247	495	0
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	369	2048	638	296	1350	593	236	951	425	296	1013	453
Arrive On Green	0.11	0.40	0.00	0.09	0.38	0.38	0.07	0.27	0.00	0.09	0.29	0.00
Sat Flow, veh/h	3442	5085	1583	3442	3539	1555	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	320	1289	0	247	979	211	186	1237	0	247	495	0
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1555	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	12.3	27.2	0.0	9.5	31.7	13.0	7.1	36.0	0.0	9.5	15.6	0.0
Cycle Q Clear(g_c), s	12.3	27.2	0.0	9.5	31.7	13.0	7.1	36.0	0.0	9.5	15.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	369	2048	638	296	1350	593	236	951	425	296	1013	453
V/C Ratio(X)	0.87	0.63	0.00	0.84	0.73	0.36	0.79	1.30	0.00	0.84	0.49	0.00
Avail Cap(c_a), veh/h	501	2048	638	347	1350	593	347	951	425	347	1013	453
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	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	58.9	32.0	0.0	60.3	35.4	29.7	61.5	49.0	0.0	60.3	39.7	0.0
Incr Delay (d2), s/veh	9.2	1.5	0.0	12.5	3.4	1.7	4.0	143.2	0.0	12.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	12.9	0.0	5.0	16.1	5.8	3.5	36.5	0.0	5.0	7.7	0.0
LnGrp Delay(d),s/veh	68.0	33.5	0.0	72.8	38.9	31.3	65.5	192.2	0.0	72.8	40.2	0.0
LnGrp LOS	E	C		E	D	C	E	F		E	D	
Approach Vol, veh/h	1609			1437			1423			742		
Approach Delay, s/veh	40.4			43.6			175.6			51.1		
Approach LOS	D			D			F			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	60.0	13.7	44.3	18.9	57.1	16.0	42.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	13.5	50.0	13.5	36.0	19.5	44.0	13.5	36.0				
Max Q Clear Time (g_c+1), s	11.5	29.2	9.1	17.6	14.3	33.7	11.5	38.0				
Green Ext Time (p_c), s	0.0	18.1	0.0	13.6	0.1	9.5	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	79.7											
HCM 2010 LOS	E											

HCM 2010 Signalized Intersection Summary

13: Auto Mall Pkwy & Osgood Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	👤👤	👤👤👤		👤👤	👤👤		👤👤	👤👤	👤👤	👤👤	👤👤	👤
Traffic Volume (veh/h)	480	1670	180	170	920	230	270	820	470	380	550	290
Future Volume (veh/h)	480	1670	180	170	920	230	270	820	470	380	550	290
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	495	1722	176	175	948	218	278	845	417	392	567	109
Adj No. of Lanes	2	3	0	2	2	0	2	2	2	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	527	1978	202	256	982	225	326	806	842	424	906	404
Arrive On Green	0.15	0.42	0.42	0.07	0.34	0.34	0.09	0.23	0.23	0.12	0.26	0.26
Sat Flow, veh/h	3442	4691	478	3442	2859	657	3442	3539	2787	3442	3539	1578
Grp Volume(v), veh/h	495	1243	655	175	586	580	278	845	417	392	567	109
Grp Sat Flow(s),veh/h/ln	1721	1695	1778	1721	1770	1746	1721	1770	1393	1721	1770	1578
Q Serve(g_s), s	19.1	44.9	45.2	6.6	43.6	43.7	10.7	30.5	16.5	15.1	19.0	7.4
Cycle Q Clear(g_c), s	19.1	44.9	45.2	6.6	43.6	43.7	10.7	30.5	16.5	15.1	19.0	7.4
Prop In Lane	1.00		0.27	1.00		0.38	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	527	1430	750	256	607	599	326	806	842	424	906	404
V/C Ratio(X)	0.94	0.87	0.87	0.68	0.96	0.97	0.85	1.05	0.50	0.92	0.63	0.27
Avail Cap(c_a), veh/h	527	1430	750	295	607	599	372	806	842	424	906	404
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	0.82	0.82	0.82	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	56.1	35.4	35.5	60.5	43.2	43.3	59.7	51.8	38.4	58.1	44.2	39.8
Incr Delay (d2), s/veh	24.9	7.4	13.4	3.0	25.5	26.1	14.0	45.3	0.6	24.4	1.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	22.4	25.0	3.3	25.6	25.4	5.7	19.9	6.4	8.6	9.5	3.3
LnGrp Delay(d),s/veh	81.0	42.8	48.8	63.5	68.7	69.4	73.7	97.1	39.0	82.5	45.6	40.3
LnGrp LOS	F	D	D	E	E	E	E	F	D	F	D	D
Approach Vol, veh/h	2393				1341				1540		1068	
Approach Delay, s/veh	52.4				68.3				77.1		58.6	
Approach LOS	D				E				E		E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	52.0	17.2	39.8	14.5	62.5	21.0	36.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	5.5	4.5	6.0	4.5	5.5				
Max Green Setting (Gmax), s	20.5	46.0	14.5	32.5	11.5	55.0	16.5	30.5				
Max Q Clear Time (g_c+T1), s	21.5	45.7	12.7	21.0	8.6	47.2	17.1	32.5				
Green Ext Time (p_c), s	0.0	0.3	0.0	9.3	0.0	7.6	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			62.8									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

