APPENDIX D
TRANSPORTATION BACKGROUND DATA

Transportation Impact Study for BioMarin 999 3rd Street San Rafael Campus Expansion

REVISED

Prepared for:
City of San Rafael

April 5, 2019

RS16-3456

FEHR PEERS

Table of Contents

Executive Summary 1

Introduction 3

Project Description 3

Study Area 5

Analysis Scenarios 7

Study Methodology 9

Analysis Methods 9

Roadway Operations 9

Traffic Forecasting 11

Significance Criteria 12

Existing Conditions 16

Roadway Network 16

Intersection Operations 21

Arterial Operations 22

Freeway Operations 23

Bicycle and Pedestrian Network 27

Bicycle Facilities 27

Pedestrian Network 27

Transit Network 29

Collision History 30

Baseline Conditions 33

Intersection Operations 37

Arterial Operations 38

Freeway Operations 39

Project Conditions 42

Trip Generation 42

BioMarin R&D Facility 42

Senior Services and Housing 44

Trip Generation Summary 47

Trip Distribution 47

Project Pedestrian Crossings 51

Baseline Plus Project Conditions (R&D Only) 54

Intersection Operations 57

Arterial Operations 58

Freeway Operations 59
Baseline Plus Project Conditions (R&D and Senior Services and Housing) 63
Intersection Operations 67
Arterial Operations 68
Freeway Operations 70
Cumulative Conditions 74
Intersection Operations 77
Arterial Operations 78
Freeway Operations 79
Cumulative Plus Project Conditions (R&D Only) 82
Intersection Operations 85
Arterial Operations 86
Freeway Operations 87
Cumulative Plus Project Conditions (R&D and Senior Services and Housing) 91
Intersection Operations 95
Arterial Operations 96
Freeway Operations 97
Impacts and Mitigation Measures 101
Project-Specific Impacts 101
Vehicle Travel 101
Bicycle and Pedestrian Travel 103
Transit Travel 104
Cumulative Impacts 104
Vehicle Travel 104
Vehicle Miles Traveled 108
Assumptions and Methodology 108
Results 108
Site Plan Review 111
Crossing Treatments and Intersection Controls 114

Appendices

Appendix A: Existing Conditions – Technical Calculations

Appendix B: Baseline Conditions – Technical Calculations

Appendix C: Baseline Plus Project Conditions (R&D Only) – Technical Calculations

Appendix D: Baseline Plus Project Conditions (R&D and Senior Services and Housing) – Technical Calculations

Appendix E: Cumulative Conditions – Technical Calculations

Appendix F: Cumulative Plus Project Conditions (R&D Only) – Technical Calculations

Appendix G: Cumulative Plus Project Conditions (R&D and Senior Services and Housing) – Technical Calculations

List of Figures

Figure 1: Project Location 4
Figure 2: AM Peak Hour Traffic Volumes and Lane Configurations – Existing Conditions 19
Figure 3: PM Peak Hour Traffic Volumes and Lane Configurations – Existing Conditions 20
Figure 4: Weekday Peak Hour Freeway Volumes – Existing Conditions 25
Figure 5: Weekday Peak Hour Off-Ramp Queues – Existing Conditions 26
Figure 6: AM Peak Hour Traffic Volumes and Lane Configurations – Baseline Conditions 35
Figure 7: PM Peak Hour Traffic Volumes and Lane Configurations – Baseline Conditions 36
Figure 8: Weekday Peak Hour Freeway Volumes – Baseline Conditions 41
Figure 9: Trip Distribution (R& D Only) – AM Peak Hour 48
Figure 10: Trip Distribution (R&D only) – PM Peak Hour 49
Figure 11: Trip Distribution (Senior Services and Housing) 50
Figure 12: AM Peak Hour Traffic Volumes and Lane Configurations – Baseline Plus Project Conditions (R&D Only) 55
Figure 13: PM Peak Hour Traffic Volumes and Lane Configurations – Baseline Plus Project Conditions (R&D Only) 56
Figure 14: Weekday Peak Hour Freeway Volumes – Baseline Plus Project Conditions (R&D Only) 62
Figure 15: AM Peak Hour Traffic Volumes and Lane Configurations – Baseline Plus Project Conditions (R&D and Senior Services and Housing) 65
Figure 16: PM Peak Hour Traffic Volumes and Lane Configurations – Baseline Plus Project Conditions (R&D and Senior Services and Housing) 66
Figure 17: Weekday Peak Hour Freeway Volumes – Baseline Plus Project Conditions (R&D Only) 73
Figure 18: AM Peak Hour Traffic Volumes and Lane Configurations – Cumulative Conditions 75
Figure 19: PM Peak Hour Traffic Volumes and Lane Configurations – Cumulative Conditions 76
Figure 20: Weekday Peak Hour Freeway Volumes – Cumulative Conditions 81
Figure 21: AM Peak Hour Traffic Volumes and Lane Configurations – Cumulative Plus Project Conditions (R&D Only) 83
Figure 22: PM Peak Hour Traffic Volumes and Lane Configurations – Cumulative Plus Project Conditions (R&D Only) 84
Figure 23: Weekday Peak Hour Freeway Volumes – Cumulative Plus Project Conditions (R&D Only) 90
Figure 24: AM Peak Hour Traffic Volumes and Lane Configurations – Cumulative Plus Project Conditions (R&D and Senior Services and Housing) 93
Figure 25: PM Peak Hour Traffic Volumes and Lane Configurations – Cumulative Plus Project Conditions (R&D and Senior Services and Housing) 94
Figure 26: Weekday Peak Hour Freeway Volumes – Cumulative Plus Project Conditions (R&D and Senior Services and Housing) 100
Figure 27: 2018 BioMarin San Rafael Campus Employee Home Locations 110
Figure 28: Site Plan Review 113

List of Tables

table 1: Intersection Level Of Service Definitions 10
Table 2: Arterial Level Of Service Definitions 10
Table 3: Freeway Level Of Service Definitions 11
Table 4: Weekday Peak Hour Intersection Operations – Existing Conditions 21
Table 5: Weekday Peak Hour Arterial Operations – Existing Conditions 23
Table 6: Weekday Peak Hour Freeway Operations – Existing Conditions 24
Table 7: Weekday Peak Hour Off-Ramp Queues – Existing Conditions 24
Table 8: Intersection Pedestrian Volumes – Existing Conditions 29
Table 9: Collision History At Study Intersections 30
Table 10: Weekday Peak Hour Intersection Operations – Baseline Conditions 37
Table 11: Weekday Peak Hour Arterial Operations – Baseline Conditions 39
Table 12: Weekday Peak Hour Freeway Operations – Baseline Conditions 40
Table 13: Weekday Peak Hour Off-Ramp Queue Length Increase – Baseline Conditions 40
Table 14: Trip Generation Rates For Proposed BioMarin Facility (Based On BioMarin San Rafael Campus Observations) 43
Table 15: Trip Generation Rates For Proposed BioMarin Facility (Based On ITE) 43
Table 16: Trip Generation Estimate For BioMarin R&D Facility 44
Table 17: Trip Generation Estimate For Senior Center And Housing 44
Table 18: Mxd Trip Reduction Summary 46
Table 19: Mode Share For Senior Center Visitors 46
Table 20: Total Vehicle Trip Generation Summary 47
Table 21: AM And PM Peak Hour New Pedestrian Crossings 52
Table 22: Lunchtime Peak Hour New Pedestrian Crossings 53
Table 23: Weekday Peak Hour Intersection Operations – Baseline Plus Project Conditions (R&D Only) 57
Table 24: Weekday Peak Hour Arterial Operations – Baseline Plus Project Conditions (R&D Only) 59
Table 25: Weekday Peak Hour Arterial Volume/Capacity – Baseline Plus Project Conditions (R&D Only) 59
Table 26: Weekday Peak Hour Freeway Operations – Baseline Plus Project Conditions (R&D Only) 60
Table 27: Weekday Peak Hour Freeway Volume/Capacity – Baseline Plus Project Conditions (R&D Only) 60
Table 28: Weekday Peak Hour Off-Ramp Queue Length Increase – Baseline Plus Project Conditions (R&D Only) 61
Table 29: Weekday Peak Hour Intersection Operations – Baseline Plus Project Conditions (R&D And Senior Services And Housing) 67
Table 30: Weekday Peak Hour Arterial Operations – Baseline Plus Project Conditions (R&D And Senior Services And Housing) 69
Table 31: Weekday Peak Hour Arterial Volume/Capacity – Baseline Plus Project Conditions (R&D And Senior Services And Housing) 70
Table 32: Weekday Peak Hour Freeway Operations – Baseline Plus Project Conditions (R&D And Senior Services And Housing) 71

Table 33: Weekday Peak Hour Freeway Volume/Capacity – Baseline Plus Project Conditions (R&D Only And Senior Services And Housing)....71
Table 34: Weekday Peak Hour Off-Ramp Queue Length Increase – Baseline Plus Project Conditions (R&D And Senior Services And Housing)....72
Table 35: Weekday Peak Hour Intersection Operations – Cumulative Conditions....77
Table 36: Weekday Peak Hour Arterial Operations – Cumulative Conditions....79
Table 37: Weekday Peak Hour Freeway Operations – Cumulative Conditions....80
Table 38: Weekday Peak Hour Off-Ramp Queues – Cumulative Conditions....80
Table 39: Weekday Peak Hour Intersection Operations – Cumulative Plus Project Conditions (R&D Only)....85
Table 40: Weekday Peak Hour Arterial Operations – Cumulative Plus Project Conditions (R&D Only)....87
Table 41: Weekday Peak Hour Arterial Volume/Capacity – Cumulative Plus Project Conditions (R&D Only)....87
Table 42: Weekday Peak Hour Freeway Operations – Cumulative Plus Project Conditions (R&D Only)....88
Table 43: Weekday Peak Hour Freeway Volume/Capacity – Cumulative Plus Project Conditions (R&D Only)....89
Table 44: Weekday Peak Hour Off-Ramp Queue Length Increase – Cumulative Plus Project Conditions (R&D Only)....89
Table 45: Weekday Peak Hour Intersection Operations – Cumulative Plus Project Conditions (R&D And Senior Services And Housing)....95
Table 46: Weekday Peak Hour Arterial Operations – Cumulative Plus Project Conditions (R&D And Senior Services And Housing)....97
Table 47: Weekday Peak Hour Arterial Volume/Capacity – Cumulative Plus Project Conditions (R&D And Senior Services And Housing)....97
Table 48: Weekday Peak Hour Freeway Operations – Cumulative Plus Project Conditions (R&D And Senior Services And Housing)....98
Table 49: Weekday Peak Hour Freeway Volume/Capacity – Cumulative Plus Project Conditions (R&D And Senior Services And Housing....99
Table 50: Weekday Peak Hour Off-Ramp Queue Length Increase – Cumulative Plus Project Conditions (R&D And Senior Services And Housing)....99
Table 51: Home-Work Vehicle Miles Traveled....109
Table 52: Comparison Of Control Options For Intersection Of 3rd Street And Brooks Street....117
Table 53: Comparison Of Control Options For Intersection Of 3rd Street And Brooks Street (Arterial Results) 117
Table 54: Comparison Of Control Options For Intersection Of 3rd Street And Brooks Street (Lunchtime Peak Hour)....118
Table 55: Comparison Of Crosswalk Options For Intersection Of 3rd Street And Lindaro Street....119
Table 56: Comparison Of Crosswalk Options For Intersection Of 3rd Street And Lindaro Street (Arterial Results)....120
Table 57: Comparison Of Crosswalk Options For Intersection Of 3rd Street And Lindaro Street (Lunchtime Peak Hour)....120
Table 58: Comparison Of Control Options For Intersection Of 3rd Street And Lindaro Street....121
Table 59: Comparison Of Control Options For Intersection Of 3rd Street And Lindaro Street (Arterial Results)....122
Table 60: Comparison Of Control Options For Intersection Of 3rd Street And Lindaro Street (Lunchtime Peak Hour)....122
Table 61: Comparison Of Control Options For Intersection Of 2nd Street And Brooks Street....124

Table 62: Comparison Of Control Options For Intersection Of 2nd Street And Brooks Street (Arterial Results) 124
Table 63: Effect Of One-Way Conversion Of Brooks Street 125
Table 64: Effect Of One-Way Conversion Of Brooks Street (Arterial Results) 125

Executive Summary

This study analyzes the transportation impacts associated with the proposed BioMarin San Rafael campus expansion project at 999 3rd Street in San Rafael. The proposed project will expand the current BioMarin campus by adding 110,000 gross square feet (GSF) of office and 97,000 GSF of laboratory space for research and development (R&D). Additionally, BioMarin is dedicating the northwest corner of the site for development of a senior center (18,000 GSF) and affordable housing (67 units) for low income seniors.

The CEQA transportation impact assessment consists of:

- Traffic operations at 36 intersections
- Traffic operations on five arterials
- Freeway operations on US 101 from north of the Mission Avenue ramps to south of the 2nd Street ramps
- Bicycle, pedestrian, and transit conditions at these locations and adjacent to the project site

The transportation assessment identifies significant and unavoidable impacts at two intersections, on one arterial, and on one freeway segment.

- 3rd Street and Tamalpais Avenue West intersection during the AM and PM peak hours (Cumulative conditions)
- 3rd Street arterial during the AM peak hour (Baseline conditions and Cumulative conditions)
- US 101 southbound Mission Avenue off-ramp diverge segment during the AM peak hour (Cumulative conditions)

Pedestrian safety concerns and the limited roadway and freeway width available to add lanes result in impacts being significant but unavoidable. Additional recommendations are provided to reduce vehicle delay on intersections operating unacceptably.

This study also provides a forecast of vehicle miles traveled for the project. Employee home-work VMT are estimated to be higher than City and regional averages.

This report additionally includes a review of the project site plan. Improvements are suggested to enhance vehicle and pedestrian access and safety. Crossing treatment and intersection control option to improve pedestrian connectivity and safety at the four intersections adjacent to the project site are also evaluated.

The report includes additional analysis requested by the City of San Rafael, including:

- Addition of a westbound left-turn pocket at the intersection of 3rd Street and Brooks Street
- Addition of a turnout at the 3rd Street driveway
- Removal of the future reconfiguration of the intersection of 3rd Street and Hetherton Street
- Analysis of improvements at 3rd Street and Brooks Street to provide a pedestrian crossing of 3rd Street
- Analysis of improvements at 2nd Street and Brooks Street to resolve visibility concerns for southbound left-turning vehicles
- Analysis of improvements at 3rd Street and Lindaro Street to provide a more direct pedestrian connection to downtown
- Analysis of pedestrian crossings at 2nd Street and Brooks Street
- Discussion of bike parking

Introduction

This report documents the existing, baseline, and cumulative conditions for the proposed BioMarin San Rafael campus expansion project at 999 3rd Street in San Rafael. The report then analyzes the impacts of the proposed project on baseline and cumulative conditions.

Project Description

The proposed project will expand the current BioMarin campus by adding 110,000 gross square feet (GSF) of office and 97,000 GSF of laboratory space for research and development (R&D). BioMarin proposes to leverage its campus parking model, with visitor, ADA, and service parking on site. Most (non-ADA) BioMarin employees working at the project site will park at the existing BioMarin garage and surface parking south of 2nd Street, where there is a large parking surplus. Additionally, BioMarin is dedicating the northwest corner of the site for development of a senior center (18,000 GSF) and affordable housing (67 units) for low income seniors. The senior center will include classrooms, meeting spaces, and other senior services. The senior center will have parking located on the ground floor of the building. No parking will be provided for senior residents.

Project Location

The project site occupies approximately three acres, bounded by 3rd Street to the north, 2nd Street to the south, Brooks Street to the west, and Lindaro Street to the east as shown in Figure 1. This site is currently vacant and was formerly occupied by PG&E.

The project site is located in downtown San Rafael, an area of mixed office, retail, dining, and other uses. The site has good walking and transit access including to the C. Paul Bettini Transit Center and the Sonoma-Marin Area Rail Transit (SMART) San Rafael downtown train station approximately two blocks to the east. The US 101/2nd Street interchange is approximately three blocks to the east. The site is also adjacent to the existing BioMarin San Rafael campus located south of 2nd Street.

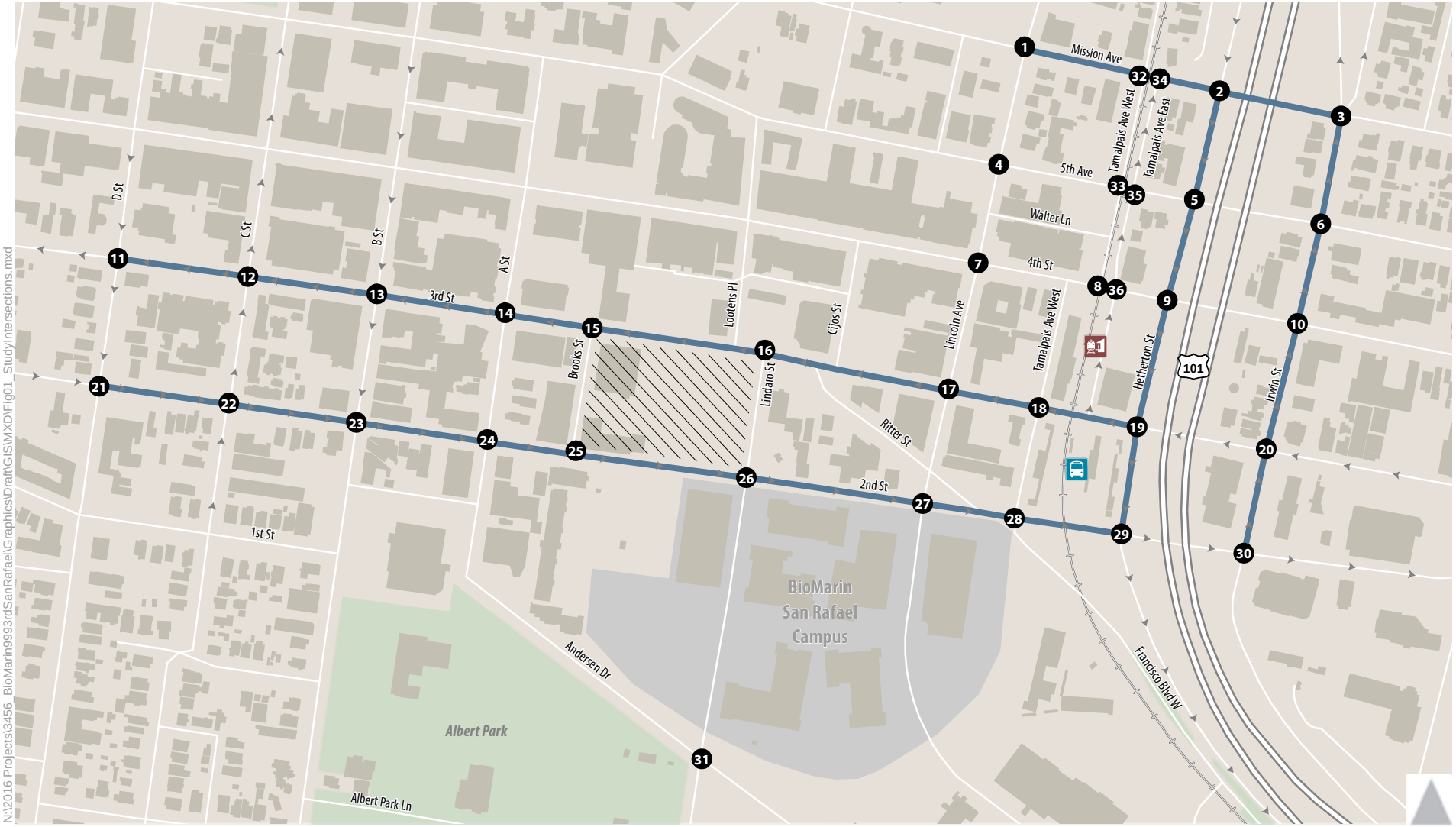


Figure 1

Project Location

Study Area

Intersections are generally the critical nodes of urban roadway networks that control system capacity and driver experience. Therefore, the operations of critical intersections surrounding the project site are used as indicators of the adequacy of the vehicular circulation system. During the scoping of the transportation impact analysis, the City requested analysis of 36 intersections, five arterial segments, and a section of US 101 (Figure 1) based on the project trip generation and distribution. These analysis locations are:

Study Intersections

1. Mission Avenue and Lincoln Avenue
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street
4. 5th Avenue and Lincoln Avenue
5. 5th Avenue and Hetherton Street
6. 5th Avenue and Irwin Street
7. 4th Street and Lincoln Avenue
8. 4th Street and Tamalpais Avenue West
9. 4th Street and Hetherton Street
10. 4th Street and Irwin Street
11. 3rd Street and D Street
12. 3rd Street and C Street
13. 3rd Street and B Street
14. 3rd Street and A Street
15. 3rd Street and Brooks Street
16. 3rd Street and Lindaro Street
17. 3rd Street and Lincoln Avenue
18. 3rd Street and Tamalpais Avenue West
19. 3rd Street and Hetherton Street
20. 3rd Street and Irwin Street
21. 2nd Street and D Street
22. 2nd Street and C Street
23. 2nd Street and B Street
24. 2nd Street and A Street
25. 2nd Street and Brooks Street
26. 2nd Street and Lindaro Street
27. 2nd Street and Lincoln Avenue
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp
30. 2nd Street and Irwin Street/US 101 Northbound Ramp
31. Andersen Drive and Lindaro Street
32. Tamalpais Avenue West and Mission Avenue
33. Tamalpais Avenue West and 5th Avenue
34. Tamalpais Avenue East and Mission Avenue
35. Tamalpais Avenue East and 5th Avenue
36. Tamalpais Avenue East and 4th Street

Arterial Study Segments

1. Mission Avenue from Lincoln Avenue to US 101 Northbound Ramp/Irwin Street
2. 3rd Street from Hetherton Street to D Street
3. 2nd Street from D Street to Hetherton Street/US 101 Southbound Ramp
4. Hetherton Street from Mission Avenue to 2nd Street
5. Irwin Street from 2nd Street to Mission Avenue

Freeway Study Segments

- US 101 segments from north of Mission Avenue ramps to south of 2nd Street ramps

Analysis Scenarios

The analysis includes an evaluation of transportation conditions during a typical weekday AM peak hour, occurring between 7:00 and 9:00 AM, and PM peak hour, occurring between 4:00 and 6:00 PM, when the combination of traffic on the surrounding roadway network and traffic generated by the project would peak.

This report presents the analysis of the following scenarios:

- Existing Conditions – Existing volumes based on recent traffic counts and the Synchro model provided by the City.

- Baseline Conditions – Existing volumes plus traffic volume estimates for approved, but not yet constructed, development; traffic increases due to regional growth expected prior to the proposed project opening (estimated 2023); and approved/funded transportation system improvements expected to be in place when the project opens. These projects are:

    - Seagate apartments, 703 3rd Street
    - Senior assisted housing, 1203 Lincoln Avenue
    - Addition of a leading pedestrian interval to the intersection of 3rd Street and Tamalpais Avenue West
    - SMART train extension to Larkspur

- Baseline Plus Project Conditions (R&D Only) – Baseline conditions plus project trip generation for the new R&D buildings only, assigned to the network based on existing travel patterns, site access, and the location and quantity of available parking.

- Baseline Plus Project Conditions (R&D & Senior Services and Housing) – Baseline conditions plus project trip generation developed for both the BioMarin and Senior Services and Housing buildings, assigned to the network based on existing travel patterns, site access, and the location and quantity of available parking.

- Cumulative Conditions – This scenario includes market-level population and employment growth and expected transportation improvements for year 2040. This scenario includes the Baseline Conditions scenario and adds the following:

    - Background growth, derived from the Metropolitan Transportation Commission Travel Demand Model

    - Conversion of C Street and D Street between 4th Street and 5th Street from one-way to two-way

    - Conversion of Tamalpais Avenue West between Mission Avenue and 4th Street from two-way to one-way southbound

- Conversion of Tamalpais Avenue West between 4th Street and 3rd Street from two-way to one-way northbound
- Employing signal optimization technology

- Cumulative Plus Project Conditions (R&D Only) – Cumulative conditions plus project trip generation for the new R&D buildings only, assigned to the network based on existing travel patterns, site access, and the location and quantity of available parking.
- Cumulative Plus Project Conditions (R&D & Senior Services and Housing) – Baseline conditions plus project trip generation developed for both the BioMarin and Senior Services and Housing buildings, assigned to the network based on existing travel patterns, site access, and the location and quantity of available parking.

Study Methodology

This chapter presents the analysis methodology and significance criteria applied in this study.

Analysis Methods

This study analyzes traffic operations using level of service (LOS) as the primary measure of performance. Automobile LOS is a qualitative description of traffic flow from the perspective of motorists. The *Highway Capacity Manual* (HCM) defines six levels of service from LOS A representing the least congested traffic conditions to LOS F representing the most congested traffic conditions. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving, as well as speed, travel time, traffic interruptions, and freedom to maneuver.

Roadway Operations

Traffic operations at all study intersections and arterial segments were analyzed for weekday AM and PM peak hour conditions using procedures and methodologies contained in the *Highway Capacity Manual* (Transportation Research Board, 2010) (HCM 2010) for calculating delay at intersections and on arterials. These methodologies were applied using the Synchro software program. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for such intersections are based on HCM 2000 methodology. Additionally, the four intersections adjacent to the project site were analyzed using the SimTraffic software program. Existing conditions data were provided in Synchro network and data files by the City of San Rafael and then updated with traffic count data provided by the City, collected by Fehr & Peers in 2016, and new counts collected by Fehr & Peers on October 24, November 7, and December 13, 2017, February 27, 2018, and March 21, 2019. Updates were made to the Synchro networks to reflect current observed conditions.

Signalized and Unsignalized Intersections

Table 1 displays the average delay ranges associated with each LOS category for intersections.

TABLE 1: INTERSECTION LEVEL OF SERVICE DEFINITIONS		
Level of Service	**Average Control Delay (seconds/vehicle)[1]**	
	Signalized	**Unsignalized**
A	0 – 10.0	0 – 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	> 80.0	> 50.0

Notes:

1. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and acceleration delay based on Highway Capacity Manual (Transportation Research Board, 2010).

For signalized intersections, the LOS is based on the average delay experienced by all vehicles passing through the intersection. For side-street stop controlled intersections, the delay and LOS for the worst movement is reported along with the average delay for the entire intersection.

Arterials

Table 2 displays the average travel speed ranges associated with each LOS category for arterials. Thresholds are from the San Rafael 2020 General Plan.

TABLE 2: ARTERIAL LEVEL OF SERVICE DEFINITIONS	
Level of Service	**Speed (mph)**
A	≥ 25.1
B	19.1 - 25.0
C	13.1 – 19.0
D	9.1 – 13.0
E	7.1 – 9.0
F	≤ 7.0

Source: San Rafael 2020 General Plan.

As discussed in the following significance criteria section, arterial LOS for TAM Congestion Management Plan (CMP) segments are determined based on volume-to-capacity ratio (V/C). The San Rafael 2020 General Plan EIR used model results to estimate this number. The Metropolitan Transportation Commission Travel Demand Model is the current available model for downtown San Rafael. This model indicates a capacity of 950 vehicles/hour/lane on 2nd Street and 3rd Street. Because this is generally higher than expected for a downtown arterial, a capacity of 800 vehicles/hour/lane is applied for those CMP segments.

Freeway Segments

Freeway operations on basic, merge, and diverge segments were analyzed for weekday AM and PM peak hour conditions using procedures and methodologies contained in the Highway Capacity Manual, Sixth Edition (Transportation Research Board, 2017). Weave segments were analyzed using the Leisch methodology, based on the Highway Design Manual (California Department of Transportation, 2014). Similar to intersections, the operating characteristics of freeway segments are evaluated using the concept of LOS. Freeway basic, merge, and diverge segment LOS is based on vehicle density (passenger cars per lane per mile). Table 3 shows the correlation of density and LOS. Inputs to calculate freeway segment densities were obtained from Caltrans Performance Measurement System (PeMS) data and from the traffic counts discussed earlier.