14: I-680 SB Ramps & Auto Mall Pkwy

03/06/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↱	↱	↱	↑↑	↱↱	↱		
Traffic Volume (veh/h)	1370	1160	30	680	640	50		
Future Volume (veh/h)	1370	1160	30	680	640	50		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	1803	836	31	701	660	0		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1979	1176	299	2593	727	334		
Arrive On Green	0.53	0.53	0.34	1.00	0.21	0.00		
Sat Flow, veh/h	3725	1583	1774	3632	3442	1583		
Grp Volume(v), veh/h	1803	836	31	701	660	0		
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1770	1721	1583		
Q Serve(g_s), s	57.1	1.8	1.6	0.0	24.3	0.0		
Cycle Q Clear(g_c), s	57.1	1.8	1.6	0.0	24.3	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1979	1176	299	2593	727	334		
V/C Ratio(X)	0.91	0.71	0.10	0.27	0.91	0.00		
Avail Cap(c_a), veh/h	2141	1244	299	2593	847	390		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.43	0.43	0.95	0.95	1.00	0.00		
Uniform Delay (d), s/veh	27.7	5.6	36.4	0.0	50.0	0.0		
Incr Delay (d2), s/veh	3.7	1.6	0.1	0.2	11.9	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	30.3	30.9	0.8	0.1	12.8	0.0		
LnGrp Delay(d),s/veh	31.4	7.2	36.4	0.2	62.0	0.0		
LnGrp LOS	C	A	D	A	E			
Approach Vol, veh/h	2639			732	660			
Approach Delay, s/veh	23.7			1.8	62.0			
Approach LOS	C			A	E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		99.5		30.5	26.2	73.4		
Change Period (Y+Rc), s		4.3		3.0	4.3	* 4.3		
Max Green Setting (Gmax), s		90.7		32.0	13.0	* 75		
Max Q Clear Time (g_c+I1), s		2.0		26.3	3.6	59.1		
Green Ext Time (p_c), s		3.0		1.1	2.1	9.9		
Intersection Summary								
HCM 2010 Ctrl Delay		26.0						
HCM 2010 LOS		C						
Notes								

User approved volume balancing among the lanes for turning movement.

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

HCM 2010 Signalized Intersection Summary

15: I-680 NB Ramps/Sabercat Rd & Auto Mall Pkwy/Durham Rd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	620	680	190	460	20	210	10	40	10	30	40
Future Volume (veh/h)	110	620	680	190	460	20	210	10	40	10	30	40
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	118	667	0	204	495	18	226	11	0	11	32	3
Adj No. of Lanes	1	2	1	1	2	0	2	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	150	1737	777	246	1895	69	341	185	157	62	65	55
Arrive On Green	0.11	0.65	0.00	0.14	0.54	0.54	0.10	0.10	0.00	0.03	0.03	0.03
Sat Flow, veh/h	1774	3539	1583	1774	3481	126	3442	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	118	667	0	204	251	262	226	11	0	11	32	3
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1837	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.2	5.7	0.0	7.3	4.9	4.9	4.1	0.3	0.0	0.4	1.1	0.1
Cycle Q Clear(g_c), s	4.2	5.7	0.0	7.3	4.9	4.9	4.1	0.3	0.0	0.4	1.1	0.1
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	150	1737	777	246	964	1000	341	185	157	62	65	55
V/C Ratio(X)	0.78	0.38	0.00	0.83	0.26	0.26	0.66	0.06	0.00	0.18	0.49	0.05
Avail Cap(c_a), veh/h	273	1737	777	246	964	1000	847	459	390	191	201	171
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.50	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	6.7	0.0	27.3	7.9	7.9	28.2	26.5	0.0	30.5	30.8	30.3
Incr Delay (d2), s/veh	1.7	0.3	0.0	19.6	0.7	0.6	1.6	0.1	0.0	0.5	2.2	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	2.1	2.8	0.0	4.9	2.5	2.6	2.0	0.2	0.0	0.2	0.6	0.1
LnGrp Delay(d),s/veh	30.0	7.1	0.0	46.9	8.5	8.5	29.9	26.6	0.0	31.0	33.0	30.5
LnGrp LOS	C	A		D	A	A	C	C		C	C	C
Approach Vol, veh/h	785			717			237			46		
Approach Delay, s/veh	10.5			19.4			29.7			32.3		
Approach LOS	B			B			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	39.7		6.2	12.0	36.2		10.6				
Change Period (Y+Rc), s	3.0	4.3		3.9	3.0	4.3		4.2				
Max Green Setting (Gmax), s	10.0	16.6		7.0	9.0	17.6		16.0				
Max Q Clear Time (g_c+10.0), s	10.0	6.9		3.1	9.3	7.7		6.1				
Green Ext Time (p_c), s	0.0	6.1		0.0	0.0	6.2		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay	17.2											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

16: Warm Springs Blvd/Osgood Rd & S Grimmer Blvd

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	460	420	100	320	60	630	1070	270	100	530	210
Future Volume (veh/h)	190	460	420	100	320	60	630	1070	270	100	530	210
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	194	469	166	102	327	18	643	1092	260	102	541	109
Adj No. of Lanes	1	1	1	2	1	1	2	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	587	488	276	507	431	629	1085	257	129	965	427
Arrive On Green	0.12	0.31	0.31	0.08	0.27	0.27	0.18	0.38	0.38	0.07	0.27	0.27
Sat Flow, veh/h	1774	1863	1549	3442	1863	1583	3442	2835	671	1774	3539	1564
Grp Volume(v), veh/h	194	469	166	102	327	18	643	679	673	102	541	109
Grp Sat Flow(s),veh/h/ln	1774	1863	1549	1721	1863	1583	1721	1770	1736	1774	1770	1564
Q Serve(g_s), s	14.4	30.9	11.0	3.8	20.8	1.1	24.5	51.3	51.3	7.6	17.6	7.3
Cycle Q Clear(g_c), s	14.4	30.9	11.0	3.8	20.8	1.1	24.5	51.3	51.3	7.6	17.6	7.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	218	587	488	276	507	431	629	677	664	129	965	427
V/C Ratio(X)	0.89	0.80	0.34	0.37	0.64	0.04	1.02	1.00	1.01	0.79	0.56	0.26
Avail Cap(c_a), veh/h	285	619	514	347	507	431	629	677	664	139	965	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.9	42.0	35.2	58.4	43.0	35.9	54.8	41.4	41.4	61.1	41.8	38.1
Incr Delay (d2), s/veh	19.8	7.5	0.6	0.3	6.2	0.2	41.5	35.3	38.3	21.5	2.4	1.4
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	8.3	17.1	4.8	1.8	11.6	0.5	15.3	31.6	31.6	4.5	8.9	3.3
LnGrp Delay(d),s/veh	77.7	49.5	35.8	58.7	49.2	36.1	96.3	76.7	79.6	82.6	44.2	39.5
LnGrp LOS	E	D	D	E	D	D	F	F	F	F	D	D
Approach Vol, veh/h	829				447		1995				752	
Approach Delay, s/veh	53.4				50.9		84.0				48.7	
Approach LOS	D				D		F				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.3	56.8	15.3	47.7	29.0	42.0	21.0	42.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	10.5	45.5	13.5	44.5	24.5	31.5	21.5	36.5				
Max Q Clear Time (g_c+1.9), s	19.6	53.3	5.8	32.9	26.5	19.6	16.4	22.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	5.5	0.0	10.2	0.0	6.2				
Intersection Summary												
HCM 2010 Ctrl Delay			67.4									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