TABLE 3: FREEWAY LEVEL OF SERVICE DEFINITIONS

Level of Service	Density (passenger cars per mile per lane)
A	≤ 11.0
B	11.1 - 18.0
C	18.1 – 26.0
D	26.1 – 35.0
E	35.1 – 45.0
F	≥ 45.1

Source: Highway Capacity Manual 2010.

The purpose of the freeway analysis is to determine the project's contribution to the available capacity on the freeway; therefore, the Highway Capacity Software (HCS) was used to complete the analysis of basic, merge, and diverge segments. HCS is an appropriate analysis tool because it applies the freeway methodologies in the HCM by accounting for the volume demand and available capacity by segment. The HCS tool is a static model, which does not account for downstream queues. However, since the purpose of this analysis is to determine the project's contribution to the regional network, the static model approach was the most appropriate to account for the project's contribution.

For information purposes only, changes in freeway ramp queue lengths were estimated. The HCM methodology used in the Synchro software program does not adequately account for queue spillover or short turn pockets. Therefore, the differences between the Synchro estimated 95th percentile queue lengths under plus-project and no-project conditions are reported.

Traffic Forecasting

The Metropolitan Transportation Commission Travel Demand Model was used to estimate traffic growth in the study area. Although this model is the best available forecasting tool for San Rafael, it does not have a

network and traffic analysis zone structure sufficient to forecast traffic volume by segment in the study area. Thus, the model was used to determine expected annual traffic volume growth in the study area. This growth was determined to be 0.4% annually and applied to the existing condition volumes to derive forecasts for baseline and cumulative year conditions.

Significance Criteria

The following thresholds of significance have been used to determine whether implementing the proposed project would result in a significant transportation impact. The San Rafael General Plan 2020, the San Rafael General Plan 2020 EIR, and the Marin County Congestion Management Plan were all used to develop these criteria and thresholds.

Signalized Intersections

The citywide LOS standard from the San Rafael General Plan 2020 is LOS D except as noted below:

- LOS E
    a. Downtown
    b. Irwin Street and Grand Avenue between 2nd Street and Mission Avenue
    c. 3rd Street and Union Street (maximum of 70 seconds of delay during peak hours)
    d. Andersen Drive and West Francisco Boulevard
    e. Andersen Drive and Bellam Boulevard
    f. Freitas Parkway and Civic Center Drive/Redwood Highway
    g. Merrydale Road and Civic Center Drive
    h. Merrydale Road and Las Gallinas
- LOS F
    a. Mission Avenue and Irwin Street
- Signalized intersections at Highway 101 and I-580 on-ramps and off-ramps are exempt from LOS standards because delay at these intersections is affected by regional traffic and not significantly impacted by local measures.

The San Rafael General Plan 2020 EIR defines the following as significant impacts:

- If a signalized intersection with baseline traffic volumes is operating at an acceptable LOS and deteriorates to an unacceptable operation with the addition of project traffic; or

- If a signalized intersection with baseline traffic volumes is at an unacceptable LOS and project traffic causes an increase in the delay of five seconds or more.

Unsignalized Intersections

Consistent with the San Rafael General Plan 2020 EIR, a significant impact at an unsignalized intersection is identified based on the following:

- If an unsignalized intersection with baseline traffic volumes is operating at an acceptable LOS and deteriorates to an unacceptable operation with the addition of project traffic; or

- If an unsignalized intersection with baseline traffic volumes is already operating at an unacceptable LOS and project traffic causes an increase in the delay of five seconds or more.

Arterials

The citywide LOS standard for arterials, as defined in San Rafael General Plan 2020, is LOS D except as noted below (Congestion Management Segments are west of US 101):

a. Downtown except as noted below — E
    - Congestion Management Segments (2nd, 3rd, and 4th Streets) — D

b. Arterials operating at LOS E outside Downtown, and F[1] — F

For the arterials in this analysis, the applied standard is LOS D for 2nd Street and 3rd Street, LOS E for eastbound Mission Avenue, and LOS F for all other arterials.

For the purposes of this analysis, a significant impact on an arterial is identified based on the following, consistent with the San Rafael General Plan 2020 EIR and the 2015 Marin County Congestion Management Plan Update:

- If an arterial with baseline traffic volumes is operating at an acceptable LOS and deteriorates to an unacceptable operation with the addition of project traffic.

- If an arterial with baseline traffic volumes is already at an unacceptable LOS and project impact causes a decrease in the calculated average travel speed of five miles per hour or more (City

[1] Arterials operating at LOS E outside Downtown, and F as of the date of adoption of General Plan 2020, are listed in Appendix C of the San Rafael General Plan 2020.

arterials) or 0.05 volume to capacity (V/C) or more (congestion management arterials), this impact is significant.

Freeway

The Marin County Congestion Management Plan establishes LOS E as the threshold for US 101 through San Rafael. The San Rafael General Plan 2020 EIR defines the following as significant impacts:

- If a freeway segment with baseline traffic volumes is operating at an acceptable LOS (LOS A, B, C, D, or E) and deteriorates to an unacceptable operation (LOS F).
- If a freeway segment with baseline traffic volumes is already at operating at LOS F and there is an increase in the V/C of 0.01 or more.

Bicycle/Pedestrian

The San Rafael General Plan 2020 includes the following goals for pedestrian and bicycle conditions:

Goal 16: Bikeways. It is the goal of San Rafael to have safe, convenient and attractive bikeways and amenities.

Goal 17: Pedestrian Paths. It is the goal of San Rafael to have safe, convenient and pleasurable pedestrian amenities.

Consistent with these goals, bicycle/pedestrian impacts would be significant if the project:

- Caused a substantial inconvenience or substantial reduction in quality of service for users of existing bicycle or pedestrian travel facilities
- Substantially reduced bicycle or pedestrian access
- Substantially reduced safety for bicyclists or pedestrians

Transit

The San Rafael General Plan 2020 includes the following goal related to the transit network:

C-14 Transit Network. Encourage the continued development of a safe, efficient, and reliable regional and local transit network to provide convenient alternatives to driving.

Consistent with this goal, transit impacts would be significant if the project:

- Induced substantial growth or concentration of population beyond the capacity of existing or planned public transit facilities.

- Increased demand for public transit service to such a degree that accepted service standards are not maintained.
- Reduced availability of public transit to users, or interfered with existing transit users.

Existing Conditions

This chapter describes the existing transportation system and traffic conditions within the study area. This includes the existing roadway network, as well as transit, bicycle, and pedestrian facilities within the vicinity of the project site. This scenario is informative and establishes present-day traffic conditions at the study intersections, arterials, and freeway segments.

The quantitative assessment of existing traffic conditions is based on an evaluation of current traffic counts. The City of San Rafael maintains a database of existing traffic volumes and provided Synchro files for use in this traffic study. These data were augmented with traffic counts collected by Fehr & Peers in 2016. Additional traffic counts were collected at study intersections on Tuesday, October 24; Tuesday, November 7, on Wednesday, December 13, 2017, and on Tuesday, February 27, 2018, during the AM (7-9 AM) and PM (4-6 PM) peak periods. Schools were in session at the time of the counts, weather conditions were dry, and no unusual traffic conditions were observed.

Roadway Network

The local circulation system near the project is shown in Figure 1. The project site is located in downtown San Rafael and west of US 101. The following roadways provide local access to the proposed project site. All of these local streets have sidewalks along both sides unless otherwise noted.

3rd Street – 3rd Street is primarily a three-lane one-way street that serves westbound traffic. 3rd Street widens from two lanes to three lanes at Grand Avenue and then continues under the freeway into downtown. At E Street, 3rd Street reduces to two lanes and then merges with 2nd Street just west of Hayes Street. On-street parking is prohibited along the north side of 3rd Street and the south side east of Lindaro Street.

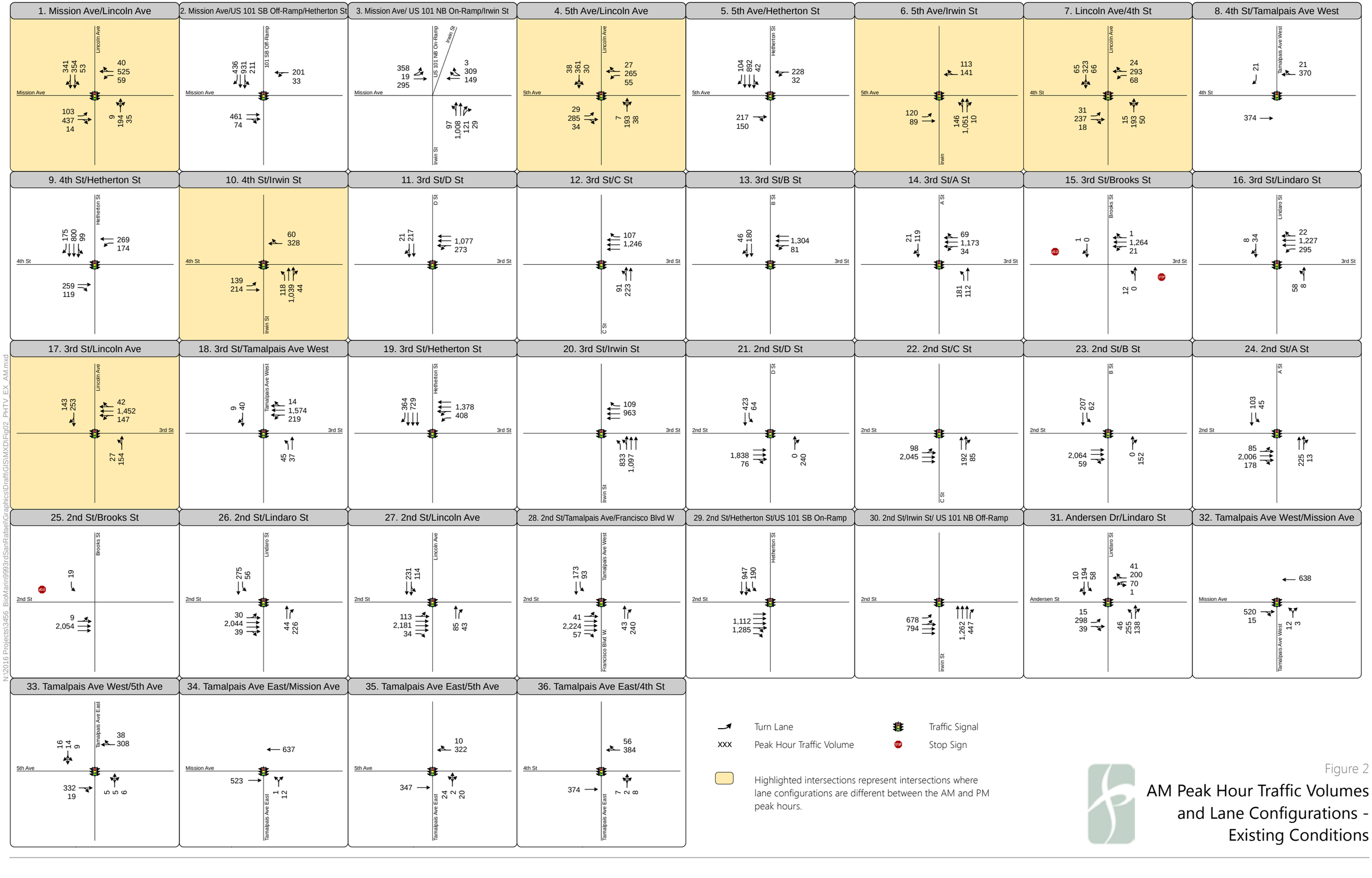
2nd Street – 2nd Street is primarily a three-lane one-way street that serves eastbound traffic. 2nd Street separates from 3rd Street and widens to three lanes just east of Miramar Avenue and continues through downtown. At Grand Avenue, 2nd Street reduces to two lanes and then merges with 3rd Street just west of Union Street. On-street parking is prohibited along 2nd Street. There are no sidewalks on the north side of 2nd Street between Lincoln Avenue and Ritter Street and the south side of 2nd Street between Francisco Boulevard West and Irwin Street.

Brooks Street – Brooks Street is a one-block long two-way street, with one travel lane in each direction that runs north-south between 2nd Street and 3rd Street. On-street parking is prohibited except for three spaces along the east curb just south of 3rd Street.

Lindaro Street – Lindaro Street is a two-way street, with one travel lane in each direction, which runs north-south from 3rd Street to Woodland Avenue. The crosswalk on the west leg of the intersection with 3rd Street is unmarked. Lindaro Street passes through the existing BioMarin San Rafael campus between 2nd Street and Andersen Drive.

Figure 2 and Figure 3 display the existing peak hour traffic volumes, lane configurations, and traffic controls at each study intersection for the AM and PM peak hours, respectively. Peak hours observed were 7:30-8:30 AM and 4:30-5:30 PM.

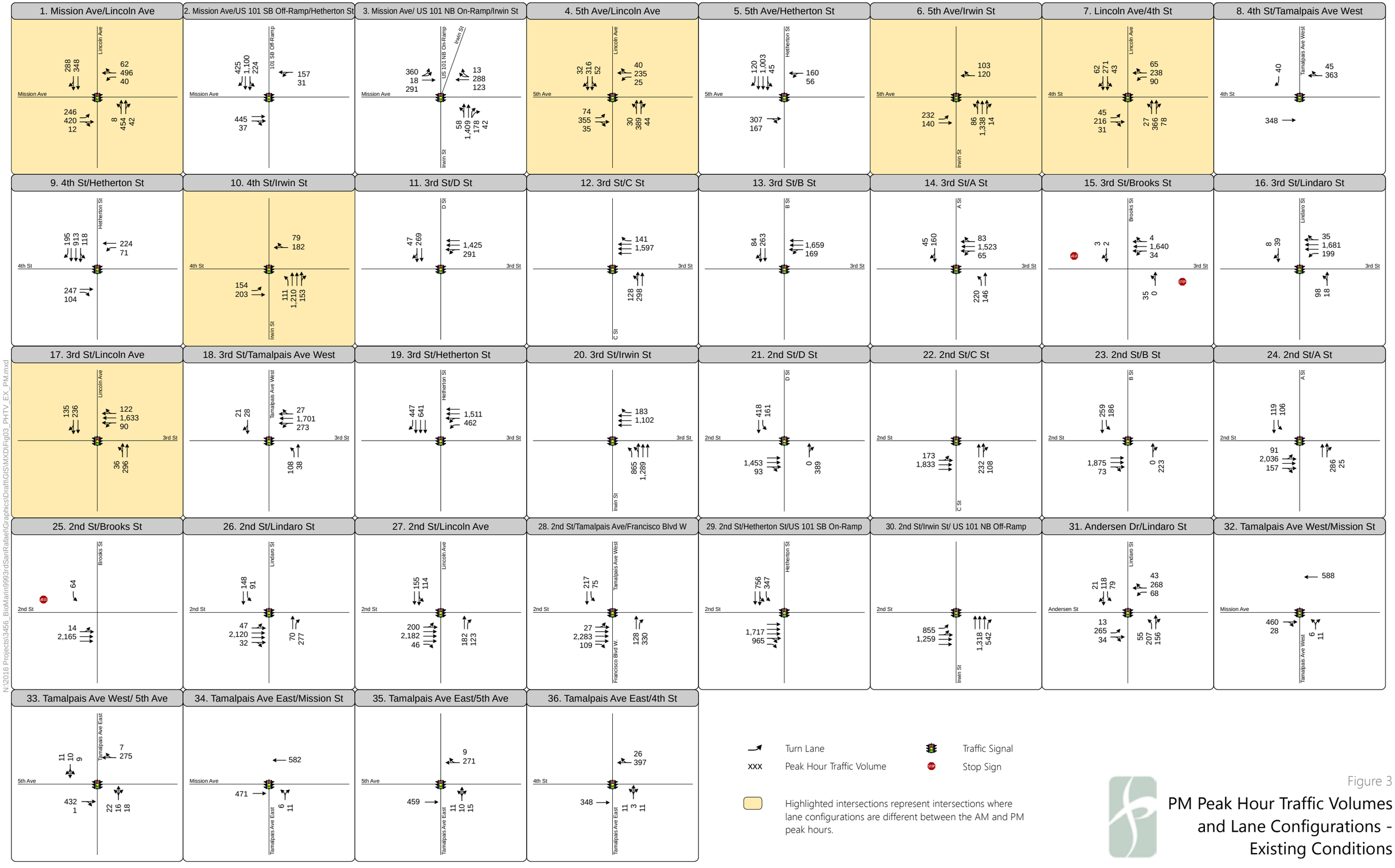
This page intentionally left blank.



N:\2016 Projects\3456_BioMarin\9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig02_PHTV_EX_AM.mxd

Figure 2

AM Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions



N:\2016 Projects\3456_BioMarin9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig03_PHTV_EX_PM.mxd

Figure 3

PM Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions

Intersection Operations

Table 4 summarizes the existing levels of service (LOS) at the study intersections. All intersections operate acceptably. Appendix A presents all LOS calculations.

TABLE 4: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – EXISTING CONDITIONS

Intersection	Control Type	LOS / Average Delay [1, 2]	
		AM	PM
1. Mission Avenue and Lincoln Avenue	Signal	C / 20.8	D / 39.0
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street[3]	Signal	D / 35.1	C / 22.9
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street[3]	Signal	C / 23.5	C / 22.2
4. 5th Avenue and Lincoln Avenue	Signal	B / 15.3	A / 9.1
5. 5th Avenue and Hetherton Street[3]	Signal	A / 6.8	A / 8.1
6. 5th Avenue and Irwin Street	Signal	D / 36.3	C / 28.9
7. 4th Street and Lincoln Avenue	Signal	B / 18.3	B / 19.8
8. 4th Street and Tamalpais Avenue West[3]	Signal	A / 5.9	A / 3.9
9. 4th Street and Hetherton Street[3]	Signal	A / 8.9	A / 9.1
10. 4th Street and Irwin Street	Signal	C / 32.4	C / 28.4
11. 3rd Street and D Street	Signal	C / 26.3	C / 29.5
12. 3rd Street and C Street	Signal	C / 24.7	C / 28.8
13. 3rd Street and B Street	Signal	C / 25.5	C / 32.6
14. 3rd Street and A Street	Signal	C / 26.1	C / 29.8
15. 3rd Street and Brooks Street	SSSC	A (B) / 1.7 (13.3)	A (A) / 1.6 (9.0)
16. 3rd Street and Lindaro Street	Signal	A / 5.7	A / 9.8
17. 3rd Street and Lincoln Avenue	Signal	D / 42.5	C / 30.3
18. 3rd Street and Tamalpais Avenue West	Signal	C / 30.4	C / 32.2
19. 3rd Street and Hetherton Street	Signal	C / 31.8	D / 44.1
20. 3rd Street and Irwin Street	Signal	C / 27.5	C / 30.7
21. 2nd Street and D Street	Signal	A / 3.2	A / 3.3
22. 2nd Street and C Street	Signal	D / 37.5	D / 36.2
23. 2nd Street and B Street	Signal	A / 2.2	A / 2.9
24. 2nd Street and A Street	Signal	D / 37.6	D / 35.1
25. 2nd Street and Brooks Street	SSSC	A (C) / 2.5 (15.6)	A (D) / 2.9 (26.0)
26. 2nd Street and Lindaro Street	Signal	B / 13.6	B / 13.4

TABLE 4: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – EXISTING CONDITIONS			
Intersection	**Control Type**	**LOS / Average Delay [1, 2]**	
		AM	**PM**
27. 2nd Street and Lincoln Avenue	Signal	D / 42.7	D / 37.3
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	Signal	D / 44.4	D / 37.1
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	Signal	D / 48.4	C / 32.6
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	Signal	C / 28.0	D / 44.9
31. Andersen Drive and Lindaro Street	Signal	C / 22.3	C / 21.0
32. Tamalpais Avenue West and Mission Avenue[3]	Signal	C / 20.4	B / 10.3
33. Tamalpais Avenue West and 5th Avenue[3]	Signal	A / 5.5	A / 6.5
34. Tamalpais Avenue East and Mission Avenue[3]	Signal	D / 49.9	B / 19.6
35. Tamalpais Avenue East and 5th Avenue[3]	Signal	A / 5.6	A / 3.9
36. Tamalpais Avenue East and 4th Street[3]	Signal	B / 12.0	A / 9.8

Notes:
1. LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
2. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
3. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for intersections 2, 3, 5, 8, 9, 32, 33, 34, 35, and 36 are based on HCM 2000 methodology.

Source: Fehr & Peers, 2018

Arterial Operations

Table 5 summarizes the existing levels of service on the arterials in the analysis area. All operate acceptably except for 2nd Street which operates unacceptably during the AM and PM peak hours. Appendix A includes arterial LOS calculations.

TABLE 5: WEEKDAY PEAK HOUR ARTERIAL OPERATIONS – EXISTING CONDITIONS

Arterial	Standard	LOS / Average Speed [1]	
		AM	PM
1. Mission Avenue EB from Lincoln Avenue to US 101 NB Ramp/Irwin Street	E	E / 8	D / 10
2. Mission Avenue WB from US 101 NB Ramp/Irwin Street to Lincoln Avenue	F	F / 4	F / 6
3. 3rd Street WB from Hetherton Street to D Street	D	D / 11	D / 12
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	D	**E / 7**	**E / 9**
5. Hetherton Street SB from Mission Avenue to 2nd Street	F	F / 7	E / 8
6. Irwin Street NB from 2nd Street to Mission Avenue	F	D / 9	D / 10

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.

Source: Fehr & Peers, 2018

Freeway Operations

Figure 4 presents existing conditions freeway volumes, and Table 6 summarizes the freeway segment density and LOS results. Detailed calculations are included in Appendix A. As shown, all segments operate at acceptable levels during the AM and PM peak hours with the exception of the southbound weave segment between the 2nd Street on-ramp and the I-580 EB off-ramp during the AM peak hour.

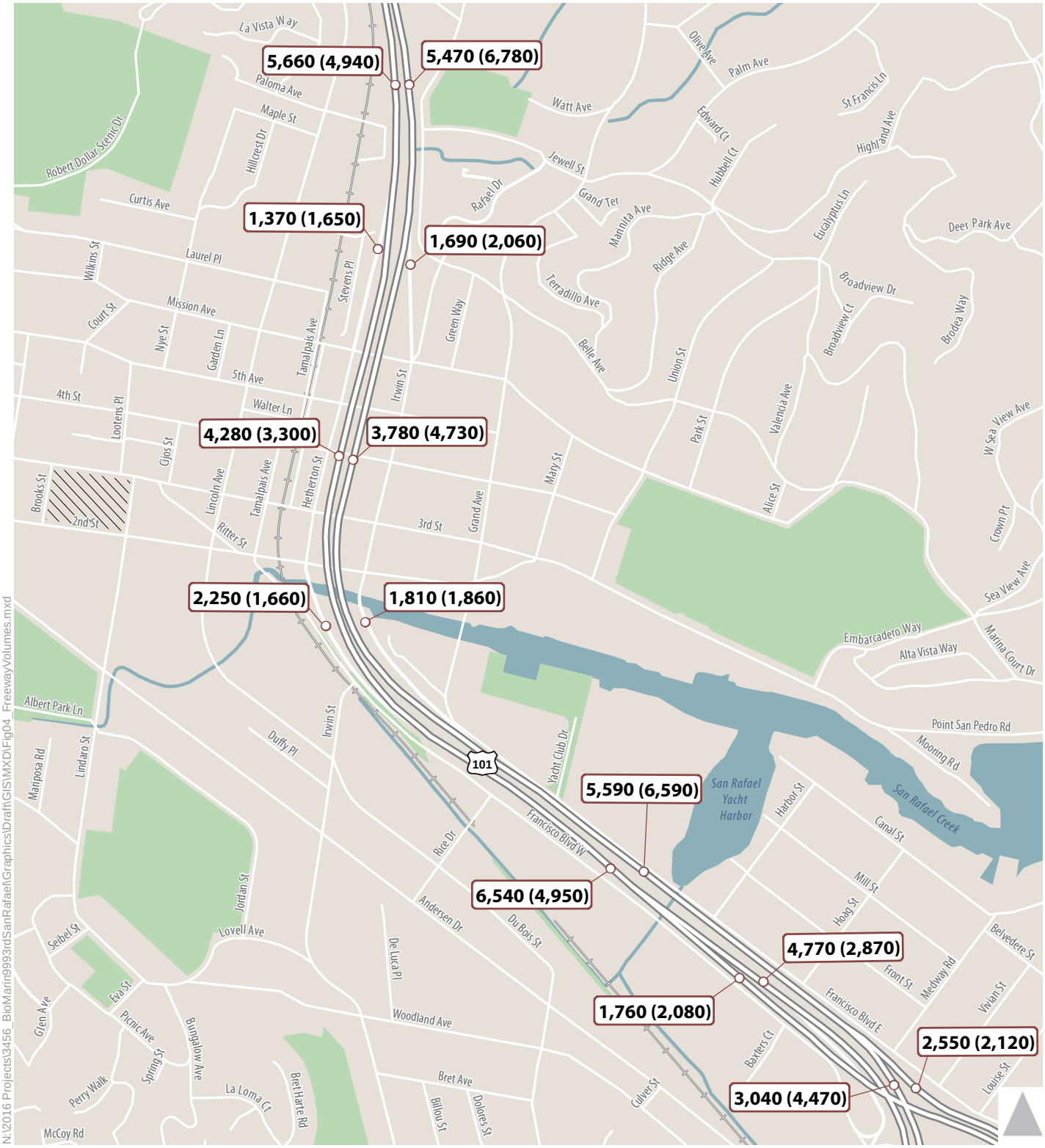
TABLE 6: WEEKDAY PEAK HOUR FREEWAY OPERATIONS – EXISTING CONDITIONS				
Segment	**Segment Type**	**Standard**	**LOS / Density (pc/mi/ln[1])**	
			AM	**PM**
Northbound				
I-580 On-Ramp to 2nd Street Off-Ramp	Weave	E	D / -[2]	E / -[2]
2nd Street Off-Ramp to Mission Avenue On-Ramp	Basic	E	C / 23	D / 29
Mission Avenue On-Ramp to Lincoln Avenue On-Ramp	Basic	E	C / 26	D / 34
Southbound				
Lincoln Avenue On-Ramp to Mission Avenue On-Ramp	Basic	E	E / 36	D / 30
Mission Avenue Off-Ramp	Diverge	E	E / 37	D / 32
Mission Avenue Off-Ramp to 2nd Street On-Ramp	Basic	E	D / 27	C / 21
2nd Street On-ramp to I-580 EB Off-Ramp	Weave	E	**F / -[2]**	E / -[2]

Notes:
1. pc/mi/ln = passenger car per mile per lane. **Bold** indicates unacceptable operations.
2. Density not calculated in Leisch methodology.
Source: Fehr & Peers, 2018

Ramp queues were also observed at the northbound 2nd Street and southbound Mission Avenue off-ramps. Maximum peak period queues were observed extending onto the freeway mainline at both off-ramps during the PM peak hour. Table 7 and Figure 5 summarize these observations.

TABLE 7: WEEKDAY PEAK HOUR OFF-RAMP QUEUES – EXISTING CONDITIONS			
Off-Ramp	**Ramp Storage Length (feet)**	**Maximum Queue (feet)[1]**	
		AM	**PM**
US 101 NB to 2nd Street	1,070	859	**2,952**
US 101 SB to Mission Avenue	940	584	**940+[2]**

Notes:
1. **Bold** indicates unacceptable operations.
2. End of queue could not be observed.
Source: Fehr & Peers, 2018



AM (PM) Freeway Volume

Figure 4

Weekday Peak Hour Freeway Volumes - Existing Conditions

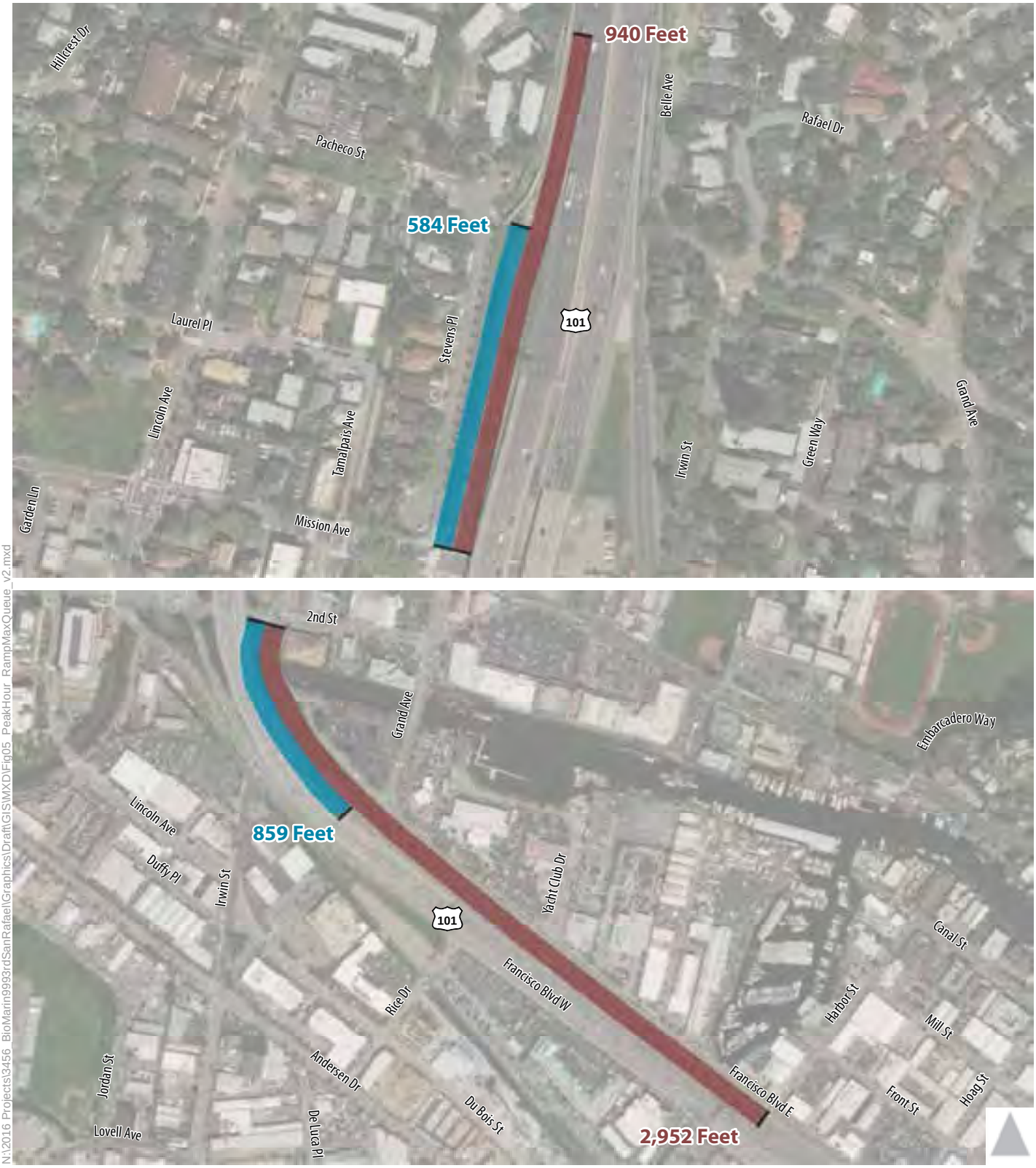


Figure 5

Weekday Peak Hour Off-Ramp Queues - Existing Conditions

Bicycle and Pedestrian Network

Bicycle Facilities

The existing bicycle network is limited within the study area:

- 4th Street is classified as a Class III bikeway (bike route) between 2nd Street and Tamalpais Avenue East and between Irwin Street and Union Street; sections of this bikeway have sharrow markings.
- Lincoln Avenue is classified as a Class III bikeway from 2nd Street to Irwin Street.
- Andersen Drive has westbound Class II bike lanes between A Street and Lindaro Street and is a Class III bikeway with sharrow markings eastbound.
- The Puerto Suello Hill Pathway (Class I bike path) passes through the study area.

The Marin County Bicycle Coalition (MCBC) map identifies Mission Avenue as the primary east-west on-street bikeway route through the study area. Lincoln Avenue, Andersen Drive, Irwin Street, and D Street are identified as primary north-south on-street bikeway routes on the MCBC map.

The 2018 San Rafael Bicycle & Pedestrian Master Plan proposes a feasibility study for an east-west bikeway through downtown along 4th Street. New north-south bicycle connections are proposed along D Street and C Street (Class IV protected bikeway couplet or Class III bicycle boulevard) and Tamalpais Avenue West (Class IV separated bikeway). The plan also proposes US 101 undercrossing improvements at 3rd Street, 4th Street, 5th Avenue, and Mission Avenue that would benefit bicyclists and pedestrians.

Pedestrian Network

Sidewalks are present along both sides of all roadways near the project site except for the following:

- South side of Ritter Street between Lincoln Avenue and 2nd Street
- North side of 2nd Street between Lincoln Avenue and Ritter Street
- South side of 2nd Street between Francisco Boulevard West and Irwin Street
- Sections of Tamalpais Avenue adjacent to the railroad tracks between Mission Avenue and 3rd Street

Adjacent to the project site, crosswalks are available as follows:

- **3rd Street and Brooks Street**: No crosswalks are marked on any of the three legs of the intersection. Pedestrian crossing of 3rd Street is prohibited on both the west and east legs. The nearest available marked crossings of 3rd Street are at A Street 220 feet to the west and Lindaro Street 450 feet to the east. An unmarked crosswalk is also at Lootens Place 370 feet to the east.

- **3rd Street and Lootens Place**: A crosswalk is marked on the north leg only; the west and east legs are unmarked. The nearest available marked crosswalks across 3rd Street are at Lindaro Street 90 feet to the east and A Street 590 feet to the west.
- **3rd Street and Lindaro Street**: Crosswalks are marked on the south and east legs only; the west leg is unmarked.
- **2nd Street and Brooks Street**: A crosswalk is marked on the north leg only; the west and east legs of the intersection, which span 2nd Street, are unmarked. The nearest available marked crosswalks across 2nd Street are at A Street 220 feet to the west and Lindaro Street 450 feet to the east.
- **2nd Street and Lindaro Street**: Crosswalks are marked on all four legs.

Pedestrian volumes were measured at four intersections adjacent to the project site in June 2016 and October/November 2017 as shown in Table 8. Pedestrian volumes crossing 2nd Street and 3rd Street at these intersections during the weekday AM and PM peak hours are relatively light under existing conditions, with the highest pedestrian counts occurring at the east leg of the 3rd Street and Lindaro Street intersection where 38 pedestrians crossed 3rd Street during the AM peak hour and 37 pedestrians crossed during the PM peak hour.

TABLE 8: INTERSECTION PEDESTRIAN VOLUMES – EXISTING CONDITIONS

Leg	Existing Weekday Pedestrian Counts	
	AM Peak Hour	PM Peak Hour
15. 3rd Street and Brooks Street		
West[1]	1	3
East[1]	2	4
North	38	37
South	36	51
16. 3rd Street and Lindaro Street		
East	38	37
North	26	51
South	22	30
25. 2nd Street and Brooks Street		
West	1	1
East	1	3
North	16	15
26. 2nd Street and Lindaro Street		
West	1	8
East	24	14
North	19	15
South	34	36

Note: [1]Pedestrian crossing currently prohibited but observed.
Source: Fehr & Peers, 2018.

Transit Network

Existing transit service within the study area is provided by bus at the San Rafael C. Paul Bettini Transit Center on Tamalpais Avenue approximately two blocks or 800 feet east of the project site. A total of 13 Marin Transit routes, eight Golden Gate Transit routes, and one Sonoma County Transit route currently serve the transit center. Greyhound also serves the center, as do airport bus companies and taxis. The transit center is well equipped with shelters and benches. Plans are being developed to build a new transit center that will be better able to accommodate buses and trains.

The Sonoma-Marin Area Rail Transit (SMART) San Rafael downtown station is also located approximately two blocks (950 feet) east of the project site. The train provides service to cities to the north, including to Novato, Petaluma, Santa Rosa, and the Sonoma County Airport. SMART operates 34 daily weekday trains and 10 daily trains on weekends and holidays. Weekday trains operate every 30 minutes in each direction

from about 5:30-10:00 AM and 3:30-9:30 PM, with limited midday service. Construction work is underway on the SMART Larkspur extension.

Collision History

Collision history at the study intersections was reviewed for the years 2015 to 2017. Table 9 presents the results of this review. Of the intersections adjacent to the project site, the intersection of 2nd Street and Lindaro Street had four collisions, with most common collision types of rear end and broadside and primary collision factor of unsafe speed. The intersection of 3rd Street and Hetherton Street had the most collisions over the three-year period: a total of 12 collisions, 5 of which involved pedestrians or cyclists, and 1 of which involved a pedestrian fatality.

TABLE 9: COLLISION HISTORY AT STUDY INTERSECTIONS

Intersection	Number of Collisions					Most Common Collision Type	Most Common Primary Collision Factor (PCF)[2]	Collision Rate[3]
	3-Year Total[1]	Average Per Year	Total Injury Collisions	Total Fatal Collisions	Total Involving Peds or Bicyclists			
1. Mission Avenue and Lincoln Avenue	11	3.67	11		3	Head-On, Other	Traffic Signals and Signs	0.39
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street	3	1.00	3			Broadside	Traffic Signals and Signs	0.11
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street	10	3.33	10			Broadside	Traffic Signals and Signs	0.31
4. 5th Avenue and Lincoln Avenue	9	3.00	9		2	Various	Automobile Right of Way	0.47
5. 5th Avenue and Hetherton Street	5	1.67	5		1	Broadside	Traffic Signals and Signs	0.23
6. 5th Avenue and Irwin Street	3	1.00	3		1	Broadside	Various	0.13
7. 4th Street and Lincoln Avenue	6	2.00	6		2	Head-On, Rear End	Unsafe Speed, Pedestrian Right of Way	0.33
8. 4th Street and Tamalpais Avenue West	2	0.67	2		2	Vehicle/ Pedestrian, Other	Improper Turning, Pedestrian Right of Way	0.21
9. 4th Street and Hetherton Street	6	2.00	6		2	Head-On, Vehicle/ Pedestrian	Traffic Signals and Signs, Pedestrian Right of Way	0.27

TABLE 9: COLLISION HISTORY AT STUDY INTERSECTIONS

Intersection	Number of Collisions					Most Common Collision Type	Most Common Primary Collision Factor (PCF)[2]	Collision Rate[3]
	3-Year Total[1]	Average Per Year	Total Injury Collisions	Total Fatal Collisions	Total Involving Peds or Bicyclists			
10. 4th Street and Irwin Street	7	2.33	7		5	Vehicle/ Pedestrian	Pedestrian Right of Way	0.29
11. 3rd Street and D Street	0	0.00	0			-	-	-
12. 3rd Street and C Street	2	0.67	2			Broadside	Traffic Signals and Signs	0.08
13. 3rd Street and B Street	7	2.33	7		4	Vehicle/ Pedestrian, Broad-side	Automobile Right of Way	0.28
14. 3rd Street and A Street	3	1.00	3			Rear End	Unsafe Speed	0.12
15. 3rd Street and Brooks Street	1	0.33	1			Rear End	Unsafe Speed	0.05
16. 3rd Street and Lindaro Street	1	0.33	1		1	Vehicle/ Pedestrian	Pedestrian Right of Way	0.04
17. 3rd Street and Lincoln Avenue	11	3.67	11		5	Vehicle/ Pedestrian, Broad-side	Improper Turning, Pedestrian Right of Way	0.37
18. 3rd Street and Tamalpais Avenue West	8	2.67	8		5	Vehicle/ Pedestrian	Pedestrian Right of Way	0.32
19. 3rd Street and Hetherton Street	12	4.00	11	1	5	Vehicle/ Pedestrian, Broad-side	Traffic Signals and Signs	0.34
20. 3rd Street and Irwin Street	1	0.33	1			Head-On	Unsafe Speed	0.03
21. 2nd Street and D Street	6	2.00	6		2	Broadside	Traffic Signals and Signs, Unsafe Speed	0.21
22. 2nd Street and C Street	3	1.00	3			Various	Traffic Signals and Signs, Unsafe Speed	0.11
23. 2nd Street and B Street	1	0.33	1		1	Vehicle/ Pedestrian	Pedestrian Violation	0.03
24. 2nd Street and A Street	8	2.67	8		4	Broadside	Traffic Signals and Signs	0.25
25. 2nd Street and Brooks Street	1	0.33	1			Rear End	Unsafe Speed	0.04
26. 2nd Street and Lindaro Street	4	1.33	4			Rear End, Broadside	Unsafe Speed	0.12

TABLE 9: COLLISION HISTORY AT STUDY INTERSECTIONS

Intersection	Number of Collisions					Most Common Collision Type	Most Common Primary Collision Factor (PCF)[2]	Collision Rate[3]
	3-Year Total[1]	Average Per Year	Total Injury Collisions	Total Fatal Collisions	Total Involving Peds or Bicyclists			
27. 2nd Street and Lincoln Avenue	11	3.67	11		1	Broadside	Traffic Signals and Signs	0.32
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	6	2.00	5	1	1	Other	Improper Turning, Traffic Signals and Signs	0.16
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	5	1.67	5		1	Sideswipe	Traffic Signals and Signs	0.12
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	12	4.00	12		7	Vehicle/ Pedestrian	Pedestrian Right of Way	0.26
31. Andersen Drive and Lindaro Street	2	0.67	2		1	Vehicle/ Pedestrian, Side-swipe	Pedestrian Right of Way	0.13
32. Tamalpais Avenue West and Mission Avenue	0	0.00				-	Pedestrian Right of Way, Automobile Right of Way	-
33. Tamalpais Avenue West and 5th Avenue	2	0.67	2		1	Vehicle/ Pedestrian, Broad-side	-	0.21
34. Tamalpais Avenue East and Mission Avenue	1	0.33	1		1	Vehicle/ Pedestrian	Pedestrian Right of Way	0.08
35. Tamalpais Avenue East and 5th Avenue	0	0.00				-	-	-
36. Tamalpais Avenue East and 4th Stree[3]	2	0.67	2		2	Vehicle/ Pedestrian, Other	Improper Turning, Pedestrian Right of Way	0.21

Notes:

1. Total number of collisions from January 1, 2015 through December 31, 2017.
2. "Pedestrian Right of Way" indicates failure to yield to pedestrian, "Automobile Right of Way" indicates failure to yield to vehicle.
3. The collision rate is expressed as accidents per million vehicles entering the intersection.

Source: Table produced by Fehr & Peers (2018), data from Statewide Integrated Traffic Records System (SWITRS) through Transportation Injury Mapping System

Baseline Conditions

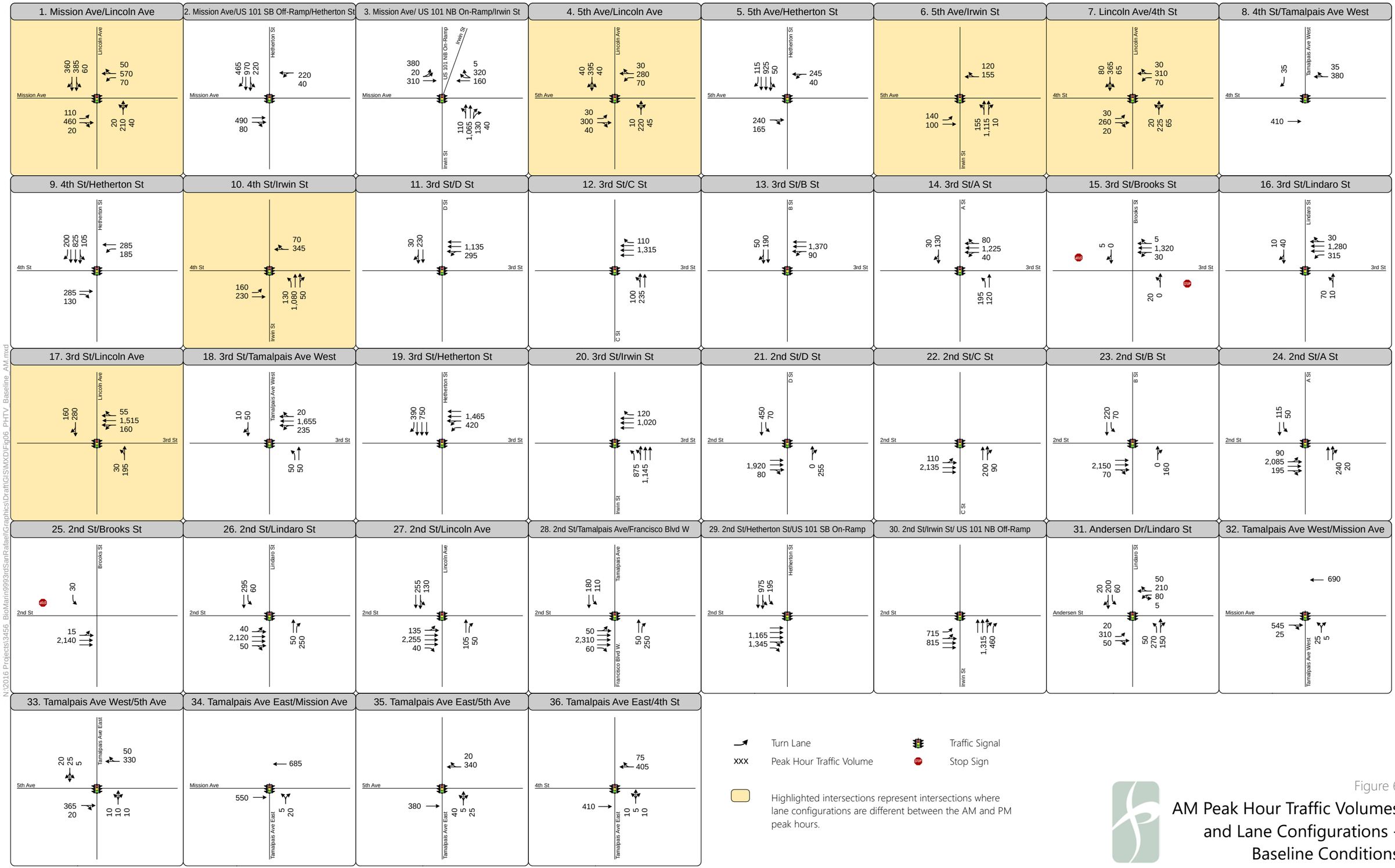
The Baseline scenario includes plus traffic volume estimates for approved, but not yet constructed, developments; traffic increases due to regional growth expected prior to the proposed project opening; and approved/funded transportation system improvements expected to be in place when the project opens.

The projects included in this scenario are:

- Seagate apartments, 703 3rd Street
- Senior assisted housing, 1203 Lincoln Avenue
- Addition of a leading pedestrian interval to the intersection of 3rd Street and Tamalpais Avenue West
- SMART train extension to Larkspur

Figure 6 and Figure 7 display the existing peak hour traffic volumes, lane configurations, and traffic controls at each study intersection for the AM and PM peak hours, respectively.

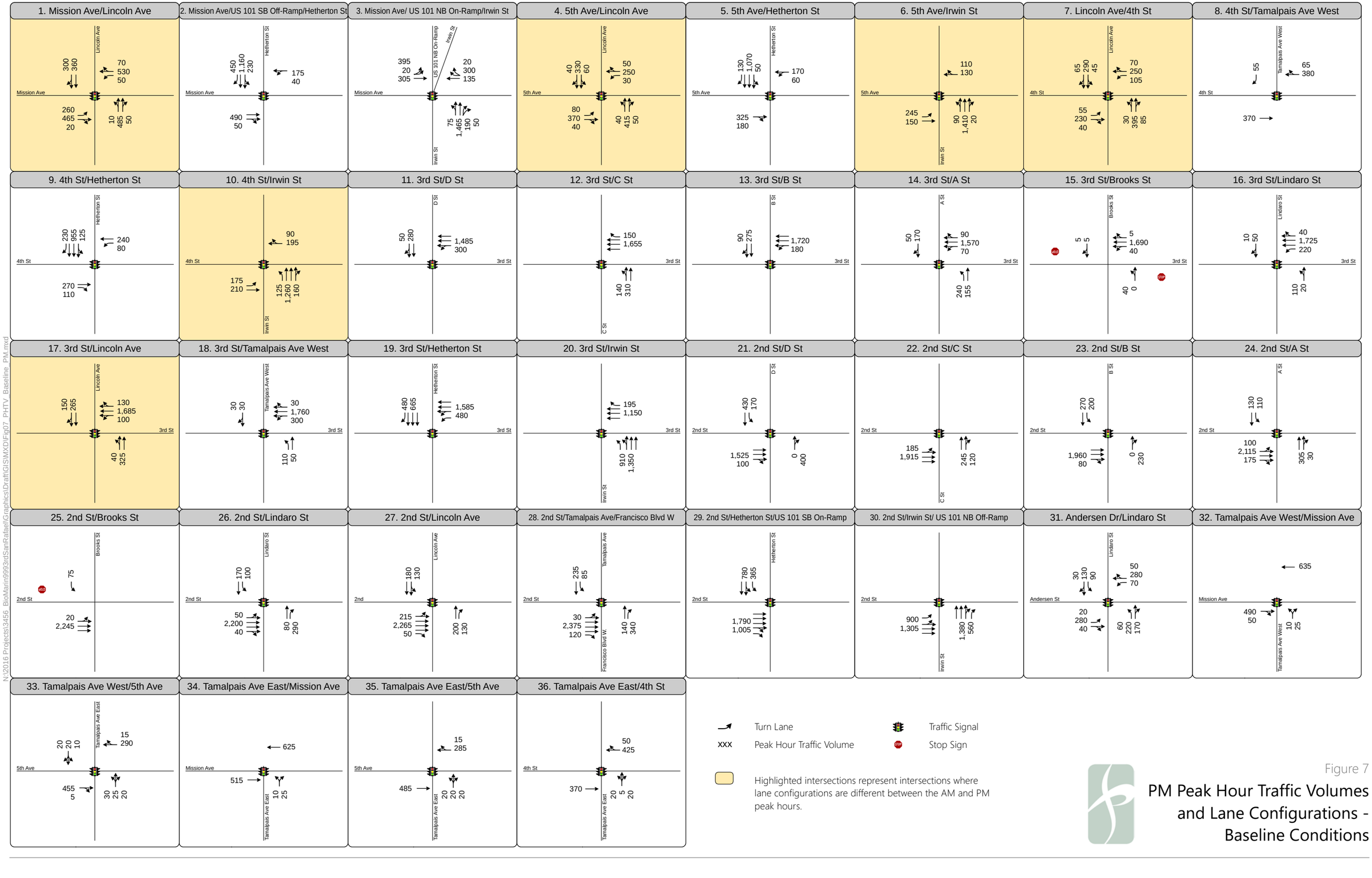
This page intentionally left blank.



N:\2016 Projects\3456_BioMarin9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig06_PHTV_Baseline_AM.mxd

Figure 6

AM Peak Hour Traffic Volumes and Lane Configurations - Baseline Conditions



N:\2016 Projects\3456 BioMarin\9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig07_PHTV_Baseline_PM.mxd

Figure 7

PM Peak Hour Traffic Volumes and Lane Configurations - Baseline Conditions

Intersection Operations

Table 10 summarizes the existing levels of service (LOS) at the study intersections. All intersections operate acceptably. Appendix B presents all LOS calculations.

TABLE 10: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – BASELINE CONDITIONS

Intersection	Control Type	LOS / Average Delay [1, 2]	
		AM	PM
1. Mission Avenue and Lincoln Avenue	Signal	C / 25.8	D / 43.3
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street[3]	Signal	D / 42.7	C / 26.9
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street[3]	Signal	C / 25.6	C / 26.1
4. 5th Avenue and Lincoln Avenue	Signal	B / 16.0	A / 9.4
5. 5th Avenue and Hetherton Street[3]	Signal	A / 7.5	A / 8.9
6. 5th Avenue and Irwin Street	Signal	D / 41.0	C / 30.7
7. 4th Street and Lincoln Avenue	Signal	B / 19.2	C / 20.5
8. 4th Street and Tamalpais Avenue West[3]	Signal	A / 6.7	A / 4.5
9. 4th Street and Hetherton Street[3]	Signal	A / 9.7	A / 9.7
10. 4th Street and Irwin Street	Signal	D / 39.9	C / 30.0
11. 3rd Street and D Street	Signal	C / 27.5	C / 30.7
12. 3rd Street and C Street	Signal	C / 25.4	C / 29.6
13. 3rd Street and B Street	Signal	C / 26.7	C / 34.4
14. 3rd Street and A Street	Signal	C / 27.1	C / 31.5
15. 3rd Street and Brooks Street	SSSC	A (B) / 1.9 (14.4)	A (B) / 2.0 (11.4)
16. 3rd Street and Lindaro Street	Signal	A / 5.9	B / 10.6
17. 3rd Street and Lincoln Avenue	Signal	D / 54.3	C / 31.7
18. 3rd Street and Tamalpais Avenue West[3]	Signal	C / 33.6	D / 47.8
19. 3rd Street and Hetherton Street	Signal	C / 32.5	D / 38.3
20. 3rd Street and Irwin Street	Signal	C / 28.9	C / 32.5
21. 2nd Street and D Street	Signal	A / 3.4	A / 3.4
22. 2nd Street and C Street	Signal	D / 42.9	D / 39.6
23. 2nd Street and B Street	Signal	A / 2.3	A / 3.0
24. 2nd Street and A Street	Signal	D / 41.6	D / 37.5
25. 2nd Street and Brooks Street	SSSC	A (B) / 2.8 (12.9)	A (D) / 3.4 (26.0)

TABLE 10: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – BASELINE CONDITIONS			
Intersection	**Control Type**	**LOS / Average Delay [1, 2]**	
		AM	**PM**
26. 2nd Street and Lindaro Street	Signal	B / 13.9	B / 15.7
27. 2nd Street and Lincoln Avenue	Signal	D / 48.3	D / 41.0
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	Signal	C / 29.2	C / 32.0
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	Signal	E / 73.6	C / 32.3
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	Signal	C / 26.2	D / 37.7
31. Andersen Drive and Lindaro Street	Signal	C / 24.5	C / 22.7
32. Tamalpais Avenue West and Mission Avenue[3]	Signal	C / 25.2	B / 13.4
33. Tamalpais Avenue West and 5th Avenue[3]	Signal	A / 6.8	A / 7.6
34. Tamalpais Avenue East and Mission Avenue[3]	Signal	E / 65.8	C / 26.3
35. Tamalpais Avenue East and 5th Avenue[3]	Signal	A / 6.5	A / 4.9
36. Tamalpais Avenue East and 4th Street[3]	Signal	B / 14.1	B / 11.8

Notes:
1. LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
2. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
3. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for intersections 2, 3, 5, 8, 9, 18, 32, 33, 34, 35, and 36 are based on HCM 2000 methodology.

Source: Fehr & Peers, 2019

Arterial Operations

Table 11 summarizes the baseline levels of service on the arterials in the analysis area. All operate acceptably except for 3rd Street and 2nd Street which both operate unacceptably during the AM and PM peak hours. Appendix B includes arterial LOS calculations.