17: Osgood Rd & North BART Access

03/06/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	0	20	0	0	0	20	1620	0	0	1030	70
Future Volume (veh/h)	60	0	20	0	0	0	20	1620	0	0	1030	70
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.70				1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900				1863	1863	0	0	1863	1900
Adj Flow Rate, veh/h	67	0	22				22	1800	0	0	1144	78
Adj No. of Lanes	1	1	0				1	2	0	0	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				2	2	0	0	2	2
Cap, veh/h	99	0	62				42	2988	0	0	2587	176
Arrive On Green	0.06	0.00	0.06				0.02	0.84	0.00	0.00	0.77	0.77
Sat Flow, veh/h	1774	0	1112				1774	3632	0	0	3450	229
Grp Volume(v), veh/h	67	0	22				22	1800	0	0	603	619
Grp Sat Flow(s),veh/h/ln	1774	0	1112				1774	1770	0	0	1770	1816
Q Serve(g_s), s	3.3	0.0	1.7				1.1	14.5	0.0	0.0	10.7	10.7
Cycle Q Clear(g_c), s	3.3	0.0	1.7				1.1	14.5	0.0	0.0	10.7	10.7
Prop In Lane	1.00		1.00				1.00		0.00	0.00		0.13
Lane Grp Cap(c), veh/h	99	0	62				42	2988	0	0	1364	1399
V/C Ratio(X)	0.68	0.00	0.35				0.53	0.60	0.00	0.00	0.44	0.44
Avail Cap(c_a), veh/h	609	0	382				365	2988	0	0	1364	1399
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.80	0.80	0.00	0.00	0.72	0.72
Uniform Delay (d), s/veh	41.7	0.0	40.9				43.4	2.2	0.0	0.0	3.6	3.6
Incr Delay (d2), s/veh	7.8	0.0	3.4				8.0	0.7	0.0	0.0	0.8	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
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.6				0.6	7.1	0.0	0.0	5.3	5.4
LnGrp Delay(d),s/veh	49.5	0.0	44.3				51.4	2.9	0.0	0.0	4.3	4.3
LnGrp LOS	D		D				D	A			A	A
Approach Vol, veh/h		89						1822			1222	
Approach Delay, s/veh		48.2						3.5			4.3	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		80.5		9.5	6.6	73.9						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		50.1		30.9	18.5	27.1						
Max Q Clear Time (g_c+I1), s		16.5		5.3	3.1	12.7						
Green Ext Time (p_c), s		28.1		0.3	0.0	13.2						
Intersection Summary												
HCM 2010 Ctrl Delay			5.1									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1500	100	0	1400	0	80
Future Vol, veh/h	1500	100	0	1400	0	80
Conflicting Peds, #/hr	0	10	0	0	0	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1667	111	0	1556	0	89