TABLE 11: WEEKDAY PEAK HOUR ARTERIAL OPERATIONS – BASELINE CONDITIONS

Arterial	Standard	LOS / Average Speed [1]	
		AM	PM
1. Mission Avenue EB from Lincoln Avenue to US 101 NB Ramp/Irwin Street	E	E / 7	E / 9
2. Mission Avenue WB from US 101 NB Ramp/Irwin Street to Lincoln Avenue	F	F / 3	F / 5
3. 3rd Street WB from Hetherton Street to D Street	D	**E / 9**	**E / 8**
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 7**
5. Hetherton Street SB from Mission Avenue to 2nd Street	F	F / 6	E / 8
6. Irwin Street NB from 2nd Street to Mission Avenue	F	E / 9	E / 8

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.

Source: Fehr & Peers, 2018

Freeway Operations

Figure 8 presents baseline conditions freeway volumes, and Table 12 summarizes the freeway segment density and LOS results. Detailed calculations are included in Appendix B. As shown, all segments operate at acceptable levels during the AM and PM peak hours with the exception of the southbound weave segment between the 2nd Street on-ramp and the I-580 EB off-ramp during the AM peak hour.

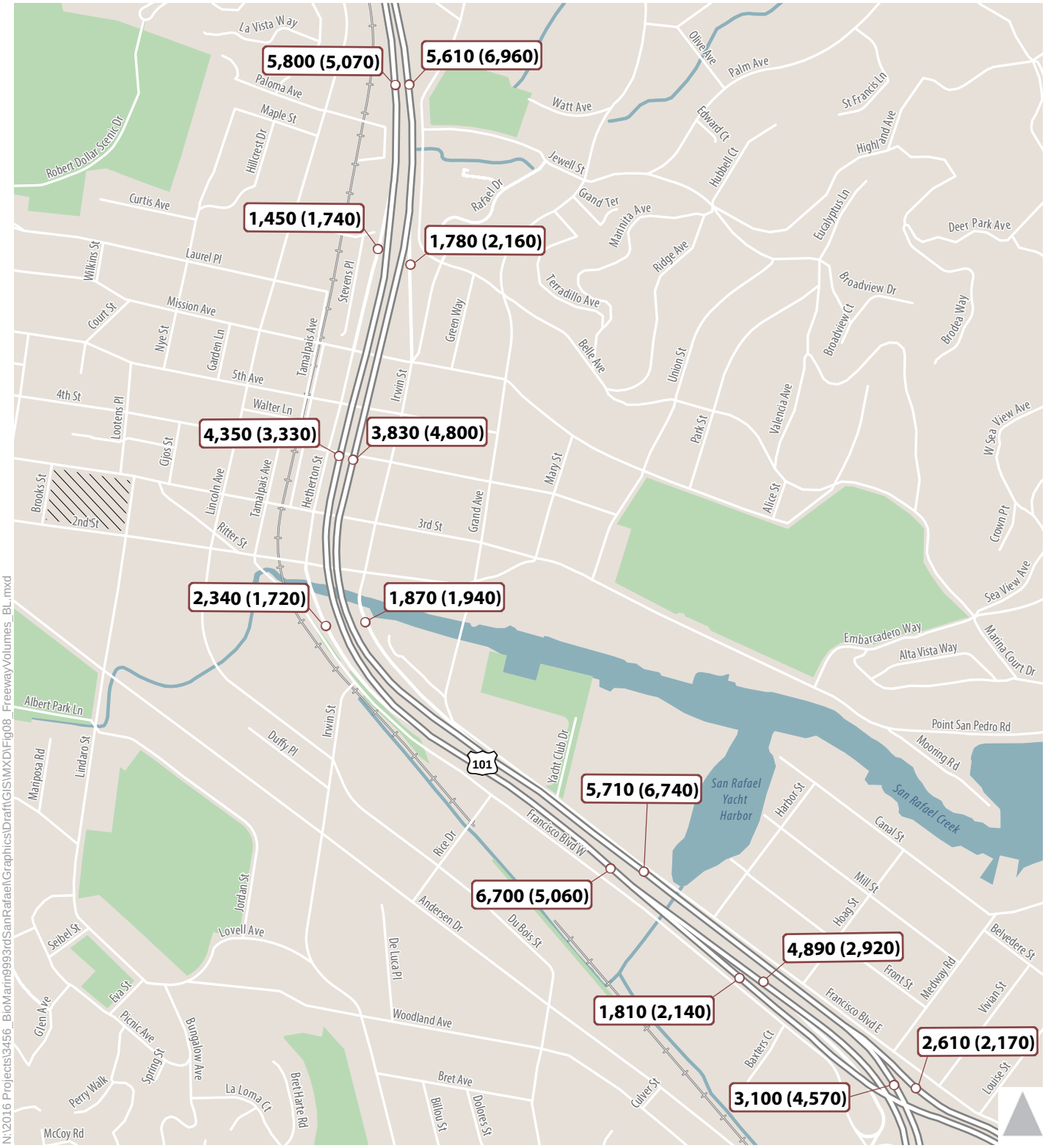
TABLE 12: WEEKDAY PEAK HOUR FREEWAY OPERATIONS – BASELINE CONDITIONS				
Segment	**Segment Type**	**Standard**	**LOS / Density (pc/mi/ln[1])**	
			AM	**PM**
Northbound				
I-580 On-Ramp to 2nd Street Off-Ramp	Weave	E	D / -[2]	E / -[2]
2nd Street Off-Ramp to Mission Avenue On-Ramp	Basic	E	C / 23	D / 29
Mission Avenue On-Ramp to Lincoln Avenue On-Ramp	Basic	E	D / 27	D / 35
Southbound				
Lincoln Avenue On-Ramp to Mission Avenue On-Ramp	Basic	E	E / 38	D / 31
Mission Avenue Off-Ramp	Diverge	E	E / 38	E / 33
Mission Avenue Off-Ramp to 2nd Street On-Ramp	Basic	E	D / 27	C / 21
2nd Street On-ramp to I-580 EB Off-Ramp	Weave	E	**F / -[2]**	E / -[2]

Notes:
1. pc/mi/ln = passenger car per mile per lane. **Bold** indicates unacceptable operations.
2. Density not calculated in Leisch methodology.
Source: Fehr & Peers, 2018

Changes in ramp queue lengths compared to existing conditions were also estimated at the northbound 2nd Street and southbound Mission Avenue off-ramps, for information purposes only. Table 13 summarizes these results.

TABLE 13: WEEKDAY PEAK HOUR OFF-RAMP QUEUE LENGTH INCREASE – BASELINE CONDITIONS		
Off-Ramp	**Increased Queue Length (feet)[1]**	
	AM	**PM**
US 101 NB to 2nd Street	150	25
US 101 SB to Mission Avenue	50	50

Notes:
1. Compared to existing conditions
Source: Fehr & Peers, 2018



AM (PM) Freeway Volume

Figure 8

Weekday Peak Hour Freeway Volumes - Baseline Conditions

Project Conditions

This chapter discusses trip generation and trip distribution of the proposed project.

Trip Generation

BioMarin R&D Facility

Current accepted trip generation methodologies, such as applying trip rates from the Institute of Transportation Engineers' (ITE) Trip Generation, are based on data collected at suburban, single-use, freestanding sites where virtually all of the trips are made by auto. These defining suburban characteristics limit the trip rate applicability to mixed-use projects and/or projects located in walkable districts with high levels of transit service that would have travel characteristics that are different from single-use suburban developments. The project site is both located in a walkable downtown district and proximate to transit, requiring an adjustment to ITE trip rates to reflect the level of transit use, walking, and bicycling that would occur to the project site. ITE recommends that local travel data is preferred if available to account for the unique context of project sites. For this trip generation assessment, trip generation forecasts are shown both based on trip count data at the existing BioMarin San Rafael campus (assuming similar employee composition as the existing BioMarin San Rafael campus) and based on unadjusted ITE trip rates.

Table 14 provides trip generation forecasts based on peak hour driveway count data at the current BioMarin San Rafael campus parking facilities and the number of employees currently working at the campus. Count data was collected on Tuesday, October 24 and Tuesday, November 7, 2018. Schools were in session at the time of the counts, weather conditions were dry, and no unusual traffic conditions were observed. Using the number of employees working at the existing San Rafael campus buildings, peak hour trip rates per employee were calculated.

TABLE 14: TRIP GENERATION RATES FOR PROPOSED BIOMARIN FACILITY (BASED ON BIOMARIN SAN RAFAEL CAMPUS OBSERVATIONS)

Land Use	Units (employees)	Trip Rate			Trips		
		Daily	Peak Hour		Daily	Peak Hour	
			AM	PM		AM	PM
Research and Development Center	550	NA	0.37	0.35	NA	203	191

Note: NA = not available
Source: Fehr & Peers, 2018.

The trip rate calculated based on San Rafael campus driveway counts is lower than that estimated using unadjusted ITE trip rates (Table 15), which is discussed further below.

TABLE 15: TRIP GENERATION RATES FOR PROPOSED BIOMARIN FACILITY (BASED ON ITE)

Land Use	ITE Code	Units (employees)	Trip Rate			Trips		
			Daily	Peak Hour		Daily	Peak Hour	
				AM	PM		AM	PM
Research and Development Center	760	550	3.39	0.44	0.40	1,863	242	219

Source: Fehr & Peers, 2018.

An employee travel survey conducted at the BioMarin San Rafael Campus in March and April 2018 indicates that on a typical day 16 percent of BioMarin employees use modes other than drive alone, including transit, bicycle, telecommute, and walking. These survey results explain why the BioMarin trip rates are lower than unadjusted ITE trip rates.

- In the survey, driving alone represented 84 percent of mode split
- 8 percent of commute trips were made by public transportation
- 4 percent of workers telecommuted on a typical day
- The remainder of commute trips were by carpooling, biking, walking, or drop-off
- Many BioMarin employees have flexible work schedules and can commute outside of peak hours

The trip generation for the new building was calculated based on the number of new employees. The resulting trip generation is summarized below in Table 16. (Because full-day counts were not available, ITE rates were used to calculate daily trips.)

TABLE 16: TRIP GENERATION ESTIMATE FOR BIOMARIN R&D FACILITY																
Land Use	ITE Code	Units (employees)	Trip Rate							Trips						
			Daily	AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out		Total	In	Out	Total	In	Out
Research and Development Center	760	550	3.39	0.37	91%	9%	0.35	9%	91%	1,863	203	185	18	191	17	174
Source: Fehr & Peers, 2018																

Senior Services and Housing

The northwest corner of the project site is proposed for development of a senior center (18,000 GSF) and affordable housing (67 units) for low income seniors. The senior center will include classrooms, meeting spaces, and other senior services. Sixty-six of the apartments will be leased to residents who do not own vehicles, with the restriction made as a requirement of the lease. One apartment will be occupied by the center manager. The senior center will have 12 parking spaces.

Trip generation levels were determined using the ITE *Trip Generation Manual, 10th Edition* based on the land use for the senior center and housing, then applied trip reduction percentages based on characteristics of the project and surrounding area. The results of this analysis are summarized in Table 17 and explained below.

TABLE 17: TRIP GENERATION ESTIMATE FOR SENIOR CENTER AND HOUSING																
Land Use	ITE Code	Qty[1]	Trip Rate							Trips						
			Daily	AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out		Total	In	Out	Total	In	Out
Recreational Community Center	495	18 KSF	28.82	1.76	66%	34%	2.31	47%	53%	519	32	21	11	42	20	22
Senior Adult Housing – Attached	252	66 DU	3.64	0.20	35%	65%	0.27	55%	45%	240	13	5	8	18	10	8
Apartment	220	1 DU	6.95	0.49	23%	77%	0.62	63%	37%	7	0	0	0	1	1	0
Total Trips (before reduction)										766	45	26	19	61	31	30
Reduction			-23%	-26%			-26%			-176	-12	-7	-5	-16	-8	-8
Total Net External Vehicle Trips (after reduction)										590	33	19	14	32	16	16
Notes: [1]KSF = thousand square feet, DU = dwelling units Source: Fehr & Peers, 2018																

MXD Trip Reduction Methodology

The MXD trip reduction methodology was used to estimate the reduction in trips from standard ITE rates. The MXD model was developed through collaboration between consultants, the U.S. EPA, and an academic research team. Travel survey data was gathered from 239 mixed-use developments (MXDs) in six major metropolitan regions and correlated with characteristics of the sites and their surroundings. The findings indicate that the amount of external traffic generated is affected by a wide variety of factors including the mix of employment and residents, the overall size and density of the development, the internal connectivity for walking or driving among land uses, the availability of transit service, and the surrounding trip destinations within the immediate area outside the project site. These characteristics were related statistically to trip behavior observed at the study development sites using statistical techniques. These statistical relationships produced equations, known as the EPA MXD model that allows predicting external vehicle trip reduction as a function of the MXD characteristics. Applying external vehicle trip reduction percentage to "raw trips," as predicted by ITE, produces an estimate for the number of vehicle trips traveling in or out of the site.

The MXD model adjusts trip generation rates to account for the influence of built environment variables such as

- the size of the mixed-use analysis area,
- the number of intersections within the mixed-use analysis area,
- the distance to transit,
- employment within a 30-minute transit trip,
- employment within one mile,
- average household size near the site, and
- average number of vehicles per household near the site.

A variety of research studies have demonstrated that these variables influence vehicle trip generation.

MXD+, Fehr & Peers' implementation of the MXD methodology, was applied to determine the reduction in automobile trips from the proposed senior center and senior housing facility because of its location in a downtown, mixed-use environment. The MXD+ analysis incorporates data from the EPA Smart Location database, the US Census American Community Survey, and the Metropolitan Transportation Commission travel model to estimate the number of trips to and from destinations outside of the analysis area via walking, biking, and transit.

To avoid underestimating vehicle trips, the estimated share of walking, biking, and transit trips forecast by MXD were reduced by 30%, resulting in a higher number of vehicle trips than forecasted by MXD. Two primary factors support this reduction: the income of senior center staff is not likely to match that needed for nearby housing, which may necessitate increased driving for affordable housing; and potentially reduced

mobility of senior center residents may also reduce walking and biking trips. These results are summarized in Table 18, and supported further following the table.

TABLE 18: MXD TRIP REDUCTION SUMMARY		
Category	**Daily**	**Peak Hour**
Walking, biking, and transit	33%	37%
Additional project factors	-10%	-11%
Total trip reduction	**23%**	**26%**
Source: Fehr & Peers, 2018.		

These conclusions are also supported by an analysis done for an earlier version of this project. The senior center and senior housing project is an updated version of the Whistlestop project evaluated in 2014, which was also located in downtown San Rafael. W-Trans letter "Focused Traffic Analysis for the Whistlestop Project," dated July 8, 2014, identified several factors likely to reduce overall vehicle trips for the senior center and senior housing:

- The "Focused Traffic Analysis" documented existing mode shares for the current Whistlestop Senior Center located at 930 Tamalpais Avenue, adjacent to the Bettini Transit Center (Table 6 of that document). Forty percent of visitors arrived by walking, biking, or transit. Some residents of the on-site senior housing will also use the senior center. However, the 2014 analysis did not account for the trips generated by senior center staff. Additionally, the current project location is farther from Bettini Transit Center than the 2014 location, which was next to the transit center. Thus, the reductions shown in Table 19 are appropriate for this project.

TABLE 19: MODE SHARE FOR SENIOR CENTER VISITORS	
Mode	**Share**
Transit	24%
Paratransit	10%
Walking	6%
Private vehicle	60%
Total vehicle trip reduction	**40%**
Source: W-Trans, 2014.	

- The "Focused Traffic Analysis" estimated trip reduction considering that the housing will be occupied by low-income seniors and automobile ownership will be prohibited by lease requirements. However, some amount of traffic associated with visitors including family, friends, aides, and deliveries is still expected. The reductions shown in Table 17 are reasonable for these conditions.

Trip Generation Summary

Table 20 summarizes the total vehicle trip generation for the project, including both the BioMarin facility and the senior center and housing.

TABLE 20: TOTAL VEHICLE TRIP GENERATION SUMMARY

	Daily	AM Peak Hour			PM Peak Hour		
		Total	Enter	Exit	Total	Enter	Exit
BioMarin facility (daily from Table 15, peak hour from Table 16)	1,863	203	185	18	191	17	174
Senior center and housing (from Table 17)	590	33	19	14	45	23	22
Total	2,453	236	204	32	236	40	196

Source: Fehr & Peers, 2018

Trip Distribution

The project trip distribution shown below is based on zip codes of current BioMarin San Rafael campus employees. Vehicle trips from the proposed project were assigned through the study intersections to study area gateways as shown in Figure 9 and Figure 10. Because parking at the project site is limited (29 spaces), most BioMarin employees will use the BioMarin garage at 775 Lindaro Street. All Senior Center visitors and employees will use the Brooks Street driveways, as shown in Figure 11.

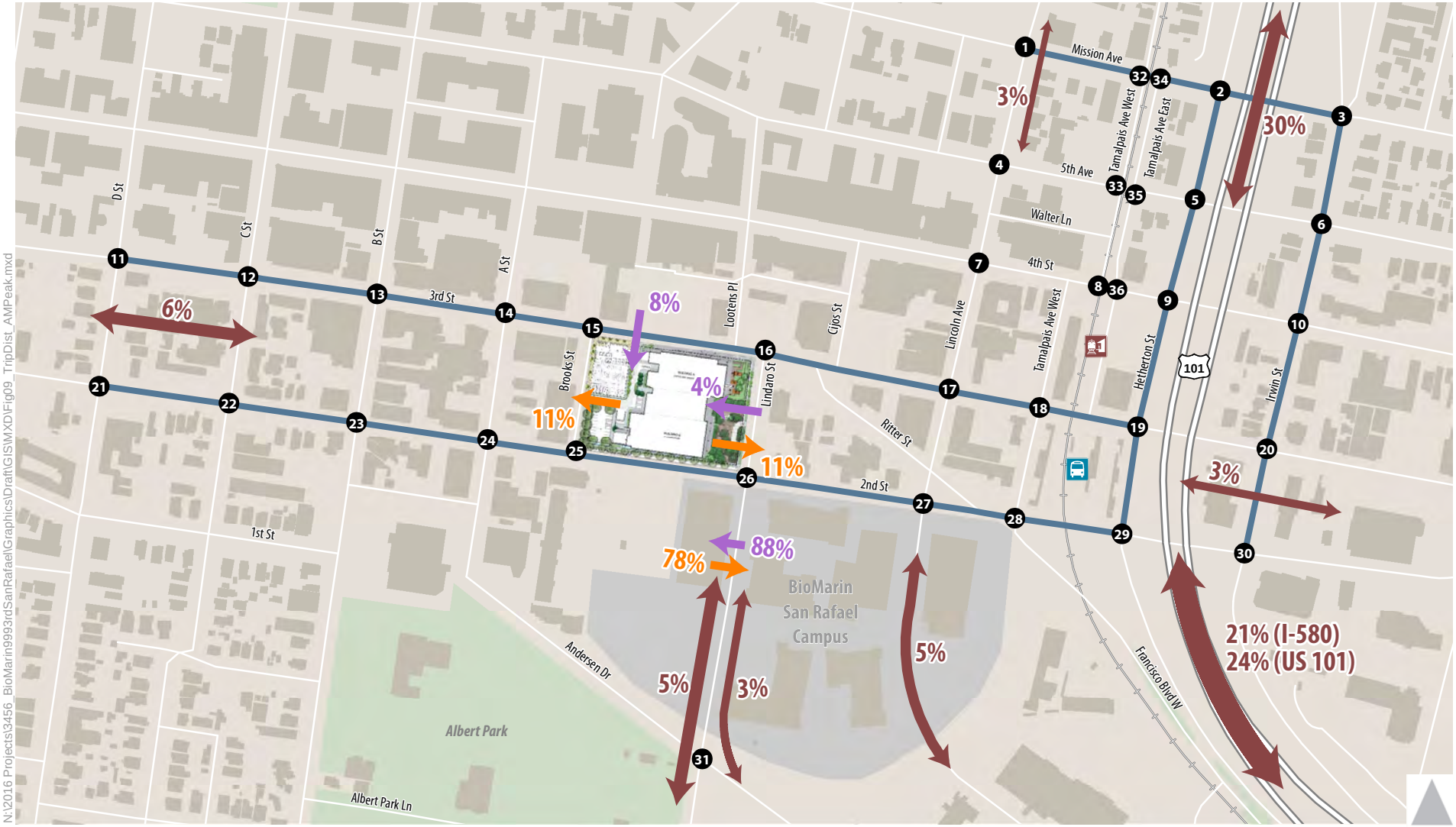


Figure 9

Trip Distribution (R & D Only) - AM Peak Hour

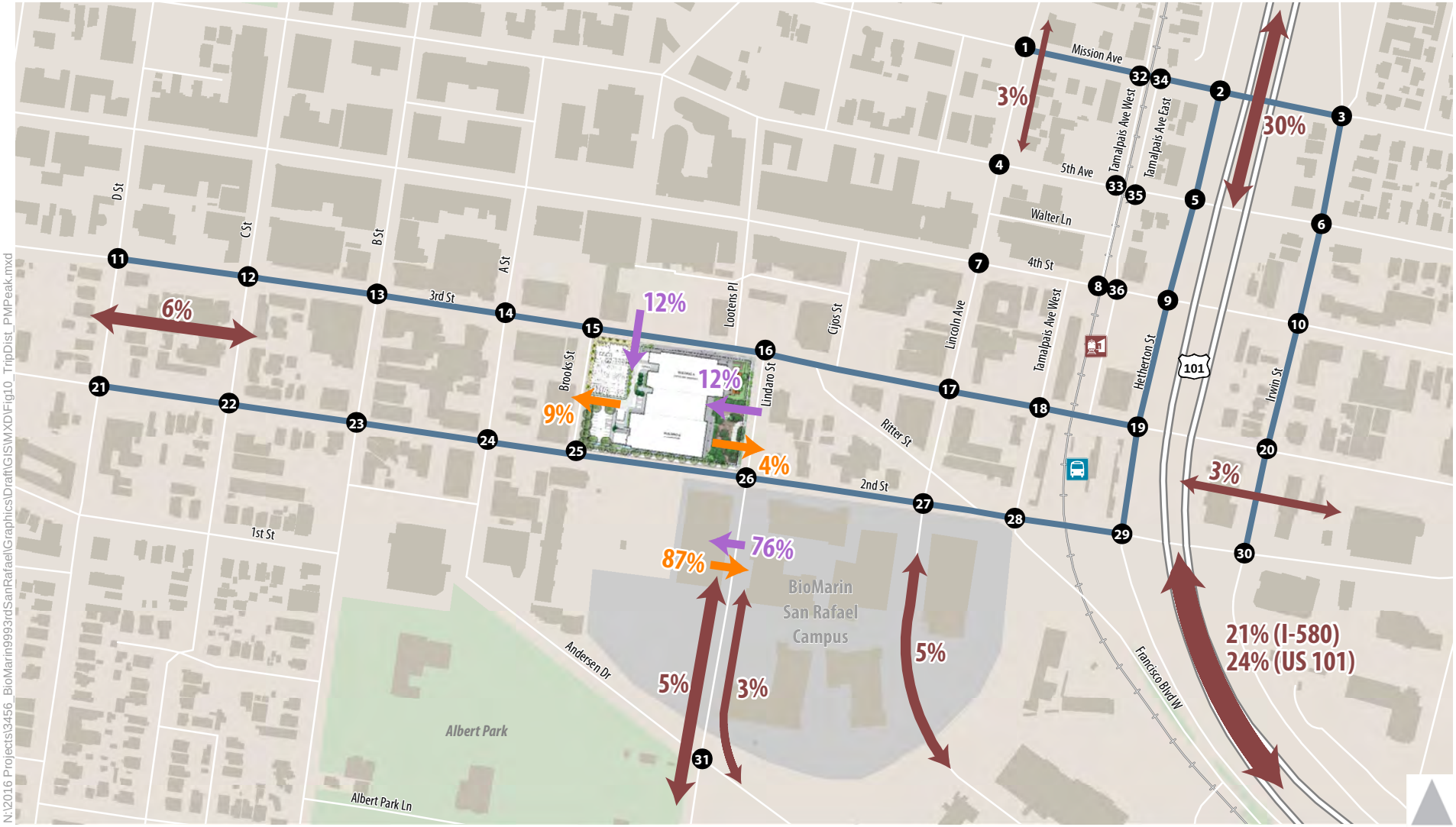


Figure 10

Trip Distribution (R & D Only) - PM Peak Hour

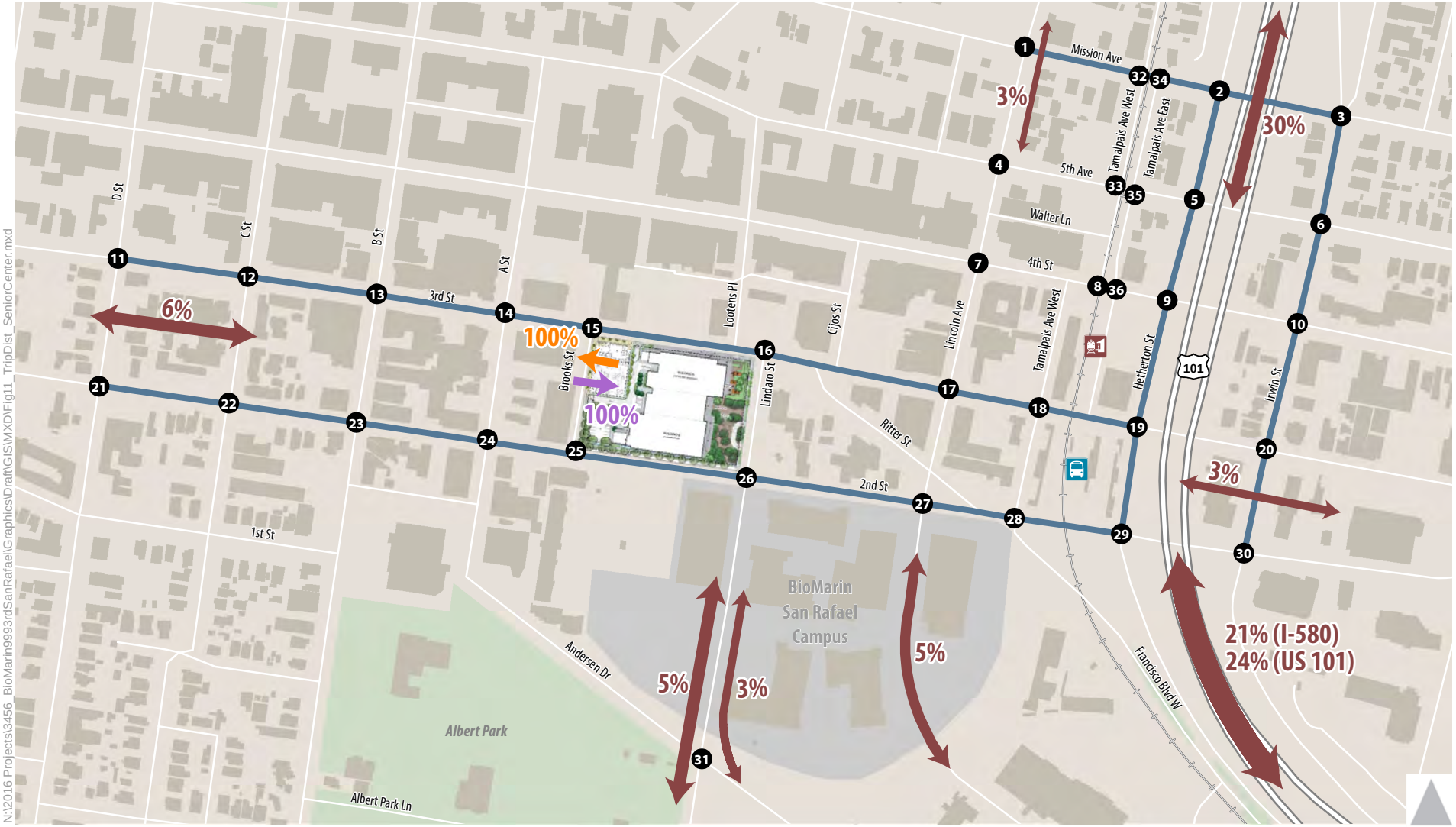


Figure 11

Trip Distribution (Senior Center and Housing)

Project Pedestrian Crossings

The BioMarin R&D facility and senior services and housing would generate a total of 215 new pedestrian trips during the AM peak hour and 213 new pedestrian trips during the PM peak hour. These trips would be most concentrated at intersections adjacent to the project site. The following factors were considered in assigning pedestrian trips to existing pedestrian crossings at intersections:

- Trips between the R&D facility and the Lindaro Street garage
- Trips between the R&D facility and the existing BioMarin San Rafael campus buildings
- Trips between the R&D facility and the San Rafael SMART station and transit center
- Trips between the R&D facility and other destinations (including residences and downtown)
- Trips between the senior service and housing and the San Rafael SMART station and transit center
- Trips between the senior service and housing and other destinations (including residences, shopping, and downtown)

These added project pedestrian crossings are summarized in Table 21. Most peak hour pedestrian trips generated by the project are employees that would travel to and from the Lindaro Street Garage. The most direct path for these pedestrians would involve using the crosswalk on the west side of the 2nd Street/Lindaro Street intersection. Some peak hour pedestrian trips would cross 3rd Street to travel to and from the existing parking garage on the north side of 3rd Street as well as businesses along 4th Street. Crossing 3rd Street at Brooks Street is currently prohibited. New project crossings in Table 21 are based on retention of this crossing restriction at 3rd Street and Brooks Street. If the existing barriers and signage were removed and a crosswalk were added on the east leg of the 3rd Street/Brooks Street intersection, most of the 4 crossings in the AM peak hour, 5 crossings in the PM peak hour, and 53 total daily crossings generated by the project would shift to this crosswalk from the south leg crosswalk.

TABLE 21: AM AND PM PEAK HOUR NEW PEDESTRIAN CROSSINGS		
Leg	**New Weekday Project Pedestrian Crossings**	
	AM Peak Hour	**PM Peak Hour**
15. 3rd Street and Brooks Street		
North		
South	4	5
16. 3rd Street and Lindaro Street		
East	5	5
North	5	5
South	23	26
25. 2nd Street and Brooks Street		
West		
East		
North	2	2
26. 2nd Street and Lindaro Street		
West	181	168
East	4	3
North	9	8
South	5	3
Source: Fehr & Peers, 2018.		

The BioMarin R&D facility and senior services and housing would generate a total of 146 new pedestrian trips to destinations north of 3rd Street during the lunchtime peak hour. 130 trips from the BioMarin buildings were estimated based on pedestrian count data at the existing BioMarin San Rafael campus (assuming similar employee composition as the existing BioMarin San Rafael campus). Although meals will be served at the senior services center, likely decreasing lunchtime pedestrian trips, 16 pedestrian trips, comparable to PM peak hour, were assumed. The following factors were considered in assigning pedestrian trips to existing pedestrian crossings at intersections:

- Many lunchtime trips are expected to be to restaurants. The destination for these pedestrian trips was considered to be north of 3rd Street.
- Considering these likely destinations, most new pedestrians trips going north of 3rd Street are expected to cross 3rd Street at Lindaro Street. Some (10 percent) were estimated to cross 3rd Street at A Street.
- Some new pedestrian trips are likely to occur between the new BioMarin facility and the existing BioMarin campus. This number was conservatively estimated to be comparable to the number of pedestrians walking to destinations north of 3rd Street.

- Fewer trips are expected to destinations west of 2nd Street and Brooks Street, due to the fewer number of likely destinations.

These added project pedestrian crossings are summarized in Table 22.

TABLE 22: LUNCHTIME PEAK HOUR NEW PEDESTRIAN CROSSINGS

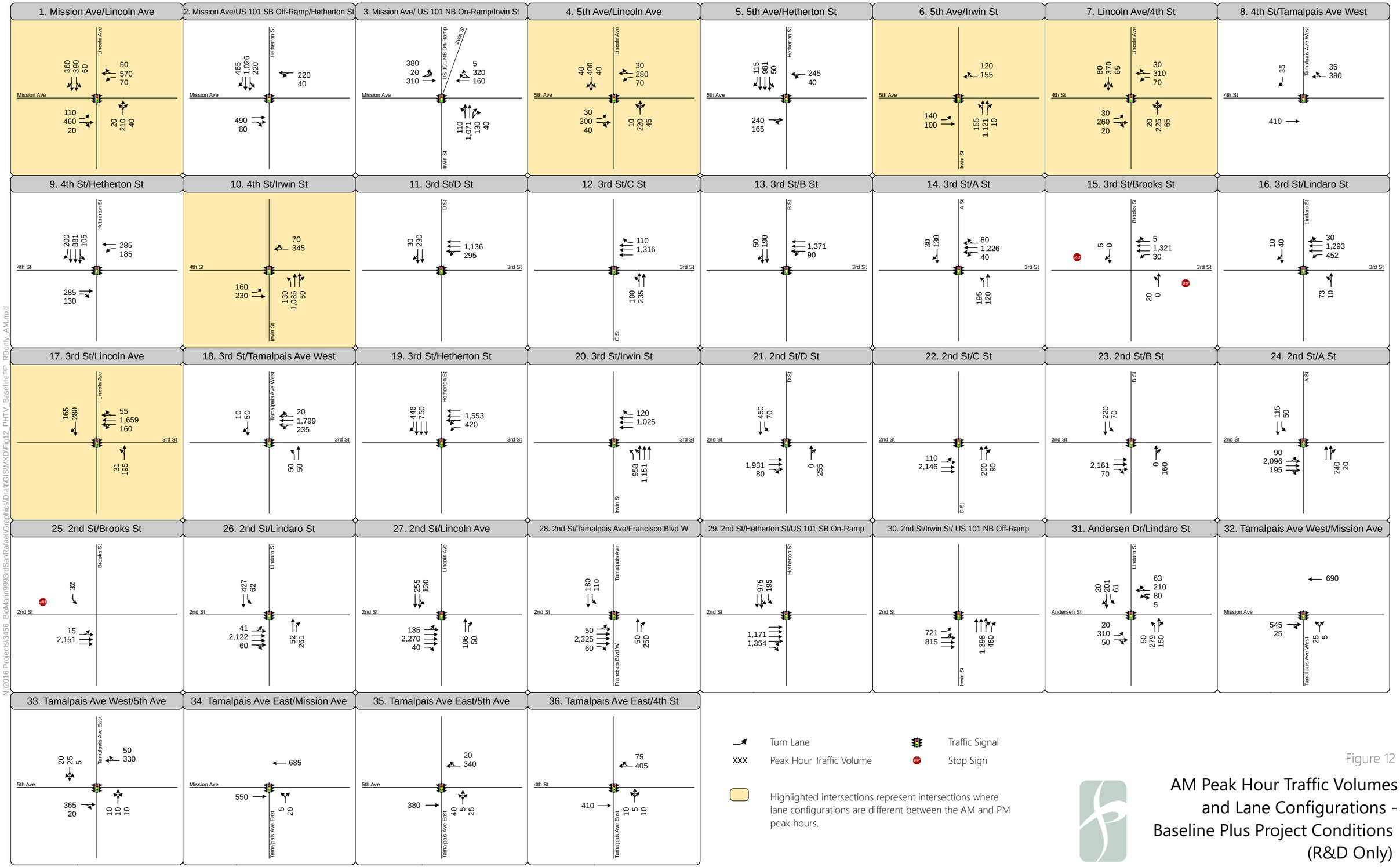
Leg	New Pedestrian Crossings
15. 3rd Street and Brooks Street	
North	
South	15
16. 3rd Street and Lindaro Street	
East	131
North	66
South	131
25. 2nd Street and Brooks Street	
West	
East	
North	5
26. 2nd Street and Lindaro Street	
West	66
East	65
North	65
South	66

Source: Fehr & Peers, 2019.

Baseline Plus Project Conditions (R&D Only)

The Baseline Plus Project (R&D Only) scenario includes baseline transportation conditions plus trips generated from the new R&D buildings. It does not include trips generated by the senior services and housing building.

Figure 12 and Figure 13 display the peak hour traffic volumes, lane configurations, and traffic controls at each study intersection for the AM and PM peak hours, respectively.



N:\2016 Projects\3456_BioMarin9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig12_PHTV_BaselinePP_RDonly_AM.mxd

Figure 12

AM Peak Hour Traffic Volumes and Lane Configurations - Baseline Plus Project Conditions (R&D Only)

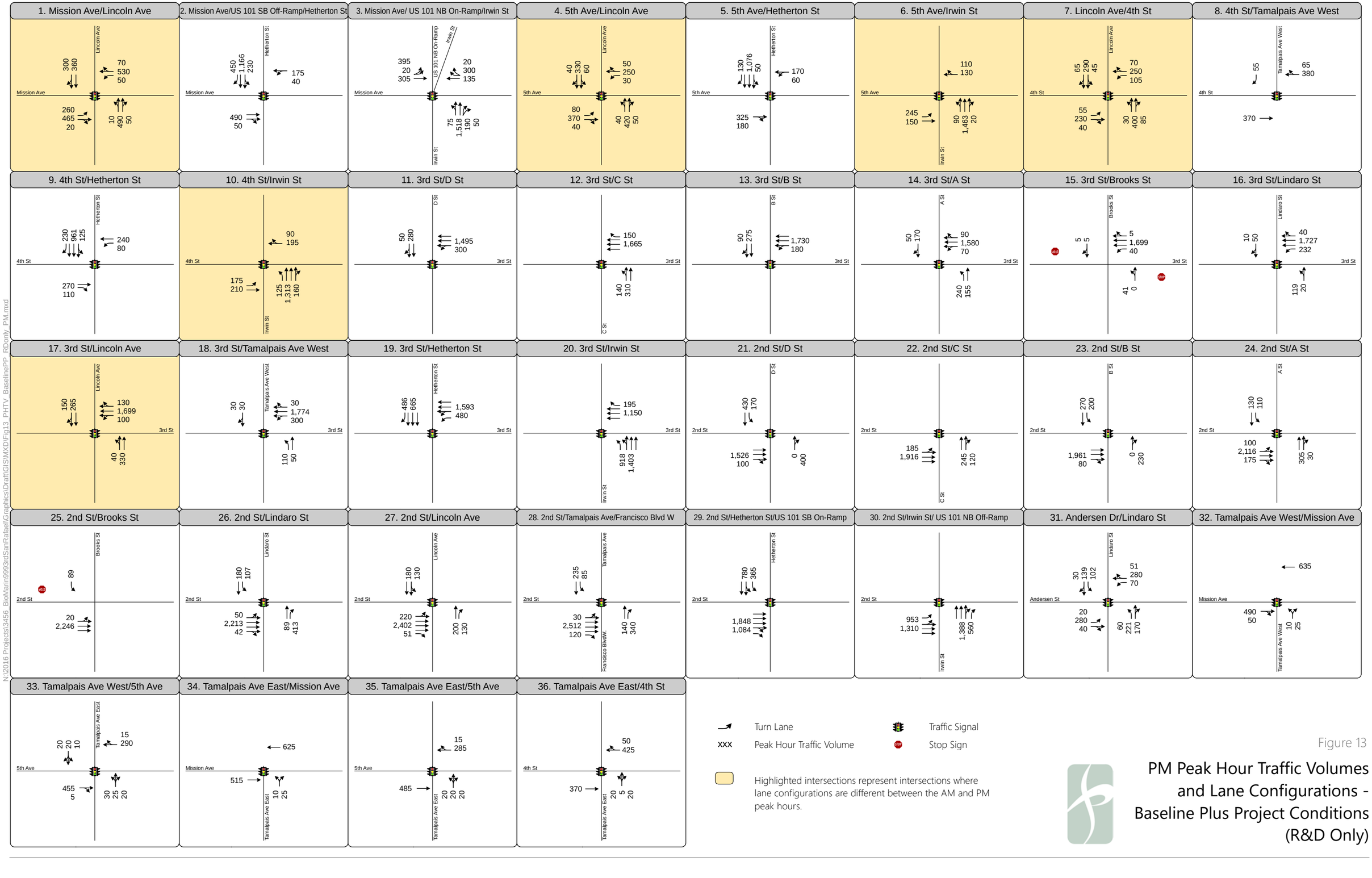


Figure 13

PM Peak Hour Traffic Volumes and Lane Configurations - Baseline Plus Project Conditions (R&D Only)

Intersection Operations

Table 23 summarizes baseline plus project (R& D only) levels of service (LOS) at the study intersections. All intersections operate acceptably. Appendix C presents all LOS calculations.

TABLE 23: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY)

Intersection	Control Type	Baseline LOS / Average Delay [1, 2]		Baseline Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
1. Mission Avenue and Lincoln Avenue	Signal	C / 25.8	D / 43.3	C / 25.8	D / 43.2
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street[3]	Signal	D / 42.7	C / 26.9	D / 48.2	C / 27.4
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street[3]	Signal	C / 25.6	C / 26.1	C / 25.5	C / 26.6
4. 5th Avenue and Lincoln Avenue	Signal	B / 16.0	A / 9.4	B / 16.0	A / 9.5
5. 5th Avenue and Hetherton Street[3]	Signal	A / 7.5	A / 8.9	A / 7.3	A / 8.9
6. 5th Avenue and Irwin Street	Signal	D / 41.0	C / 30.7	D / 41.3	C / 31.7
7. 4th Street and Lincoln Avenue	Signal	B / 19.2	C / 20.5	B / 19.1	C / 20.6
8. 4th Street and Tamalpais Avenue West[3]	Signal	A / 6.7	A / 4.5	A / 6.7	A / 4.5
9. 4th Street and Hetherton Street[3]	Signal	A / 9.7	A / 9.7	A / 9.6	A / 9.7
10. 4th Street and Irwin Street	Signal	D / 39.9	C / 30.0	D / 39.7	C / 30.2
11. 3rd Street and D Street	Signal	C / 27.5	C / 30.7	C / 27.5	C / 30.8
12. 3rd Street and C Street	Signal	C / 25.4	C / 29.6	C / 25.4	C / 29.7
13. 3rd Street and B Street	Signal	C / 26.7	C / 34.4	C / 26.7	C / 34.6
14. 3rd Street and A Street	Signal	C / 27.1	C / 31.5	C / 27.1	C / 31.6
15. 3rd Street and Brooks Street	SSSC	A (B) / 1.9 (14.4)	A (B) / 2.0 (11.4)	A (B) / 2.7 (14.5)	A (B) / 2.6 (12.4)
16. 3rd Street and Lindaro Street	Signal	A / 5.9	B / 10.6	B / 13.3	B / 11.2
17. 3rd Street and Lincoln Avenue	Signal	D / 54.3	C / 31.7	E / 57.8	C / 31.9
18. 3rd Street and Tamalpais Avenue West [3]	Signal	C / 33.6	D / 47.8	D / 51.2	D / 49.9
19. 3rd Street and Hetherton Street	Signal	C / 32.5	D / 38.3	D /38.3	D / 38.9
20. 3rd Street and Irwin Street	Signal	C / 28.9	C / 32.5	C / 29.6	C / 33.5
21. 2nd Street and D Street	Signal	A / 3.4	A / 3.4	A / 3.4	A / 3.4
22. 2nd Street and C Street	Signal	D / 42.9	D / 39.6	D / 43.6	D / 39.6
23. 2nd Street and B Street	Signal	A / 2.3	A / 3.0	A / 2.3	A / 3.0

TABLE 23: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY)

Intersection	Control Type	Baseline LOS / Average Delay [1, 2]		Baseline Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
24. 2nd Street and A Street	Signal	D / 41.6	D / 37.5	D / 42.1	D / 37.6
25. 2nd Street and Brooks Street	SSSC	A (B) / 2.8 (12.9)	A (D) / 3.4 (26.0)	A (C) / 2.8 (15.6)	A (D) / 4.0 (31.7)
26. 2nd Street and Lindaro Street	Signal	B / 13.9	B / 15.7	B / 16.4	B / 17.9
27. 2nd Street and Lincoln Avenue	Signal	D / 48.3	D / 41.0	D / 49.3	D / 48.9
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	Signal	C / 29.2	C / 32.0	C / 29.4	D / 36.4
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	Signal	E / 73.6	C / 32.3	E / 75.1	C / 32.6
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	Signal	C / 26.2	D / 37.7	C / 26.6	D / 39.4
31. Andersen Drive and Lindaro Street	Signal	C / 24.5	C / 22.7	C / 24.9	C / 23.0
32. Tamalpais Avenue West and Mission Avenue[3]	Signal	C / 25.2	B / 13.4	C / 25.2	B / 13.4
33. Tamalpais Avenue West and 5th Avenue[3]	Signal	A / 6.8	A / 7.6	A / 6.8	A / 7.5
34. Tamalpais Avenue East and Mission Avenue[3]	Signal	E / 65.8	C / 26.3	E / 65.8	C / 26.3
35. Tamalpais Avenue East and 5th Avenue[3]	Signal	A / 6.5	A / 4.9	A / 6.5	A / 4.9
36. Tamalpais Avenue East and 4th Street[3]	Signal	B / 14.1	B / 11.8	B / 14.0	B / 11.8

Notes:

1. LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
2. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
3. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for intersections 2, 3, 5, 8, 9, 18, 32, 33, 34, 35, and 36 are based on HCM 2000 methodology.

Source: Fehr & Peers, 2019

Arterial Operations

Table 24 summarizes the baseline levels with project (R& D only) levels of service on the arterials in the analysis area. Appendix C includes arterial LOS calculations.

TABLE 24: WEEKDAY PEAK HOUR ARTERIAL OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY)

Arterial	Standard	Baseline LOS / Average Speed [1]		Baseline Plus Project LOS / Average Speed [1]	
		AM	PM	AM	PM
1. Mission Avenue EB from Lincoln Avenue to US 101 NB Ramp/Irwin Street	E	E / 7	E / 9	E / 7	E / 9
2. Mission Avenue WB from US 101 NB Ramp/Irwin Street to Lincoln Avenue	F	F / 3	F / 5	F / 3	F / 5
3. 3rd Street WB from Hetherton Street to D Street	D	**E / 9**	**E / 8**	**E / 8**	**E / 8**
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 7**	**F / 6**	**F / 6**
5. Hetherton Street SB from Mission Avenue to 2nd Street	F	F / 6	E / 8	F / 6	E / 8
6. Irwin Street NB from 2nd Street to Mission Avenue	F	E / 9	E / 8	E / 8	E / 8

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.

Source: Fehr & Peers, 2018

Because the project would worsen operations on congestion management arterials expected to operate unacceptably, volume to capacity increases were calculated for those arterials. These results are reported in Table 25. Based on these results, the increase on 3rd Street in the AM peak hour is unacceptable.

TABLE 25: WEEKDAY PEAK HOUR ARTERIAL VOLUME/CAPACITY – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY)

Segment	Baseline		Baseline Plus Project		Increase	
	AM	PM	AM	PM	AM	PM
3. 3rd Street WB from Hetherton Street to D Street	0.773	0.860	0.833	0.866	**0.060**	0.006
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	0.784	0.873	0.789	0.916	0.005	0.043

Notes:
1. **Bold** indicates unacceptable increase.

Source: Fehr & Peers, 2018

Freeway Operations

Figure 14 presents baseline plus project (R&D only) conditions freeway volumes, and Table 26 summarizes the freeway segment density and LOS results. Detailed calculations are included in Appendix C. Addition of project traffic does not create any additional unacceptable operations.

TABLE 26: WEEKDAY PEAK HOUR FREEWAY OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY)						
Segment	**Segment Type**	**Standard**	**Baseline LOS / Density (pc/mi/ln[1])**		**Baseline Plus Project LOS / Density (pc/mi/ln[1])**	
			AM	**PM**	**AM**	**PM**
Northbound						
I-580 On-Ramp to 2nd Street Off-Ramp	Weave	E	D / -[2]	E / -[2]	D / -[2]	E / -[2]
2nd Street Off-Ramp to Mission Avenue On-Ramp	Basic	E	C / 23	D / 29	C / 23	D / 30
Mission Avenue On-Ramp to Lincoln Avenue On-Ramp	Basic	E	D / 27	D / 35	D / 27	E / 35
Southbound						
Lincoln Avenue On-Ramp to Mission Avenue On-Ramp	Basic	E	E / 38	D / 31	E / 39	D / 31
Mission Avenue Off-Ramp	Diverge	E	E / 38	E / 33	E / 38	E / 33
Mission Avenue Off-Ramp to 2nd Street On-Ramp	Basic	E	D / 27	C / 21	D / 27	C / 21
2nd Street On-Ramp to I-580 EB Off-Ramp	Weave	E	**F / -[2]**	E / -[2]	**F / -[2]**	E / -[2]

Notes:
1. pc/mi/ln = passenger car per mile per lane. **Bold** indicates unacceptable operations.
2. Density not calculated in Leisch methodology.

Source: Fehr & Peers, 2018

Volume to capacity was also calculated for the segment with unacceptable operations, as shown in Table 27. Increases due to the project were acceptable (less than 0.01).

TABLE 27: WEEKDAY PEAK HOUR FREEWAY VOLUME/CAPACITY – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY)						
Segment	**Baseline**		**Baseline Plus Project**		**Increase**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**
Southbound						
2nd Street On-Ramp to I-580 EB Off-Ramp	1.183	NA[1]	1.185	NA[1]	0.002	NA[1]

Notes:
1. NA, acceptable operations. **Bold** indicates unacceptable increase.

Source: Fehr & Peers, 2018

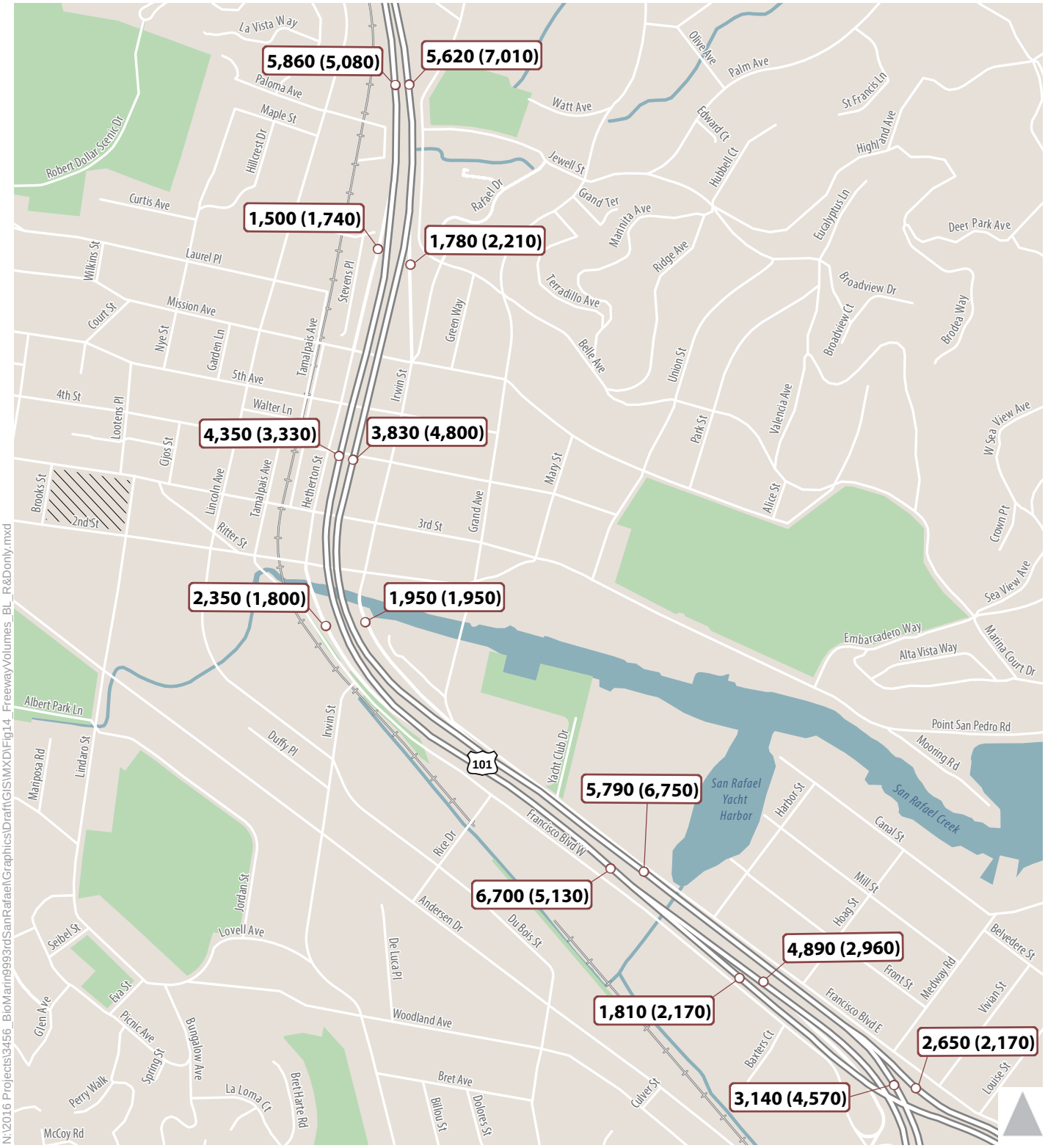
Changes in ramp queue lengths compared to baseline conditions were also estimated at the northbound 2nd Street and southbound Mission Avenue off-ramps, for information purposes only. Table 28 summarizes these results.