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 854
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.32
Pot Cap-1 Maneuver	-	-	0 - 0 302
Stage 1	-	-	0 - 0
Stage 2	-	-	0 - 0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 296
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	22.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	296	-	-	-
HCM Lane V/C Ratio	0.3	-	-	-
HCM Control Delay (s)	22.3	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.2	-	-	-

Intersection

Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	40	0	0	0	140	10	0	0	20	0
Future Vol, veh/h	0	0	40	0	0	0	140	10	0	0	20	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	44	0	0	0	156	11	0	0	22	0
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	6.9	0	8.3	7.3
HCM LOS	A	-	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	93%	0%	0%	0%
Vol Thru, %	7%	0%	100%	100%
Vol Right, %	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	40	0	20
LT Vol	140	0	0	0
Through Vol	10	0	0	20
RT Vol	0	40	0	0
Lane Flow Rate	167	44	0	22
Geometry Grp	1	1	1	1
Degree of Util (X)	0.195	0.046	0	0.026
Departure Headway (Hd)	4.217	3.76	4.406	4.139
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	853	958	0	859
Service Time	2.234	1.76	2.407	2.191
HCM Lane V/C Ratio	0.196	0.046	0	0.026
HCM Control Delay	8.3	6.9	7.4	7.3
HCM Lane LOS	A	A	N	A
HCM 95th-tile Q	0.7	0.1	0	0.1

APPENDIX E: MODEL VALIDATION SUMMARY



Using FHWA Screenline Maximum Deviation/RMSE

Counts

Screenline Count (for Deviation)

Screenline	AM	PM	Daily
A: I-880 and I-680	22,005	18,881	323,940
B: East-West volumes, west of I-680	6,367	5,857	
C: East-West volumes, west of Fremont Blvd	5,755	5,968	
D: North-South volumes, north of Wash Blvd	2,692	2,890	
E: North-South volumes, south of Auto Mall Pkwy	3,320	3,843	

Goals

AM	PM	Daily
45%	55%	20%
55%	55%	
55%	55%	
55%	55%	
55%	55%	

Screenline Count (for RMSE)

Screenline	AM	PM
A: I-880 and I-680	22,005	18,881

Goal

AM	PM
28%	35%

Model Estimate

Screenline Count (for Deviation)

Screenline	AM	PM	Daily
A: I-880 and I-680	23,052	23,712	306,273
B: East-West volumes, west of I-680	6,547	6,282	
C: East-West volumes, west of Fremont Blvd	6,362	6,198	
D: North-South volumes, north of Wash Blvd	2,150	2,251	
E: North-South volumes, south of Auto Mall Pkwy	3,513	3,418	

Goals

AM	PM	Daily
45%	55%	20%
55%	55%	
55%	55%	
55%	55%	
55%	55%	

Screenline Count (for RMSE)

Screenline	AM	PM
A: I-880 and I-680	23,052	23,712

Goal

AM	PM
28%	35%

Deviation

Screenline Volume Deviation

Screenline	AM	PM	Daily
A: I-880 and I-680	5%	26%	-5%
B: East-West volumes, west of I-680	3%	7%	
C: East-West volumes, west of Fremont Blvd	11%	4%	
D: North-South volumes, north of Wash Blvd	-20%	-22%	
E: North-South volumes, south of Auto Mall Pkwy	6%	-11%	