TABLE 28: WEEKDAY PEAK HOUR OFF-RAMP QUEUE LENGTH INCREASE – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY)

Off-Ramp	Increased Queue Length (feet)[1]	
	AM	PM
US 101 NB to 2nd Street	0	0
US 101 SB to Mission Avenue	25	0

Notes:
1. Compared to baseline conditions

Source: Fehr & Peers, 2018



AM (PM) Freeway Volume

Figure 14

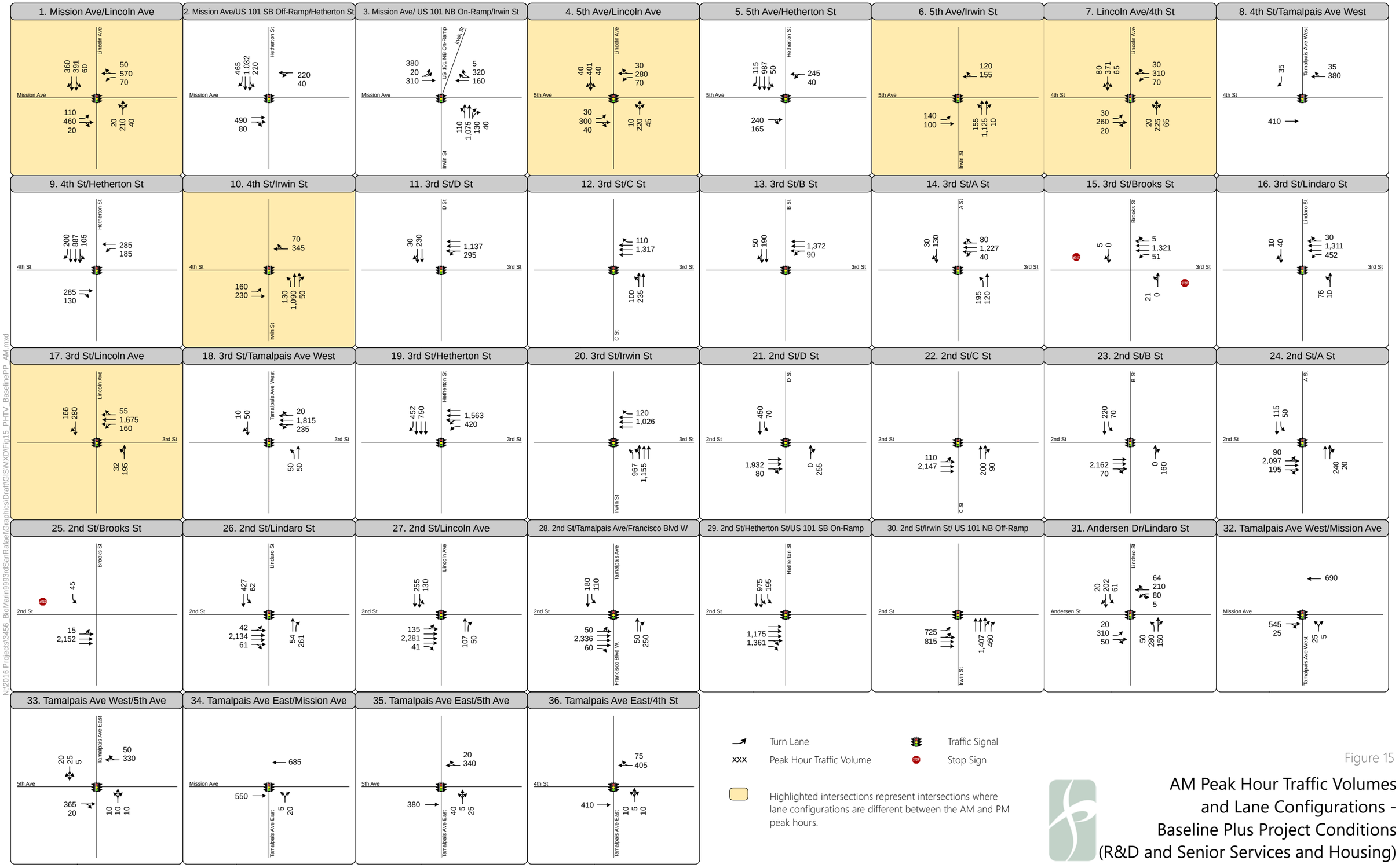
Weekday Peak Hour Freeway Volumes - Baseline Plus Project Conditions (R&D Only)

Baseline Plus Project Conditions (R&D and Senior Services and Housing)

The Baseline Plus Project (R&D and Senior Services and Housing) scenario includes baseline transportation conditions plus trips generated from the new R&D buildings and the senior services and housing building.

Figure 15 and Figure 16 display the peak hour traffic volumes, lane configurations, and traffic controls at each study intersection for the AM and PM peak hours, respectively.

This page intentionally left blank.



N:\2016 Projects\3456_BioMarin9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig15_PHTV_BaselinePP_AM.mxd

Figure 15

AM Peak Hour Traffic Volumes and Lane Configurations - Baseline Plus Project Conditions (R&D and Senior Services and Housing)

Figure 16

PM Peak Hour Traffic Volumes and Lane Configurations - Baseline Plus Project Conditions (R&D and Senior Services and Housing)

Intersection Operations

Table 29 summarizes baseline plus project (R& D and Senior Services and Housing) levels of service (LOS) at the study intersections. All intersections operate acceptably. Appendix D presents all LOS calculations.

TABLE 29: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Intersection	Control Type	Baseline LOS / Average Delay [1, 2]		Baseline Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
1. Mission Avenue and Lincoln Avenue	Signal	C / 25.8	D / 43.3	C / 25.8	D / 43.2
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street[3]	Signal	D / 42.7	C / 26.9	D / 49.0	C / 27.8
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street[3]	Signal	C / 25.6	C / 26.1	C / 25.6	C / 26.7
4. 5th Avenue and Lincoln Avenue	Signal	B / 16.0	A / 9.4	B / 16.0	A / 9.5
5. 5th Avenue and Hetherton Street[3]	Signal	A / 7.5	A / 8.9	A / 7.3	A / 8.9
6. 5th Avenue and Irwin Street	Signal	D / 41.0	C / 30.7	D / 41.6	C / 31.8
7. 4th Street and Lincoln Avenue	Signal	B / 19.2	C / 20.5	B / 19.1	C / 20.6
8. 4th Street and Tamalpais Avenue West[3]	Signal	A / 6.7	A / 4.5	A / 6.7	A / 4.5
9. 4th Street and Hetherton Street[3]	Signal	A / 9.7	A / 9.7	A / 9.5	A / 9.7
10. 4th Street and Irwin Street	Signal	D / 39.9	C / 30.0	D / 39.7	C / 30.2
11. 3rd Street and D Street	Signal	C / 27.5	C / 30.7	C / 27.6	C / 30.9
12. 3rd Street and C Street	Signal	C / 25.4	C / 29.6	C / 25.5	C / 29.7
13. 3rd Street and B Street	Signal	C / 26.7	C / 34.4	C / 26.7	C / 34.6
14. 3rd Street and A Street	Signal	C / 27.1	C / 31.5	C / 27.1	C / 31.6
15. 3rd Street and Brooks Street	SSSC	A (B) / 1.9 (14.4)	A (B) / 2.0 (11.4)	A (B) / 2.8 (13.0)	A (B) / 2.9 (13.3)
16. 3rd Street and Lindaro Street	Signal	A / 5.9	B / 10.6	B / 11.1	B / 12.2
17. 3rd Street and Lincoln Avenue	Signal	D / 54.3	C / 31.7	E / 59.1	C / 32.2
18. 3rd Street and Tamalpais Avenue West[3]	Signal	C / 33.6	D / 47.8	D / 53.9	D / 52.5
19. 3rd Street and Hetherton Street	Signal	C / 32.5	D / 38.3	D / 37.9	D / 39.7
20. 3rd Street and Irwin Street	Signal	C / 28.9	C / 32.5	C / 29.7	C / 33.9
21. 2nd Street and D Street	Signal	A / 3.4	A / 3.4	A / 3.4	A / 3.4
22. 2nd Street and C Street	Signal	D / 42.9	D / 39.6	D / 43.7	D / 39.7
23. 2nd Street and B Street	Signal	A / 2.3	A / 3.0	A / 2.3	A / 3.0

TABLE 29: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Intersection	Control Type	Baseline LOS / Average Delay [1, 2]		Baseline Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
24. 2nd Street and A Street	Signal	D / 41.6	D / 37.5	D / 42.1	D / 37.6
25. 2nd Street and Brooks Street	SSSC	A (B) / 2.8 (12.9)	A (D) / 3.4 (26.0)	A (C) / 3.0 (19.9)	A (D) / 3.9 (27.8)
26. 2nd Street and Lindaro Street	Signal	B / 13.9	B / 15.7	B / 16.3	B / 19.8
27. 2nd Street and Lincoln Avenue	Signal	D / 48.3	D / 41.0	D / 50.1	D / 50.2
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	Signal	C / 29.2	C / 32.0	C / 29.5	D / 37.1
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	Signal	E / 73.6	C / 32.3	E / 76.1	C / 32.7
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	Signal	C / 26.2	D / 37.7	C / 26.7	D / 39.8
31. Andersen Drive and Lindaro Street	Signal	C / 24.5	C / 22.7	C / 25.0	C / 23.1
32. Tamalpais Avenue West and Mission Avenue[3]	Signal	C / 25.2	B / 13.4	C / 25.2	B / 13.4
33. Tamalpais Avenue West and 5th Avenue[3]	Signal	A / 6.8	A / 7.6	A / 6.8	A / 7.6
34. Tamalpais Avenue East and Mission Avenue[3]	Signal	E / 65.8	C / 26.3	E / 65.8	C / 26.3
35. Tamalpais Avenue East and 5th Avenue[3]	Signal	A / 6.5	A / 4.9	A / 6.5	A / 4.9
36. Tamalpais Avenue East and 4th Street[3]	Signal	B / 14.1	B / 11.8	B / 14.0	B / 11.8

Notes:
1. LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
2. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
3. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for intersections 2, 3, 5, 8, 9, 18, 32, 33, 34, 35, and 36 are based on HCM 2000 methodology.

Source: Fehr & Peers, 2018

Arterial Operations

Table 30 summarizes the baseline levels with project (R&D and Senior Services and Housing) levels of service on the arterials in the analysis area. 3rd Street LOS would decrease to an unacceptable level during the AM peak hour. Appendix D includes arterial LOS calculations.

TABLE 30: WEEKDAY PEAK HOUR ARTERIAL OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Arterial	Standard	Baseline LOS / Average Speed [1]		Baseline Plus Project LOS / Average Speed [1]	
		AM	PM	AM	PM
1. Mission Avenue EB from Lincoln Avenue to US 101 NB Ramp/Irwin Street	E	E / 7	E / 9	E / 7	E / 9
2. Mission Avenue WB from US 101 NB Ramp/Irwin Street to Lincoln Avenue	F	F / 3	F / 5	F / 3	F / 5
3. 3rd Street WB from Hetherton Street to D Street	D	**E / 9**	**E / 8**	**E / 7**	**E / 8**
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 7**	**F / 6**	**F / 5**
5. Hetherton Street SB from Mission Avenue to 2nd Street	F	F / 6	E / 8	F / 6	E / 8
6. Irwin Street NB from 2nd Street to Mission Avenue	F	E / 9	E / 8	E / 8	E / 8

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.

Source: Fehr & Peers, 2018

Because the project would worsen operations on congestion management arterials expected to operate unacceptably, volume to capacity increases were calculated for those arterials. These results are reported in Table 31. Based on these results, the increase on 3rd Street in the AM peak hour is unacceptable.

TABLE 31: WEEKDAY PEAK HOUR ARTERIAL VOLUME/CAPACITY – BASELINE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Segment	Baseline		Baseline Plus Project		Increase	
	AM	PM	AM	PM	AM	PM
3. 3rd Street WB from Hetherton Street to D Street	0.773	0.860	0.840	0.874	**0.067**	0.013
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	0.784	0.873	0.793	0.922	0.008	0.048

Notes:
1. **Bold** indicates unacceptable increase.
Source: Fehr & Peers, 2018

Freeway Operations

Figure 17 presents baseline plus project (R&D and Senior Services and Housing) conditions freeway volumes, and Table 32 summarizes the freeway segment density and LOS results. Detailed calculations are included in Appendix D. Addition of project traffic does not create any additional unacceptable operations.

TABLE 32: WEEKDAY PEAK HOUR FREEWAY OPERATIONS – BASELINE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Segment	Segment Type	Standard	Baseline LOS / Density (pc/mi/ln[1])		Baseline Plus Project LOS / Density (pc/mi/ln[1])	
			AM	PM	AM	PM
Northbound						
I-580 On-Ramp to 2nd Street Off-Ramp	Weave	E	D / -[2]	E / -[2]	D / -[2]	E / -[2]
2nd Street Off-Ramp to Mission Avenue On-Ramp	Basic	E	C / 23	D / 29	C / 23	D / 30
Mission Avenue On-Ramp to Lincoln Avenue On-Ramp	Basic	E	D / 27	D / 35	D / 27	E / 35
Southbound						
Lincoln Avenue On-Ramp to Mission Avenue On-Ramp	Basic	E	E / 38	D / 31	E / 39	D / 31
Mission Avenue Off-Ramp	Diverge	E	E / 38	E / 33	E / 38	E / 33
Mission Avenue Off-Ramp to 2nd Street On-Ramp	Basic	E	D / 27	C / 21	D / 27	C / 21
2nd Street On-ramp to I-580 EB Off-Ramp	Weave	E	**F / -[2]**	E / -[2]	**F / -[2]**	E / -[2]

Notes:
2. pc/mi/ln = passenger car per mile per lane. **Bold** indicates unacceptable operations.
3. Density not calculated in Leisch methodology.
Source: Fehr & Peers, 2018

Volume to capacity was also calculated for the segment with unacceptable operations, as shown in Table 33. Increases due to the project were acceptable (less than 0.01).

TABLE 33: WEEKDAY PEAK HOUR FREEWAY VOLUME/CAPACITY – BASELINE PLUS PROJECT CONDITIONS (R&D ONLY AND SENIOR SERVICES AND HOUSING)

Segment	Baseline		Baseline Plus Project		Increase	
	AM	PM	AM	PM	AM	PM
Southbound						
2nd Street On-Ramp to I-580 EB Off-Ramp	1.183	NA[1]	1.187	NA[1]	0.004	NA[1]

Notes:
1. NA, acceptable operations. **Bold** indicates unacceptable increase.
Source: Fehr & Peers, 2018

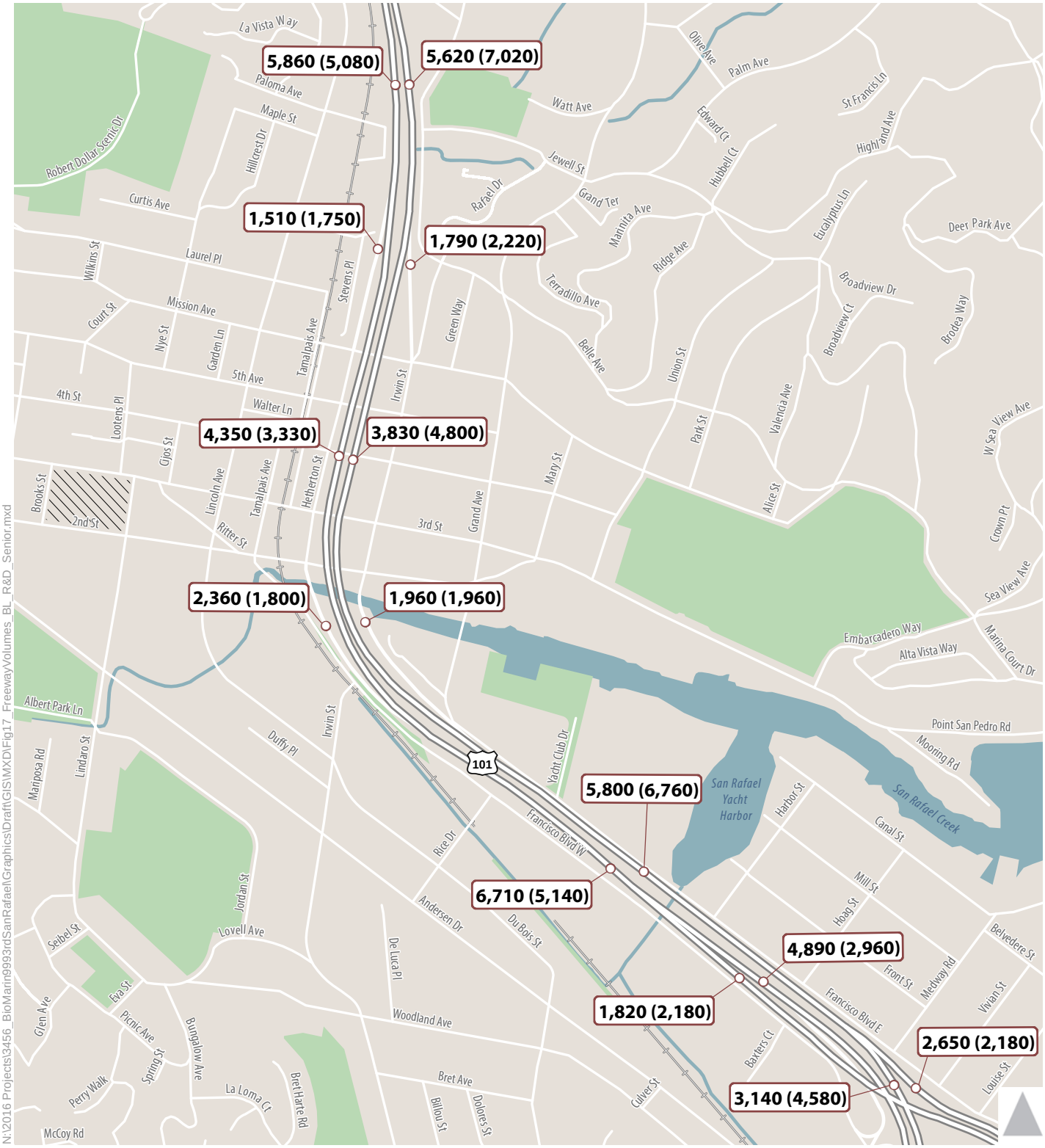
Changes in ramp queue lengths compared to baseline conditions were also estimated at the northbound 2nd Street and southbound Mission Avenue off-ramps, for information purposes only. Table 34 summarizes these results.

TABLE 34: WEEKDAY PEAK HOUR OFF-RAMP QUEUE LENGTH INCREASE – BASELINE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Off-Ramp	Increased Queue Length (feet)[1]	
	AM	PM
US 101 NB to 2nd Street	0	0
US 101 SB to Mission Avenue	25	0

Notes:
1. Compared to baseline conditions

Source: Fehr & Peers, 2018



N:\2016 Projects\3456_BioMarin9993rdSanRafaelGraphics\Draft\GIS\MXD\Fig17_FreewayVolumes_BL_R&D_Senior.mxd

AM (PM) Freeway Volume

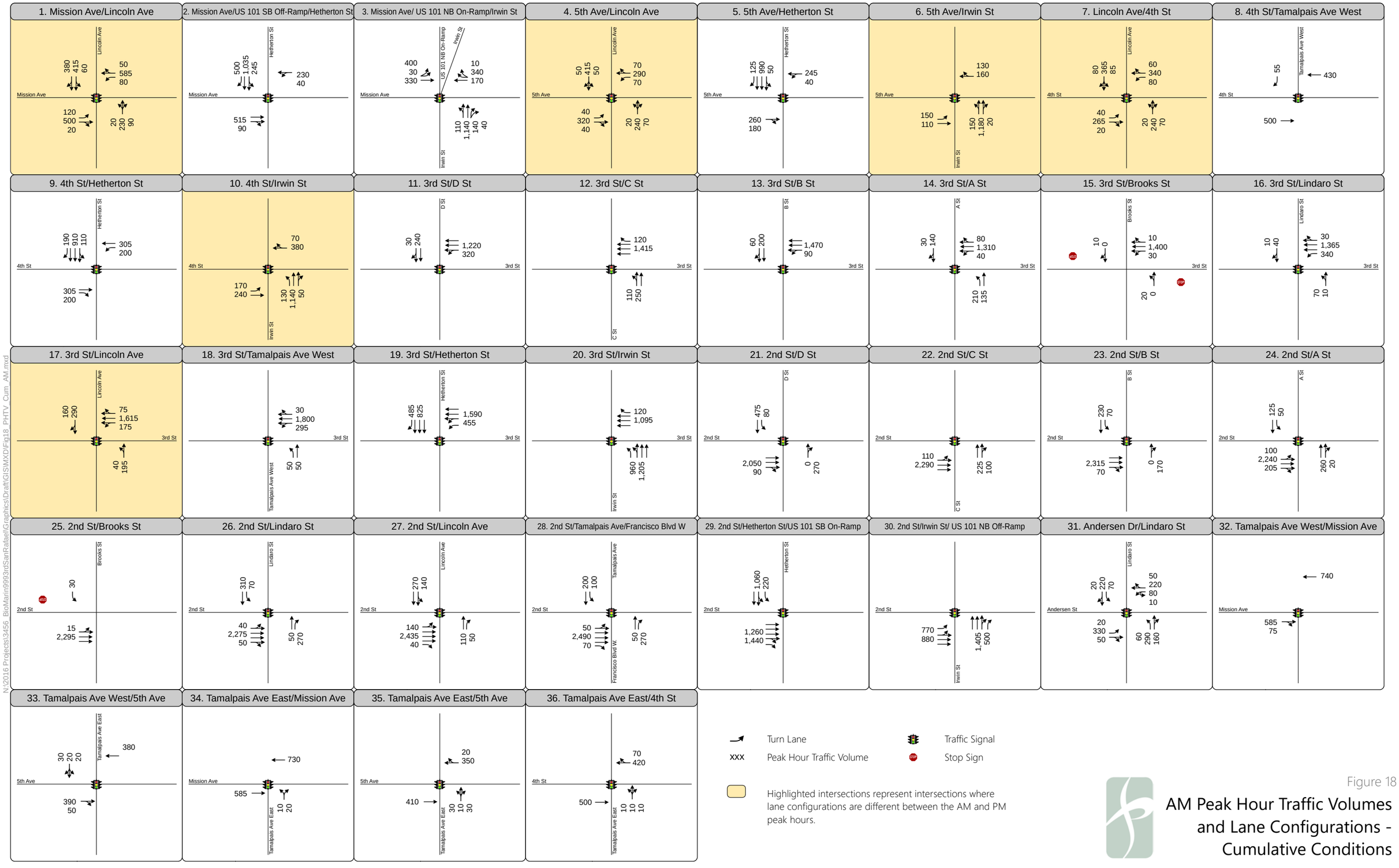
Figure 17

Weekday Peak Hour Freeway Volumes - Baseline Plus Project Conditions (R&D and Senior Services and Housing)

Cumulative Conditions

The Cumulative scenario includes market-level population and employment growth and expected transportation improvements for year 2040.

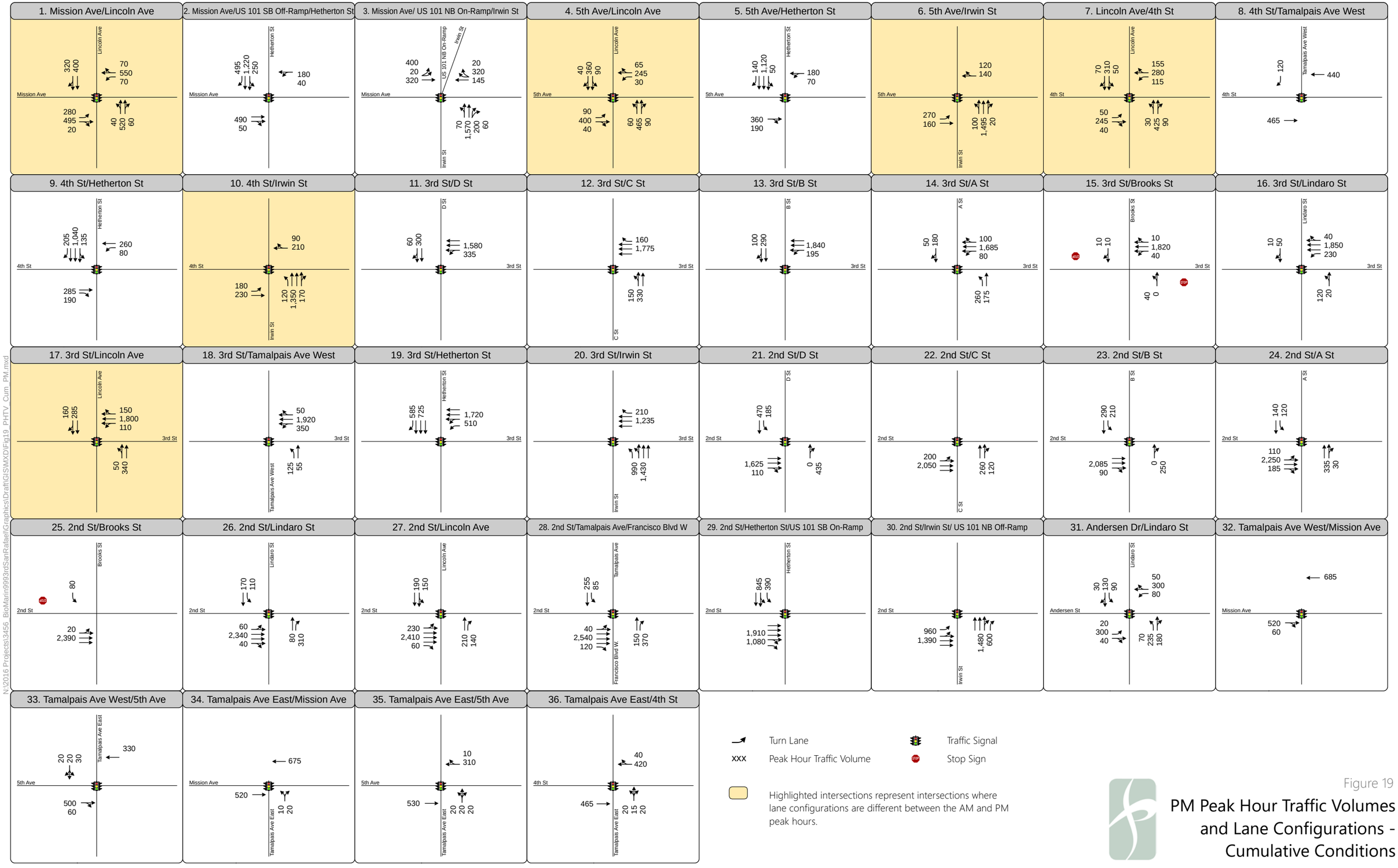
Figure 18 and Figure 19 display the Cumulative peak hour traffic volumes, lane configurations, and traffic controls at each study intersection for the AM and PM peak hours, respectively.



N:\2016 Projects\3456 BioMarin\9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig18_PHTV_Cum_AM.mxd

Figure 18

AM Peak Hour Traffic Volumes and Lane Configurations - Cumulative Conditions



N:\2016 Projects\3456 BioMarin\9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig19_PHTV_Cum_PM.mxd

Figure 19

PM Peak Hour Traffic Volumes and Lane Configurations - Cumulative Conditions

Intersection Operations

Table 35 summarizes the Cumulative levels of service (LOS) at the study intersections. All intersections operate acceptably except for the 3rd Street and Tamalpais Avenue West intersection (PM peak hour only) and 2nd Street and Hetherton Street/US 101 Southbound Ramp intersection (AM peak hour only). Appendix E presents all LOS calculations.

TABLE 35: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – CUMULATIVE CONDITIONS

Intersection	Control Type	LOS / Average Delay [1, 2]	
		AM	PM
1. Mission Avenue and Lincoln Avenue	Signal	C / 27.5	C / 31.6
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street[3]	Signal	C / 23.9	B / 19.1
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street[3]	Signal	C / 27.2	C / 28.1
4. 5th Avenue and Lincoln Avenue	Signal	C / 25.2	A / 9.8
5. 5th Avenue and Hetherton Street[3]	Signal	B / 13.0	B / 13.9
6. 5th Avenue and Irwin Street	Signal	C / 33.3	C / 31.0
7. 4th Street and Lincoln Avenue	Signal	C / 27.7	C / 22.1
8. 4th Street and Tamalpais Avenue West[3]	Signal	A / 7.0	A / 6.4
9. 4th Street and Hetherton Street[3]	Signal	B / 10.1	A / 9.6
10. 4th Street and Irwin Street	Signal	D / 48.6	C / 31.7
11. 3rd Street and D Street	Signal	C / 23.6	C / 27.4
12. 3rd Street and C Street	Signal	C / 23.2	C / 28.1
13. 3rd Street and B Street	Signal	C / 25.3	C / 32.5
14. 3rd Street and A Street	Signal	C / 26.7	C / 34.2
15. 3rd Street and Brooks Street	SSSC	A (B) / 1.8 (13.5)	A (B) / 3.3 (13.9)
16. 3rd Street and Lindaro Street	Signal	A / 8.2	A / 9.4
17. 3rd Street and Lincoln Avenue	Signal	D / 52.2	C / 29.6
18. 3rd Street and Tamalpais Avenue West	Signal	E / 65.6	**F / 86.4**
19. 3rd Street and Hetherton Street	Signal	D / 38.3	D / 47.1
20. 3rd Street and Irwin Street	Signal	C / 28.3	D / 38.3
21. 2nd Street and D Street	Signal	D / 39.1	C / 32.5
22. 2nd Street and C Street	Signal	C / 28.6	C / 28.9
23. 2nd Street and B Street	Signal	C / 32.2	E / 56.4

TABLE 35: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – CUMULATIVE CONDITIONS			
Intersection	**Control Type**	**LOS / Average Delay [1, 2]**	
		AM	**PM**
24. 2nd Street and A Street	Signal	C / 27.4	C / 30.5
25. 2nd Street and Brooks Street	SSSC	A (C) / 2.6 (21.2)	A (D) / 3.4 (27.5)
26. 2nd Street and Lindaro Street	Signal	B / 14.3	B / 14.9
27. 2nd Street and Lincoln Avenue	Signal	D / 38.2	D / 38.3
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	Signal	D / 35.7	D / 46.5
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	Signal	**F / 95.9**	C / 34.7
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	Signal	C / 27.5	D / 39.6
31. Andersen Drive and Lindaro Street	Signal	C / 27.2	C / 24.0
32. Tamalpais Avenue West and Mission Avenue[3]	Signal	C / 27.1	B / 12.5
33. Tamalpais Avenue West and 5th Avenue[3]	Signal	A / 6.6	A / 9.0
34. Tamalpais Avenue East and Mission Avenue[3]	Signal	D / 46.1	C / 27.1
35. Tamalpais Avenue East and 5th Avenue[3]	Signal	A / 7.3	A / 5.7
36. Tamalpais Avenue East and 4th Street[3]	Signal	B / 16.1	A / 9.9

Notes:
1. LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
2. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
3. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for intersections 2, 3, 5, 8, 9, 32, 33, 34, 35, and 36 are based on HCM 2000 methodology.