Goals

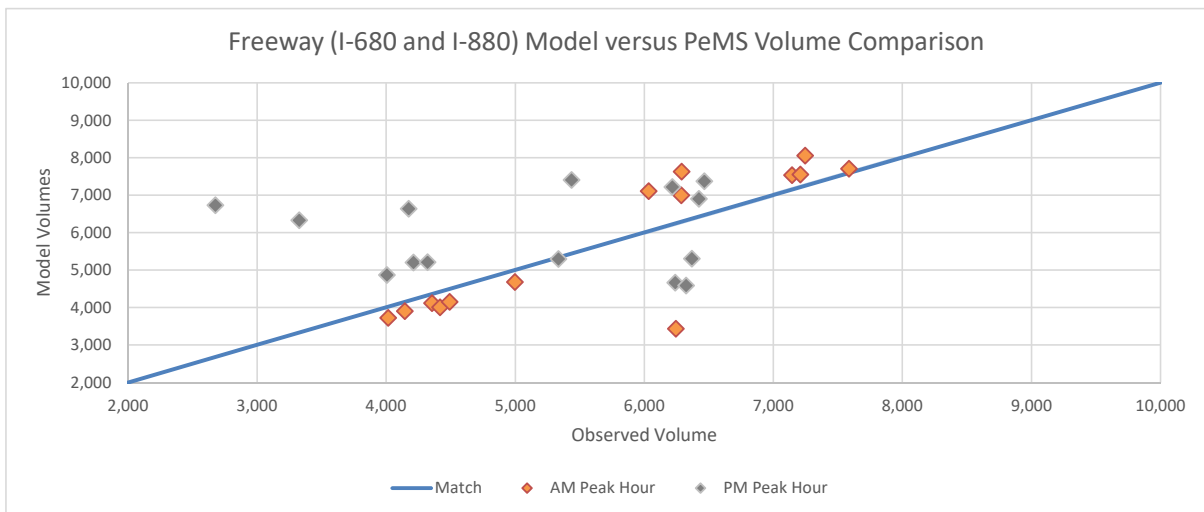
AM	PM	Daily
45%	55%	20%
55%	55%	
55%	55%	
55%	55%	
55%	55%	