Source: Fehr & Peers, 2018

Arterial Operations

Table 36 summarizes the cumulative levels of service on the arterials in the analysis area. Mission Avenue, 3rd Street, and 2nd Street all experience unacceptable operations. Appendix E includes arterial LOS calculations.

TABLE 36: WEEKDAY PEAK HOUR ARTERIAL OPERATIONS – CUMULATIVE CONDITIONS

Arterial	Standard	LOS / Average Speed [1]	
		AM	PM
1. Mission Avenue EB from Lincoln Avenue to US 101 NB Ramp/Irwin Street	E	**F / 7**	E / 8
2. Mission Avenue WB from US 101 NB Ramp/Irwin Street to Lincoln Avenue	F	F / 3	F / 4
3. 3rd Street WB from Hetherton Street to D Street	D	**F / 6**	**F / 6**
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 6**
5. Hetherton Street SB from Mission Avenue to 2nd Street	F	F / 4	E / 7
6. Irwin Street NB from 2nd Street to Mission Avenue	F	E / 8	E / 7

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.

Source: Fehr & Peers, 2018

Freeway Operations

Figure 20 presents cumulative conditions freeway volumes, and Table 37 summarizes the freeway segment density and LOS results. Detailed calculations are included in Appendix E. As shown, all segments operate at acceptable levels with the exception of the northbound weave segment between the I-580 EB on-ramp and the 2nd Street off-ramp during the PM peak hour, the southbound Mission Avenue off-ramp diverge segment, and the southbound weave segment between the 2nd Street on-ramp and the I-580 EB off-ramp during the AM peak hour.

TABLE 37: WEEKDAY PEAK HOUR FREEWAY OPERATIONS – CUMULATIVE CONDITIONS				
Segment	**Segment Type**	**Standard**	**LOS / Density (pc/mi/ln[1])**	
			AM	**PM**
Northbound				
I-580 On-Ramp to 2nd Street Off-Ramp	Weave	E	D / -[2]	**F / -[2]**
2nd Street Off-Ramp to Mission Avenue On-Ramp	Basic	E	C / 25	D / 33
Mission Avenue On-Ramp to Lincoln Avenue On-Ramp	Basic	E	D / 27	E / 39
Southbound				
Lincoln Avenue On-Ramp to Mission Avenue On-Ramp	Basic	E	E / 43	D / 34
Mission Avenue Off-Ramp	Diverge	E	**F / -[2]**	**F / -[2]**
Mission Avenue Off-Ramp to 2nd Street On-Ramp	Basic	E	D / 26	C / 21
2nd Street On-ramp to I-580 EB Off-Ramp	Weave	E	**F / -[2]**	E / -[2]

Notes:
1. pc/mi/ln = passenger car per mile per lane. **Bold** indicates unacceptable operations.
2. Density not calculated in Leisch methodology or when V/C>1.

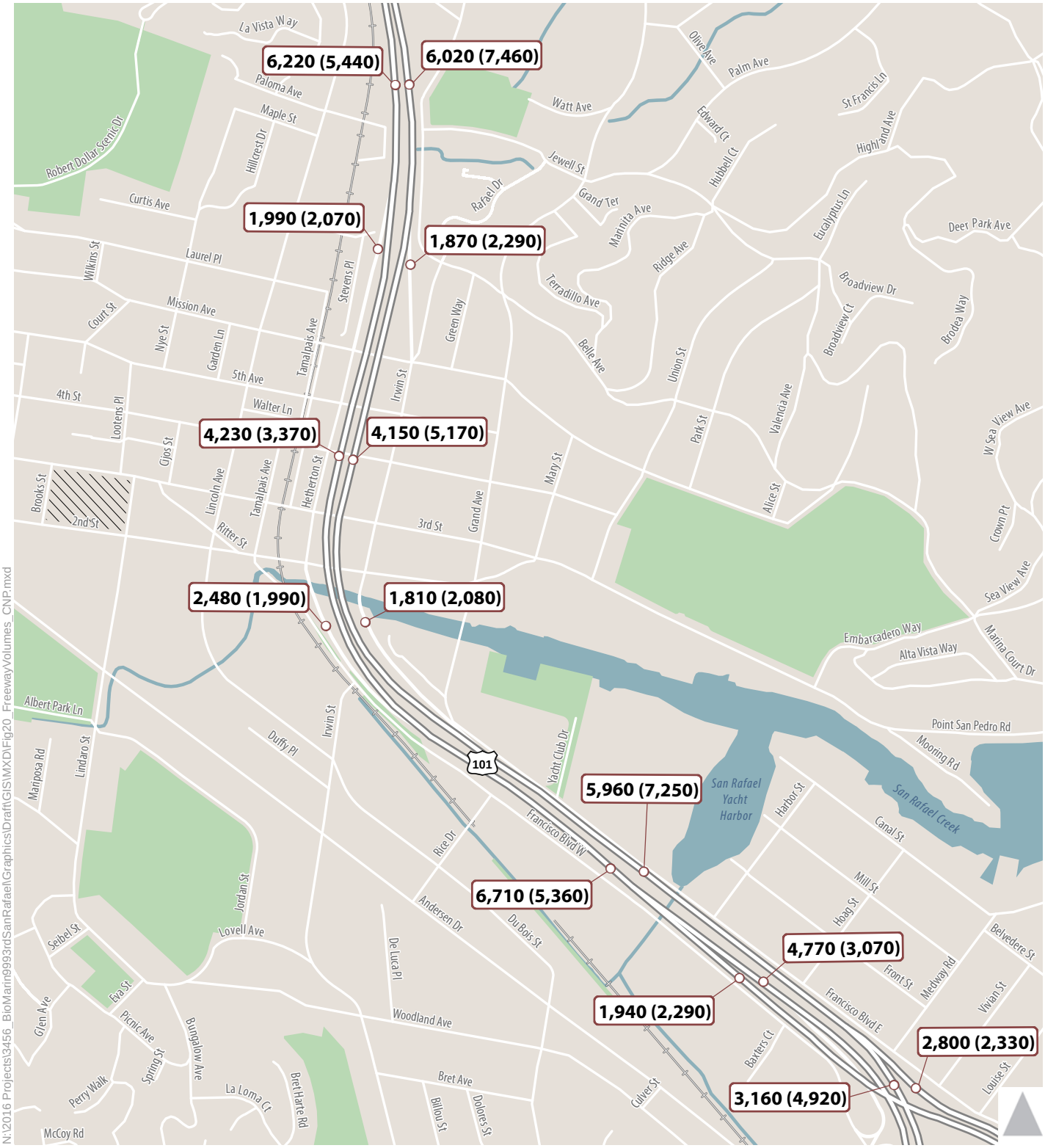
Source: Fehr & Peers, 2018

Changes in ramp queue lengths compared to existing conditions were also estimated at the northbound 2nd Street and southbound Mission Avenue off-ramps, for information purposes only. Table 38 summarizes these calculations. Expected signal improvements in the cumulative scenario contribute to these results.

TABLE 38: WEEKDAY PEAK HOUR OFF-RAMP QUEUES – CUMULATIVE CONDITIONS		
Off-Ramp	**Increased Queue Length (feet)[1]**	
	AM	**PM**
US 101 NB to 2nd Street	225	75
US 101 SB to Mission Avenue	0	0

Notes:
1. Compared to existing conditions

Source: Fehr & Peers, 2018



N:\2016 Projects\3456_BioMarin9993rdSanRafaelGraphics\Draft\GIS\MXD\Fig20_FreewayVolumes_CNP.mxd

AM (PM) Freeway Volume

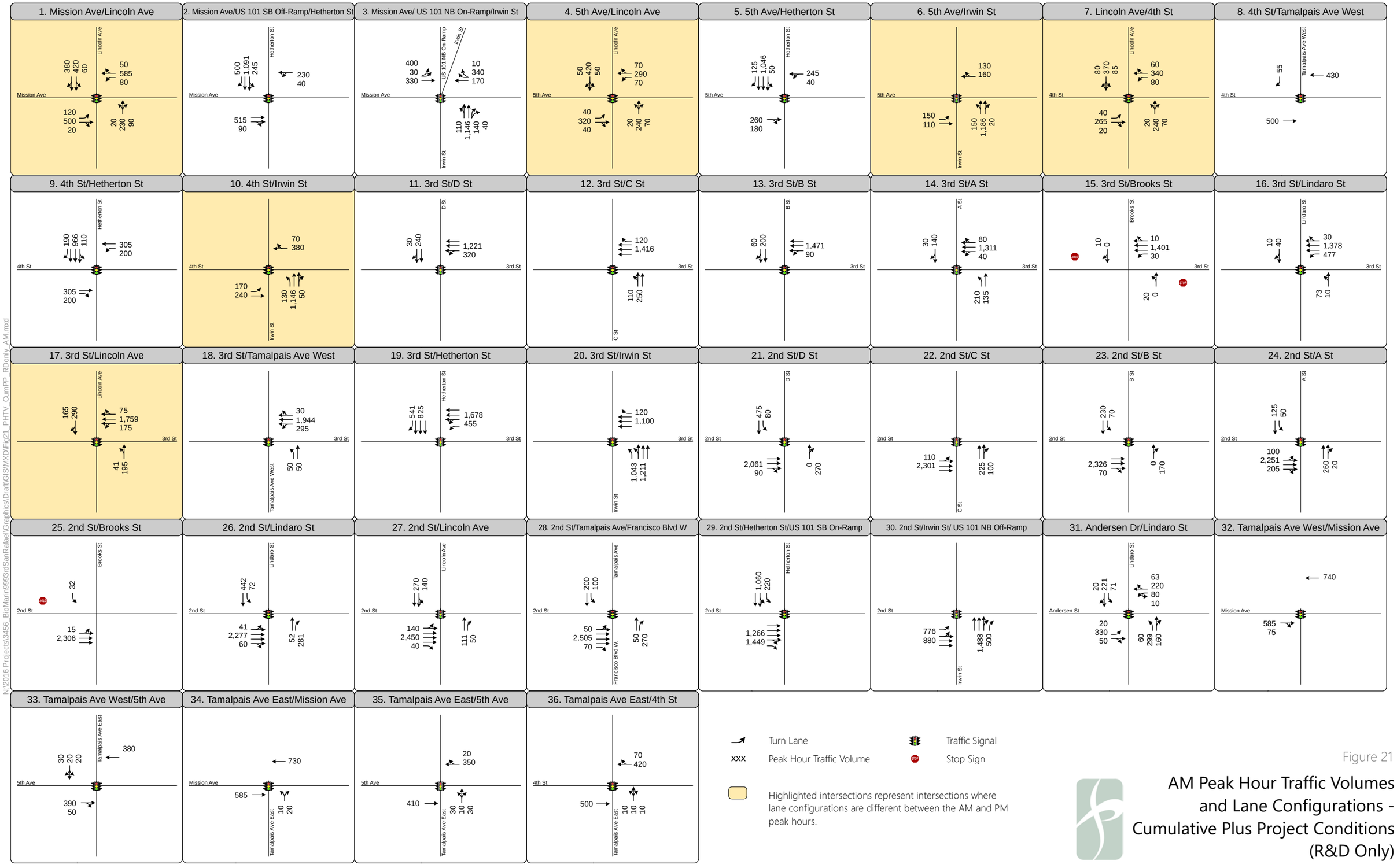
Figure 20

Weekday Peak Hour Freeway Volumes - Cumulative Conditions

Cumulative Plus Project Conditions (R&D Only)

The Cumulative Plus Project (R&D Only) scenario includes cumulative transportation conditions plus trips generated from the new R&D buildings. It does not include trips generated by the senior services and housing building.

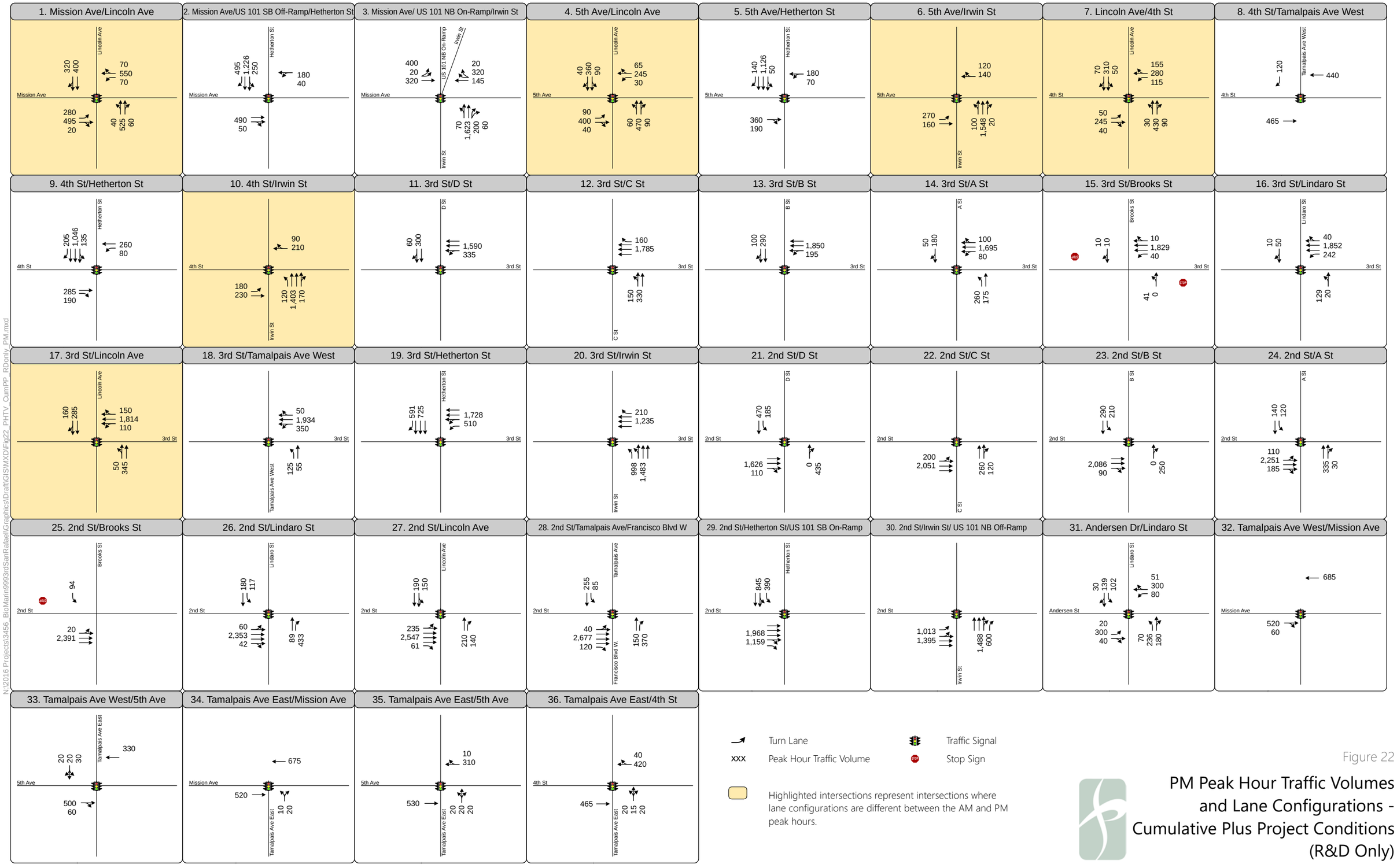
Figure 21 and Figure 22 display the peak hour traffic volumes, lane configurations, and traffic controls at each study intersection for the AM and PM peak hours, respectively.



N:\2016 Projects\3456 BioMarin9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig21_PHTV_CumPP_RDonly_AM.mxd

Figure 21

AM Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions (R&D Only)



N:\2016 Projects\3456 BioMarin\9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig22_PHTV_CumPP_RDonly_PM.mxd

Figure 22

PM Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions (R&D Only)

Intersection Operations

Table 39 summarizes cumulative plus project (R& D only) levels of service (LOS) at the study intersections. All intersections operate acceptably except for 3rd Street and Tamalpais Avenue West, where increasing westbound volumes create unacceptable AM peak hour conditions and worsen unacceptable operations slightly in the PM peak hour; and 2nd Street and Hetherton Street/US 101 Southbound Ramp, where operations worsen slightly in the AM peak hour. Appendix F presents all LOS calculations.

TABLE 39: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D ONLY)

Intersection	Control Type	Cumulative LOS / Average Delay [1, 2]		Cumulative Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
1. Mission Avenue and Lincoln Avenue	Signal	C / 27.5	C / 31.6	C / 27.5	C / 31.6
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street[3]	Signal	C / 23.9	B / 19.1	C / 24.7	B / 19.2
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street[3]	Signal	C / 27.2	C / 28.1	C / 27.3	C / 31.2
4. 5th Avenue and Lincoln Avenue	Signal	C / 25.2	A / 9.8	C / 25.1	A / 9.8
5. 5th Avenue and Hetherton Street[3]	Signal	B / 13.0	B / 13.9	B / 12.8	B / 14.5
6. 5th Avenue and Irwin Street	Signal	C / 33.3	C / 31.0	C / 33.7	C / 31.4
7. 4th Street and Lincoln Avenue	Signal	C / 27.7	C / 22.1	C / 27.6	C / 22.2
8. 4th Street and Tamalpais Avenue West[3]	Signal	A / 7.0	A / 6.4	A / 7.0	A / 6.3
9. 4th Street and Hetherton Street[3]	Signal	B / 10.1	A / 9.6	A / 9.9	A / 9.3
10. 4th Street and Irwin Street	Signal	D / 48.6	C / 31.7	D / 48.0	C / 31.8
11. 3rd Street and D Street	Signal	C / 23.6	C / 27.4	C / 23.6	C / 27.5
12. 3rd Street and C Street	Signal	C / 23.2	C / 28.1	C / 23.2	C / 28.2
13. 3rd Street and B Street	Signal	C / 25.3	C / 32.5	C / 25.3	C / 32.6
14. 3rd Street and A Street	Signal	C / 26.7	C / 34.2	B / 18.2	C / 24.5
15. 3rd Street and Brooks Street	SSSC	A (B) / 1.8 (13.5)	A (B) / 3.3 (13.9)	A (A) / 2.1 (8.3)	A (C) / 3.7 (16.1)
16. 3rd Street and Lindaro Street	Signal	A / 8.2	A / 9.4	B / 12.2	B / 10.6
17. 3rd Street and Lincoln Avenue	Signal	D / 52.2	C / 29.6	E / 60.7	C / 29.6
18. 3rd Street and Tamalpais Avenue West	Signal	E / 65.6	**F / 86.4**	**F / 93.4**	**F / 89.0**
19. 3rd Street and Hetherton Street	Signal	D / 38.3	D / 47.1	D / 46.0	D / 48.2
20. 3rd Street and Irwin Street	Signal	C / 28.3	D / 38.3	C / 28.7	D / 38.4
21. 2nd Street and D Street	Signal	D / 39.1	C / 32.5	D / 39.1	C / 32.5

TABLE 39: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D ONLY)

Intersection	Control Type	Cumulative LOS / Average Delay [1, 2]		Cumulative Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
22. 2nd Street and C Street	Signal	C / 28.6	C / 28.9	C / 28.7	C / 28.9
23. 2nd Street and B Street	Signal	C / 32.2	E / 56.4	C / 32.2	E / 56.4
24. 2nd Street and A Street	Signal	C / 27.4	C / 30.5	C / 27.5	C / 30.5
25. 2nd Street and Brooks Street	SSSC	A (C) / 2.6 (21.2)	A (D) / 3.4 (27.5)	A (C) / 2.9 (19.9)	A (D) / 3.8 (29.9)
26. 2nd Street and Lindaro Street	Signal	B / 14.3	B / 14.9	B / 18.5	C / 21.7
27. 2nd Street and Lincoln Avenue	Signal	D / 38.2	D / 38.3	D / 36.4	D / 44.4
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	Signal	D / 35.7	D / 46.5	D / 36.4	E / 60.4
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	Signal	**F / 95.9**	C / 34.7	**F / 97.0**	D / 35.9
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	Signal	C / 27.5	D / 39.6	C / 27.2	D / 41.9
31. Andersen Drive and Lindaro Street	Signal	C / 27.2	C / 24.0	C / 27.7	C / 24.3
32. Tamalpais Avenue West and Mission Avenue[3]	Signal	C / 27.1	B / 12.5	C / 27.1	B / 12.5
33. Tamalpais Avenue West and 5th Avenue[3]	Signal	A / 6.6	A / 9.0	A / 6.6	A / 9.1
34. Tamalpais Avenue East and Mission Avenue[3]	Signal	D / 46.1	C / 27.1	D / 46.1	C / 27.1
35. Tamalpais Avenue East and 5th Avenue[3]	Signal	A / 7.3	A / 5.7	A / 7.1	A / 5.8
36. Tamalpais Avenue East and 4th Street[3]	Signal	B / 16.1	A / 9.9	B / 16.0	A / 9.9

Notes:
1. LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
2. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
3. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for intersections 2, 3, 5, 8, 9, 32, 33, 34, 35, and 36 are based on HCM 2000 methodology.

Source: Fehr & Peers, 2018

Arterial Operations

Table 40 summarizes the cumulative plus project (R& D only) levels of service on the arterials in the analysis area. The speed decrease on Mission Avenue is less than one mile per hour and thus acceptable. Appendix F includes arterial LOS calculations.

TABLE 40: WEEKDAY PEAK HOUR ARTERIAL OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D ONLY)

Arterial	Standard	Cumulative LOS / Average Speed [1]		Cumulative Plus Project LOS / Average Speed [1]	
		AM	PM	AM	PM
1. Mission Avenue EB from Lincoln Avenue to US 101 NB Ramp/Irwin Street	E	**F / 7**	E / 8	**F / 7**	E / 8
2. Mission Avenue WB from US 101 NB Ramp/Irwin Street to Lincoln Avenue	F	F / 3	F / 4	F / 3	F / 4
3. 3rd Street WB from Hetherton Street to D Street	D	**F / 6**	**F / 6**	**F / 5**	**F / 5**
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 6**	**F / 6**	**F / 5**
5. Hetherton Street SB from Mission Avenue to 2nd Street	F	F / 4	E / 7	F / 4	E / 7
6. Irwin Street NB from 2nd Street to Mission Avenue	F	E / 8	E / 7	E / 7	E / 7

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.

Source: Fehr & Peers, 2018

Because the project would worsen operations on congestion management arterials expected to operate unacceptably, volume to capacity increases were calculated for those arterials. These results are reported in Table 41. Based on these results, the increase on 3rd Street in the AM peak hour is unacceptable.

TABLE 41: WEEKDAY PEAK HOUR ARTERIAL VOLUME/CAPACITY – CUMULATIVE PLUS PROJECT CONDITIONS (R&D ONLY)

Segment	Cumulative		Cumulative Plus Project		Increase	
	AM	PM	AM	PM	AM	PM
3. 3rd Street WB from Hetherton Street to D Street	0.865	0.960	0.925	0.966	**0.060**	0.006
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	0.844	0.934	0.848	0.977	0.005	0.043

Notes:
1. **Bold** indicates unacceptable increase.

Source: Fehr & Peers, 2018

Freeway Operations

Figure 23 presents cumulative plus project (R&D only) conditions freeway volumes, and Table 42 summarizes the freeway segment density and LOS results. Detailed calculations are included in Appendix F. As shown, project traffic does not cause any segment density to increase to an unacceptable LOS.

TABLE 42: WEEKDAY PEAK HOUR FREEWAY OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D ONLY)						
Segment	**Segment Type**	**Standard**	**Cumulative LOS / Density (pc/mi/ln[1])**		**Cumulative Plus Project LOS / Density (pc/mi/ln[1])**	
			AM	**PM**	**AM**	**PM**
Northbound						
I-580 On-Ramp to 2nd Street Off-Ramp	Weave	E	D / -[2]	**F / -[2]**	D / -[2]	**F / -[2]**
2nd Street Off-Ramp to Mission Avenue On-Ramp	Basic	E	C / 25	D / 33	C / 25	D / 33
Mission Avenue On-Ramp to Lincoln Avenue On-Ramp	Basic	E	D / 27	E / 39	D / 29	E / 40
Southbound						
Lincoln Avenue On-Ramp to Mission Avenue On-Ramp	Basic	E	E / 43	D / 34	E / 43	D / 34
Mission Avenue Off-Ramp	Diverge	E	**F / -[2]**	**F / -[2]**	**F / -[2]**	**F / -[2]**
Mission Avenue Off-Ramp to 2nd Street On-Ramp	Basic	E	D / 26	C / 21	D / 26	C / 21
2nd Street On-ramp to I-580 EB Off-Ramp	Weave	E	**F / -[2]**	E / -[2]	**F / -[2]**	E / -[2]

Notes:
4. pc/mi/ln = passenger car per mile per lane. **Bold** indicates unacceptable operations.
5. Density not calculated in Leisch methodology.

Source: Fehr & Peers, 2018

Volume to capacity was also calculated for the segments with unacceptable operations, as shown in Table 43. Increases due to the project were acceptable (less than 0.01), except for the Mission Avenue off-ramp in the AM peak hour.