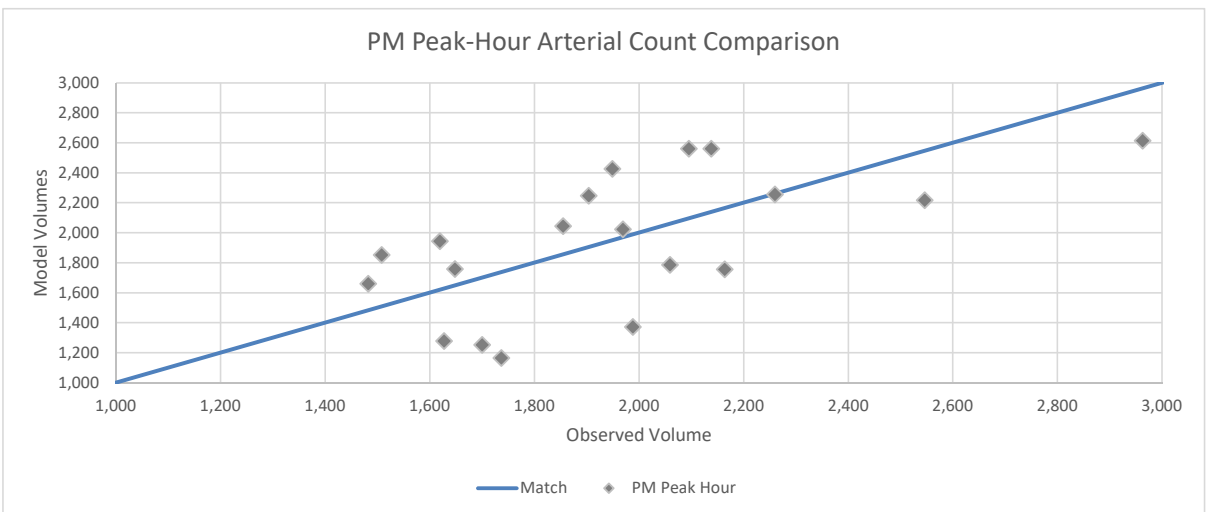
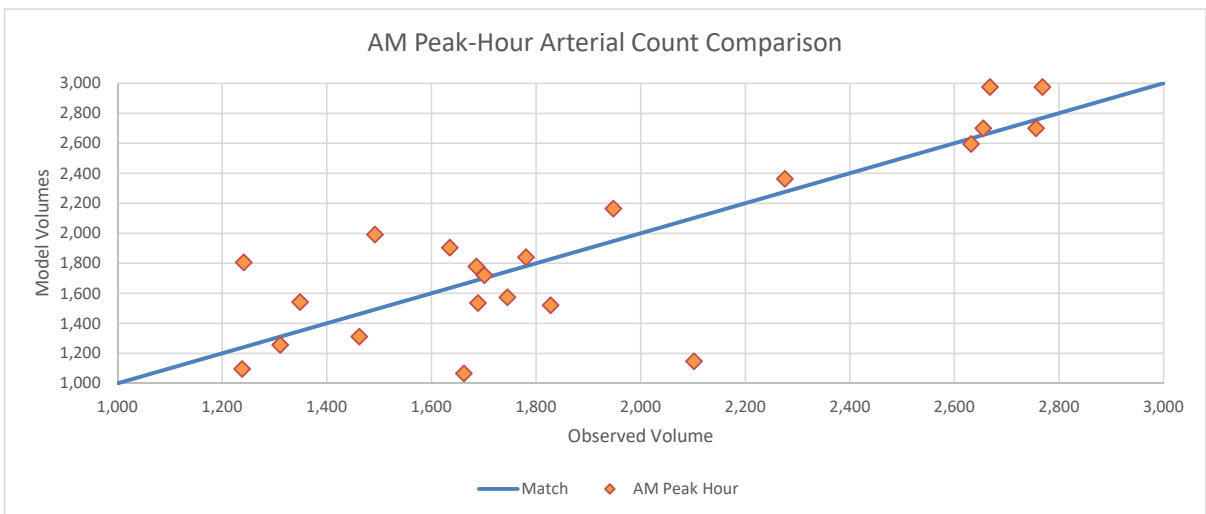
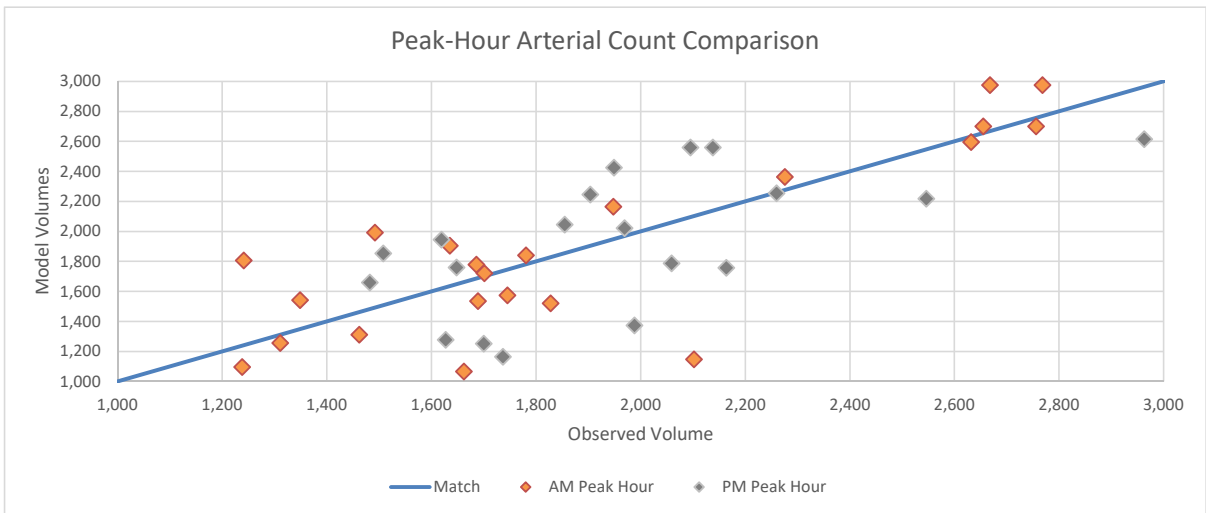
Screenline RMSE

Screenline	AM	PM
A: I-880 and I-680	17%	36%

Goal

AM	PM
28%	35%





Using daily Caltrans Maximum Deviation						
TWO-WAY						
AM Peak Hour						
Metric	Goal	All Links	Local Roadways	Freeways (non-HOV/HOT)	Freeways (HOV/HOT only)	Freeway Ramps
Model/Count Ratio =	+/-10%	1.00	1.01	1.06	0.76	0.96
Percent Within Caltrans Maximum Deviation =	>75%	93%	92%	100%	82%	100%
Percent Root Mean Square Error =	<40%	28%	31%	17%	46%	27%
Correlation Coefficient =	>0.88	94%	88%	85%	59%	63%
Count		71	38	14	11	8
PM Peak Hour						
Metric	Goal	All Links	Local Roadways	Freeways (non-HOV/HOT)	Freeways (HOV/HOT only)	Freeway Ramps
Model/Count Ratio =	+/-10%	1.07	0.98	1.34	0.53	0.95
Percent Within Caltrans Maximum Deviation =	>75%	79%	89%	86%	55%	50%
Percent Root Mean Square Error =	<40%	49%	32%	47%	59%	68%
Correlation Coefficient =	>0.88	87%	81%	-3%	-8%	13%
Count		71	38	14	11	8
ONE-WAY						
AM Peak Hour						
Metric	Goal	All Links	Local Roadways	Freeways (non-HOV/HOT)	Freeways (HOV/HOT only)	Freeway Ramps
Model/Count Ratio =	+/-10%	1.00	1.01	1.06	0.76	0.96
Percent Within Caltrans Maximum Deviation =	>75%	88%	86%	100%	82%	100%
Percent Root Mean Square Error =	<40%	31%	35%	17%	46%	27%
Correlation Coefficient =	>0.88	96%	89%	85%	59%	63%
Count		109	76	14	11	8
PM Peak Hour						
Metric	Goal	All Links	Local Roadways	Freeways (non-HOV/HOT)	Freeways (HOV/HOT only)	Freeway Ramps
Model/Count Ratio =	+/-10%	1.07	0.98	1.34	0.53	0.95
Percent Within Caltrans Maximum Deviation =	>75%	82%	88%	86%	55%	50%
Percent Root Mean Square Error =	<40%	58%	36%	47%	59%	68%
Correlation Coefficient =	>0.88	90%	80%	-3%	-8%	13%
Count		109	76	14	11	8

APPENDIX F: MODEL LAND USE CHANGES



Alameda CTC Model Land Use						
TAZ	Existing (2017)		2040 Off-The-Shelf		2040 Revised for Irvington BART	
	Residential	Jobs	Residential	Jobs	Residential	Jobs
	Total HH	Total	Total HH	Total	Total HH	Total
830	374	12	521	12	451	12
868	448	170	599	182	599	182
869	1,397	1,281	1,802	1,281	1,602	1,281
870	300	95	415	115	365	115
874	417	41	422	41	422	41
875	1,463	347	1,518	347	1,518	347
876	817	375	843	375	843	375
878	598	0	604	0	604	0
879	20	491	674	491	374	491
881	423	63	463	119	463	119
882	342	301	362	301	362	301
894	72	145	600	145	1,000	145
895	0	834	44	834	44	834
896	0	1,056	450	2,144	450	2,144
897	1	1,638	100	2,160	300	2,160
898	2	3,631	900	5,087	1,700	5,087
1527	328	301	423	301	423	301
1528	448	170	599	182	599	182
1529	448	170	476	182	476	182
1530	300	95	415	115	415	115
1531	20	491	153	491	153	491
1532	598	0	604	0	604	0
1533	38	34	41	34	41	34
1534	20	491	153	491	153	491
1535	20	491	153	491	153	491
1536	35	812	35	812	35	812
1537	600	879	600	879	600	2,979
1538	25	1,759	25	1,759	25	1,759
1539	4	8,229	4	8,229	4	8,229
Study Area	9,558	24,402	13,998	27,600	14,778	29,700
City of Fremont Total	79,906	114,497	92,728	132,358	93,508	134,458

Fremont