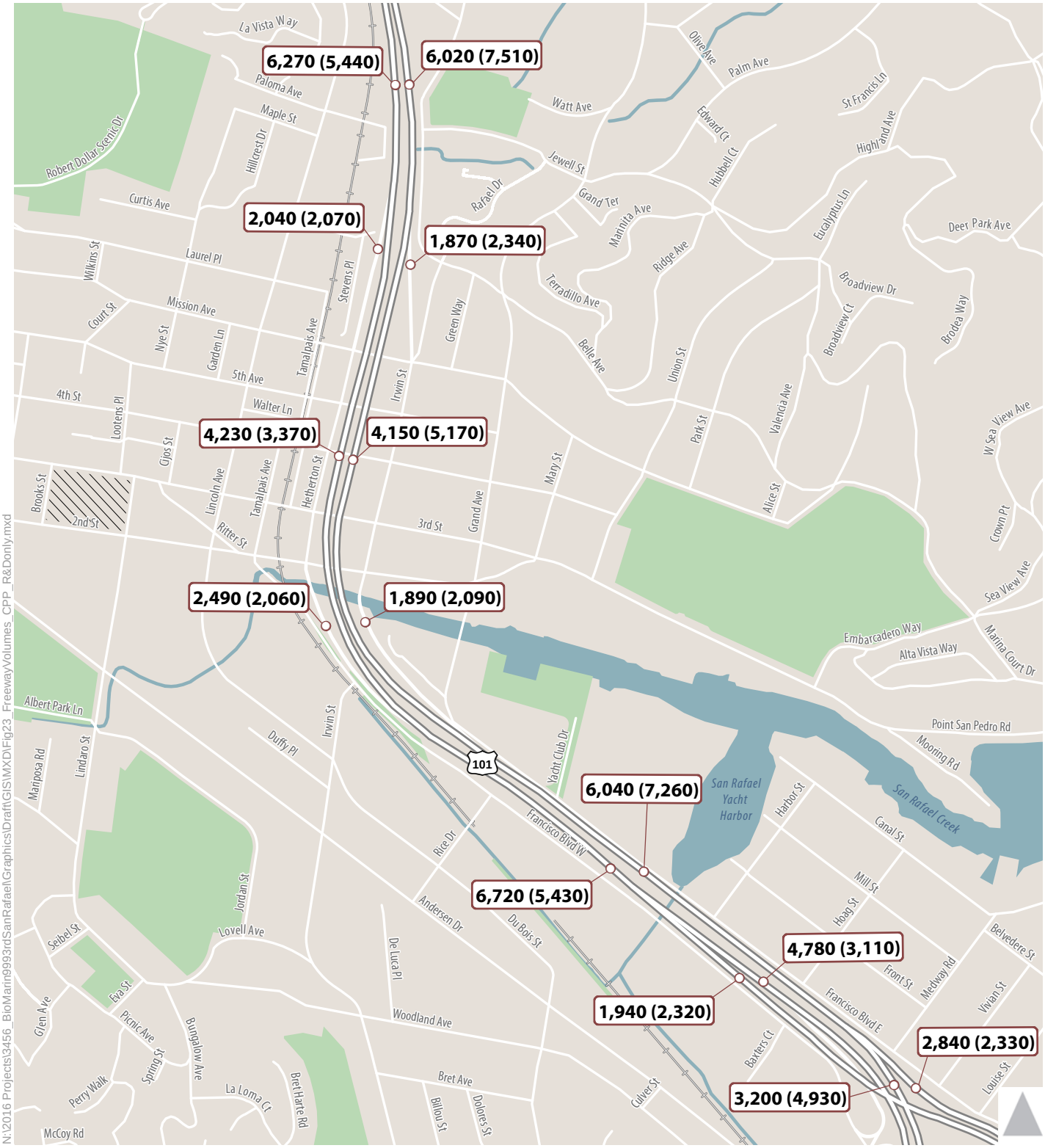
TABLE 43: WEEKDAY PEAK HOUR FREEWAY VOLUME/CAPACITY – CUMULATIVE PLUS PROJECT CONDITIONS (R&D ONLY)						
Segment	**Cumulative**		**Cumulative Plus Project**		**Increase**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**
Northbound						
I-580 On-Ramp to 2nd Street Off-Ramp	NA[1]	1.043	NA[1]	1.045	NA[1]	0.002
Southbound						
Mission Avenue Off-Ramp (Freeway)	0.977	0.854	0.986	0.856	0.009	0.002
Mission Avenue Off-Ramp (Ramp)	1.073	1.054	1.106	1.060	**0.033**	0.006
2nd Street On-Ramp to I-580 EB Off-Ramp	1.201	NA[1]	1.203	NA[1]	0.002	NA[1]

Notes:
1. NA, acceptable operations. **Bold** indicates unacceptable increase.
Source: Fehr & Peers, 2018

Changes in ramp queue lengths compared to cumulative conditions were also estimated at the northbound 2nd Street and southbound Mission Avenue off-ramps, for information purposes only. Table 44 summarizes these results.

TABLE 44: WEEKDAY PEAK HOUR OFF-RAMP QUEUE LENGTH INCREASE – CUMULATIVE PLUS PROJECT CONDITIONS (R&D ONLY)		
Off-Ramp	**Increased Queue Length (feet)[1]**	
	AM	**PM**
US 101 NB to 2nd Street	0	25
US 101 SB to Mission Avenue	0	0

Notes:
1. Compared to cumulative conditions
Source: Fehr & Peers, 2018



AM (PM) Freeway Volume

Figure 23

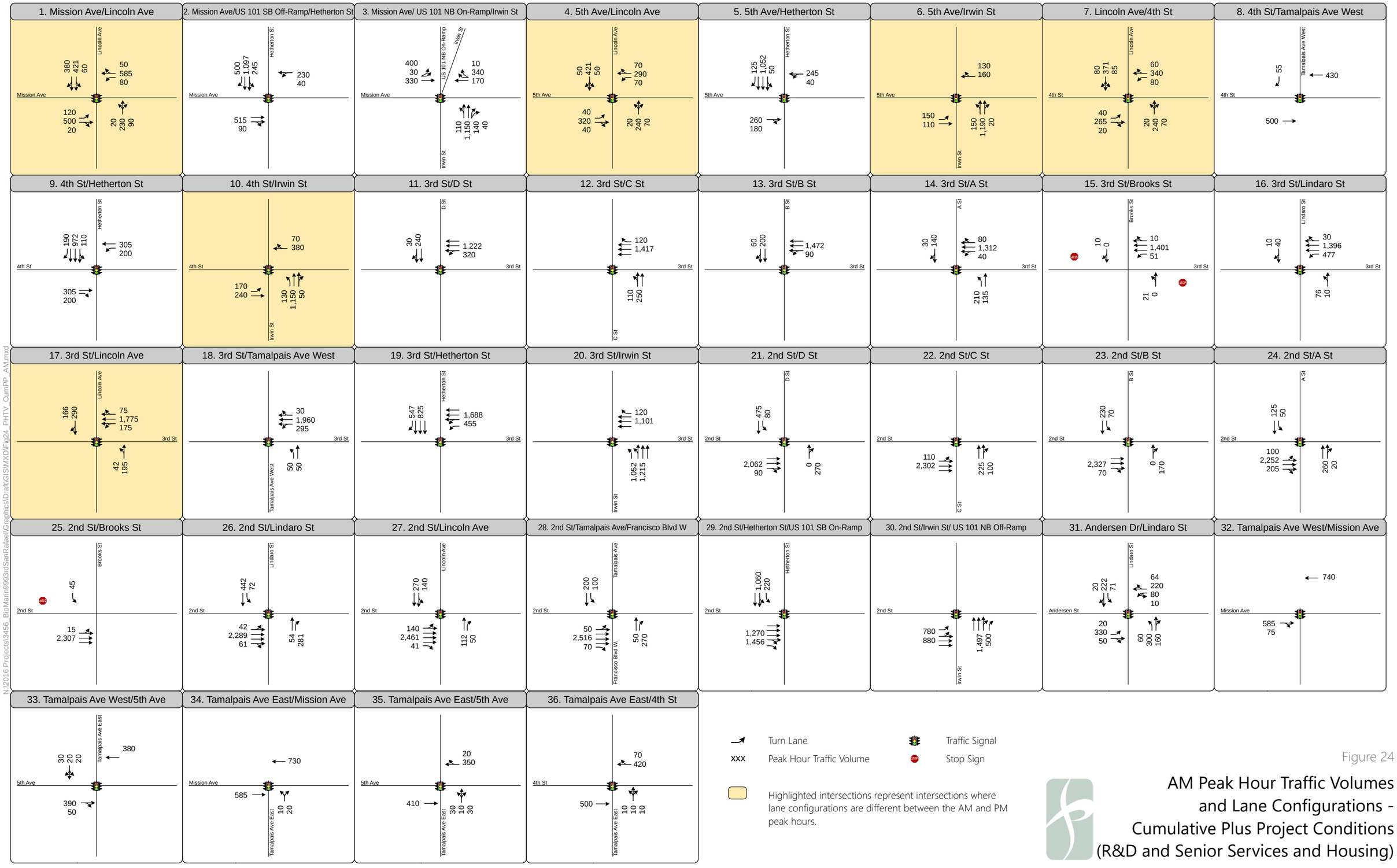
Weekday Peak Hour Freeway Volumes - Cumulative Plus Project Conditions (R&D Only)

Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

The Cumulative Plus Project (R&D and Senior Services and Housing) scenario includes cumulative transportation conditions plus trips generated from the new R&D buildings and the senior services and housing building.

Figure 24 and Figure 25 display the peak hour traffic volumes, lane configurations, and traffic controls at each study intersection for the AM and PM peak hours, respectively.

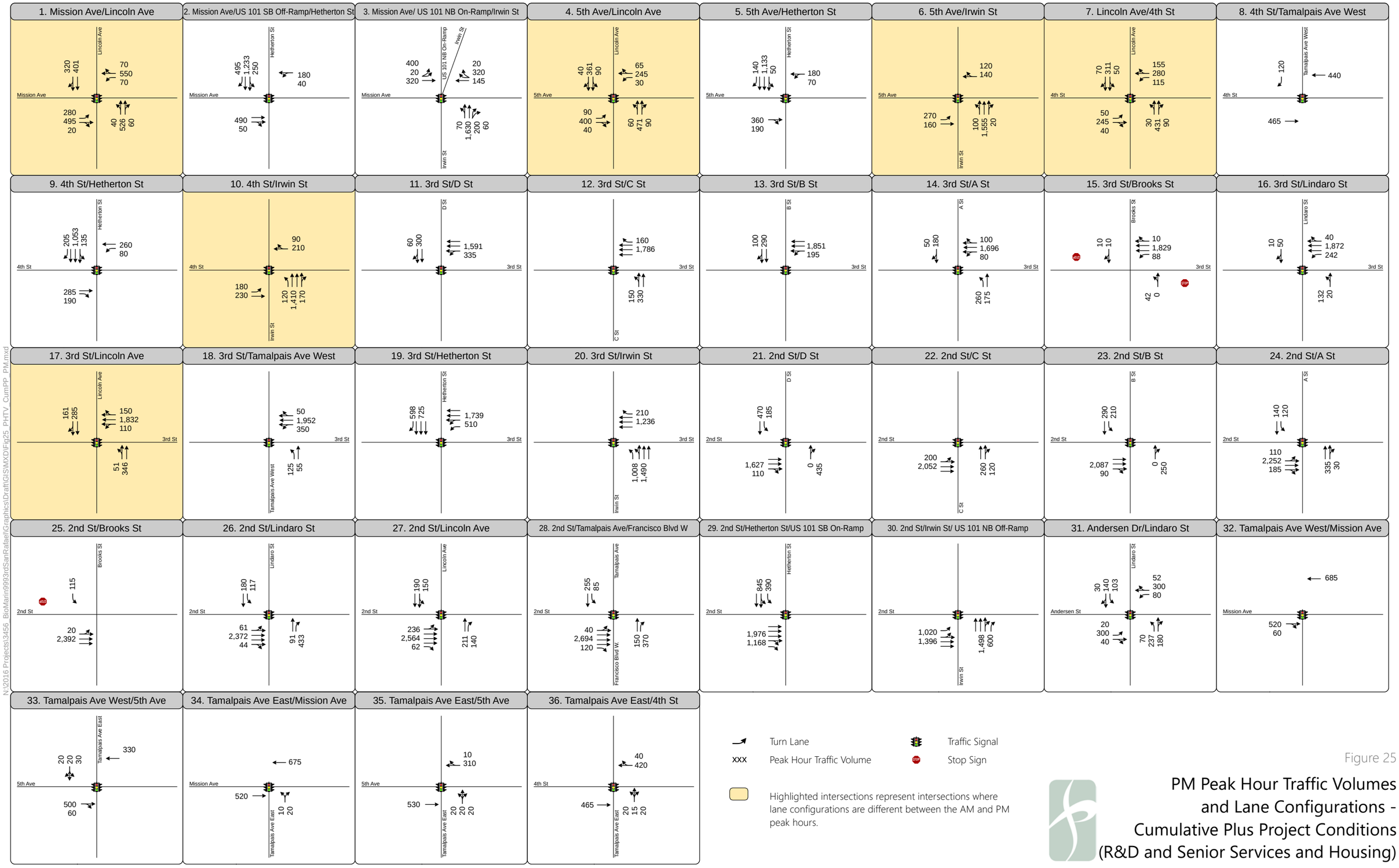
This page intentionally left blank.



N:\2016 Projects\3456 BioMarin9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig24_PHTV_CumPP_AM.mxd

Figure 24

AM Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions (R&D and Senior Services and Housing)



N:\2016 Projects\3456 BioMarin\9993rdSanRafael\Graphics\Draft\GIS\MXD\Fig25_PHTV_CumPP_PM.mxd

Figure 25

PM Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Intersection Operations

Table 45 summarizes cumulative plus project (R& D and Senior Services and Housing) levels of service (LOS) at the study intersections. All intersections operate acceptably except for 3rd Street and Tamalpais Avenue West, where increasing westbound volumes create unacceptable AM peak hour conditions and worsen unacceptable operations significantly in the PM peak hour; and 2nd Street and Hetherton Street/US 101 Southbound Ramp, where operations worsen slightly in the AM peak hour. Appendix G presents all LOS calculations.

TABLE 45: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Intersection	Control Type	Cumulative LOS / Average Delay [1, 2]		Cumulative Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
1. Mission Avenue and Lincoln Avenue	Signal	C / 27.5	C / 31.6	C / 27.5	C / 31.6
2. Mission Avenue and US 101 Southbound Ramp/Hetherton Street[3]	Signal	C / 23.9	B / 19.1	C / 24.8	B / 18.5
3. Mission Avenue and US 101 Northbound Ramp/Irwin Street[3]	Signal	C / 27.2	C / 28.1	C / 27.4	C / 31.7
4. 5th Avenue and Lincoln Avenue	Signal	C / 25.2	A / 9.8	C / 25.1	A / 9.8
5. 5th Avenue and Hetherton Street[3]	Signal	B / 13.0	B / 13.9	B / 12.9	B / 14.2
6. 5th Avenue and Irwin Street	Signal	C / 33.3	C / 31.0	C / 33.9	C / 31.5
7. 4th Street and Lincoln Avenue	Signal	C / 27.7	C / 22.1	C / 27.6	C / 22.2
8. 4th Street and Tamalpais Avenue West[3]	Signal	A / 7.0	A / 6.4	A / 7.0	A / 6.3
9. 4th Street and Hetherton Street[3]	Signal	B / 10.1	A / 9.6	A / 9.9	A / 9.5
10. 4th Street and Irwin Street	Signal	D / 48.6	C / 31.7	D / 48.0	C / 31.8
11. 3rd Street and D Street	Signal	C / 23.6	C / 27.4	C / 23.6	C / 27.5
12. 3rd Street and C Street	Signal	C / 23.2	C / 28.1	C / 23.2	C / 28.2
13. 3rd Street and B Street	Signal	C / 25.3	C / 32.5	C / 25.3	C / 32.7
14. 3rd Street and A Street	Signal	C / 26.7	C / 34.2	B / 18.2	C / 24.6
15. 3rd Street and Brooks Street	SSSC	A (B) / 1.8 (13.5)	A (B) / 3.3 (13.9)	A (B) / 2.3 (10.6)	A (B) / 2.8 (13.3)
16. 3rd Street and Lindaro Street	Signal	A / 8.2	A / 9.4	B / 15.3	A / 9.4
17. 3rd Street and Lincoln Avenue	Signal	D / 52.2	C / 29.6	E / 63.2	C / 29.8
18. 3rd Street and Tamalpais Avenue West	Signal	E / 65.6	**F / 86.4**	**F / 96.7**	**F / 94.0**
19. 3rd Street and Hetherton Street	Signal	D / 38.3	D / 47.1	D / 47.1	D / 49.4
20. 3rd Street and Irwin Street	Signal	C / 28.3	D / 38.3	C / 28.8	D / 38.6
21. 2nd Street and D Street	Signal	D / 39.1	C / 32.5	D / 39.1	C / 32.5
22. 2nd Street and C Street	Signal	C / 28.6	C / 28.9	C / 28.7	C / 28.9

TABLE 45: WEEKDAY PEAK HOUR INTERSECTION OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Intersection	Control Type	Cumulative LOS / Average Delay [1, 2]		Cumulative Plus Project LOS / Average Delay [1, 2]	
		AM	PM	AM	PM
23. 2nd Street and B Street	Signal	C / 32.2	E / 56.4	C / 32.2	E / 56.4
24. 2nd Street and A Street	Signal	C / 27.4	C / 30.5	C / 27.5	C / 30.5
25. 2nd Street and Brooks Street	SSSC	A (C) / 2.6 (21.2)	A (D) / 3.4 (27.5)	A (C) / 2.9 (22.0)	A (D) / 3.8 (27.7)
26. 2nd Street and Lindaro Street	Signal	B / 14.3	B / 14.9	B / 18.6	C / 21.0
27. 2nd Street and Lincoln Avenue	Signal	D / 38.2	D / 38.3	D / 37.1	D / 46.1
28. 2nd Street and Tamalpais Avenue/Francisco Boulevard West	Signal	D / 35.7	D / 46.5	D / 37.0	E / 61.4
29. 2nd Street and Hetherton Street/US 101 Southbound Ramp	Signal	**F / 95.9**	C / 34.7	**F / 97.9**	D / 35.9
30. 2nd Street and Irwin Street/US 101 Northbound Ramp	Signal	C / 27.5	D / 39.6	C / 28.0	D / 43.4
31. Andersen Drive and Lindaro Street	Signal	C / 27.2	C / 24.0	C / 27.8	C / 24.3
32. Tamalpais Avenue West and Mission Avenue[3]	Signal	C / 27.1	B / 12.5	C / 27.1	B / 12.5
33. Tamalpais Avenue West and 5th Avenue[3]	Signal	A / 6.6	A / 9.0	A / 6.6	A / 9.1
34. Tamalpais Avenue East and Mission Avenue[3]	Signal	D / 46.1	C / 27.1	D / 46.1	C / 26.8
35. Tamalpais Avenue East and 5th Avenue[3]	Signal	A / 7.3	A / 5.7	A / 7.1	A / 5.7
36. Tamalpais Avenue East and 4th Street[3]	Signal	B / 16.1	A / 9.9	B / 16.0	A / 9.9

Notes:
1. LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
2. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
3. The HCM 2010 methodology in Synchro does not provide delay or LOS when signal timing includes a pedestrian-only phase, intersections with more than four legs, or clustered intersections. Thus, the results for intersections 2, 3, 5, 8, 9, 32, 33, 34, 35, and 36 are based on HCM 2000 methodology.

Source: Fehr & Peers, 2018

Arterial Operations

Table 46 summarizes the cumulative plus project (R& D and Senior Services and Housing) levels of service on the arterials in the analysis area. The speed decrease on Mission Avenue is less than one mile per hour and thus acceptable. Appendix G includes arterial LOS calculations.

TABLE 46: WEEKDAY PEAK HOUR ARTERIAL OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Arterial	Standard	Cumulative LOS / Average Speed [1]		Cumulative Plus Project LOS / Average Speed [1]	
		AM	PM	AM	PM
1. Mission Avenue EB from Lincoln Avenue to US 101 NB Ramp/Irwin Street	E	**F / 7**	E / 8	**F / 7**	E / 8
2. Mission Avenue WB from US 101 NB Ramp/Irwin Street to Lincoln Avenue	F	F / 3	F / 4	F / 3	F / 4
3. 3rd Street WB from Hetherton Street to D Street	D	**F / 6**	**F / 6**	**F / 5**	**F / 5**
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 6**	**F / 6**	**F / 5**
5. Hetherton Street SB from Mission Avenue to 2nd Street	F	F / 4	E / 7	F / 4	E / 7
6. Irwin Street NB from 2nd Street to Mission Avenue	F	E / 8	E / 7	F / 7	F / 7

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.

Source: Fehr & Peers, 2018

Because the project would worsen operations on congestion management arterials expected to operate unacceptably, volume to capacity increases were calculated for those arterials. These results are reported in Table 47. Based on these results, the increase on 3rd Street in the AM peak hour is unacceptable.

TABLE 47: WEEKDAY PEAK HOUR ARTERIAL VOLUME/CAPACITY – CUMULATIVE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Segment	Cumulative		Cumulative Plus Project		Increase	
	AM	PM	AM	PM	AM	PM
3. 3rd Street WB from Hetherton Street to D Street	0.865	0.960	0.931	0.974	**0.067**	0.013
4. 2nd Street EB from D Street to Hetherton Street/US 101 SB Ramp	0.844	0.934	0.852	0.983	0.008	0.048

Notes:
1. NA = not applicable, calculation not required. **Bold** indicates unacceptable increase.

Source: Fehr & Peers, 2018

Freeway Operations

Figure 26 presents cumulative plus project (R&D and Senior Services and Housing) conditions freeway volumes, and Table 48 summarizes the freeway segment density and LOS results. Detailed calculations are

included in Appendix G. As shown, project traffic does not cause any segment density to increase to an unacceptable LOS.

TABLE 48: WEEKDAY PEAK HOUR FREEWAY OPERATIONS – CUMULATIVE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Segment	Segment Type	Standard	Cumulative LOS / Density (pc/mi/ln[1])		Cumulative Plus Project LOS / Density (pc/mi/ln[1])	
			AM	PM	AM	PM
Northbound						
I-580 On-Ramp to 2nd Street Off-Ramp	Weave	E	D / -[2]	**F / -[2]**	D / -[2]	**F / -[2]**
2nd Street Off-Ramp to Mission Avenue On-Ramp	Basic	E	C / 25	D / 33	C / 25	D / 33
Mission Avenue On-Ramp to Lincoln Avenue On-Ramp	Basic	E	D / 27	E / 39	D / 29	E / 40
Southbound						
Lincoln Avenue On-Ramp to Mission Avenue On-Ramp	Basic	E	E / 43	D / 34	E / 44	D / 34
Mission Avenue Off-Ramp	Diverge	E	**F / -[2]**	**F / -[2]**	**F / -[2]**	**F / -[2]**
Mission Avenue Off-Ramp to 2nd Street On-Ramp	Basic	E	D / 26	C / 21	D / 26	C / 21
2nd Street On-ramp to I-580 EB Off-Ramp	Weave	E	**F / -[2]**	E / -[2]	**F / -[2]**	E / -[2]

Notes:
2. pc/mi/ln = passenger car per mile per lane. **Bold** indicates unacceptable operations.
3. Density not calculated in Leisch methodology.
Source: Fehr & Peers, 2018

Volume to capacity was also calculated for the segments with unacceptable operations, as shown in Table 49. Increases due to the project were acceptable (less than 0.01), except for the Mission Avenue off-ramp in the AM peak hour.

TABLE 49: WEEKDAY PEAK HOUR FREEWAY VOLUME/CAPACITY – CUMULATIVE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING

Segment	Cumulative		Cumulative Plus Project		Increase	
	AM	PM	AM	PM	AM	PM
Northbound						
I-580 On-Ramp to 2nd Street Off-Ramp	NA[1]	1.043	NA[1]	1.047	NA[1]	0.004
Southbound						
Mission Avenue Off-Ramp (Freeway)	0.9774	0.854	0.9868	0.856	0.0094	0.002
Mission Avenue Off-Ramp (Ramp)	1.073	1.054	1.106	1.060	**0.033**	0.006
2nd Street On-Ramp to I-580 EB Off-Ramp	1.201	NA[1]	1.204	NA[1]	0.003	NA[1]

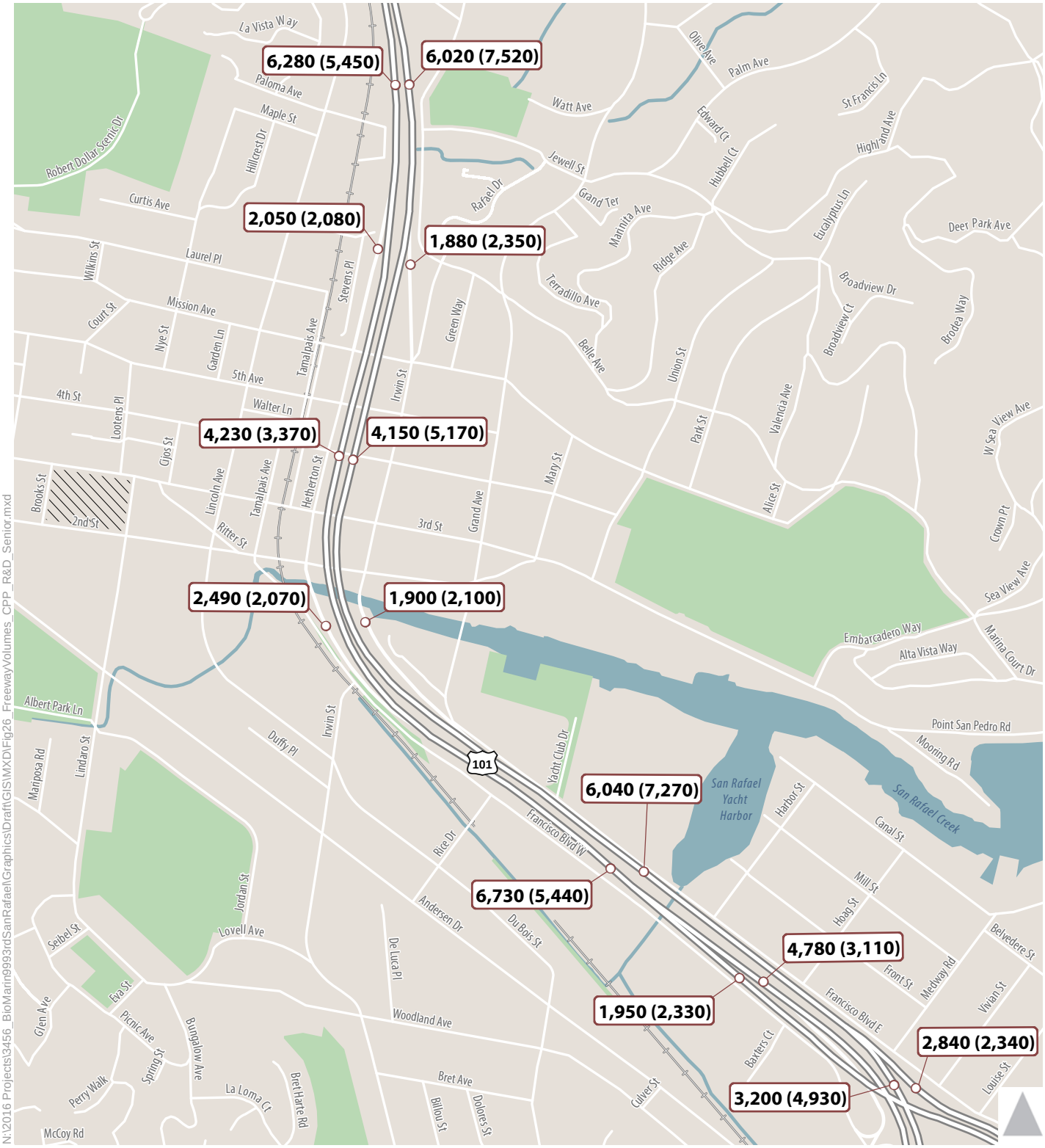
Notes:
2. NA, acceptable operations. **Bold** indicates unacceptable increase.
Source: Fehr & Peers, 2018

Changes in ramp queue lengths compared to cumulative conditions were also estimated at the northbound 2nd Street and southbound Mission Avenue off-ramps, for information purposes only. Table 50 summarizes these calculations.

TABLE 50: WEEKDAY PEAK HOUR OFF-RAMP QUEUE LENGTH INCREASE – CUMULATIVE PLUS PROJECT CONDITIONS (R&D AND SENIOR SERVICES AND HOUSING)

Off-Ramp	Increased Queue Length (feet)[1]	
	AM	PM
US 101 NB to 2nd Street	0	25
US 101 SB to Mission Avenue	0	0

Notes:
1. Compared to cumulative conditions
Source: Fehr & Peers, 2018



AM (PM) Freeway Volume

Figure 26

Weekday Peak Hour Freeway Volumes - Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Impacts and Mitigation Measures

This chapter summarizes the significance of transportation and traffic impacts using the criteria described in Study Methodology. Where impacts are deemed significant, mitigation measures are recommended to lessen their significance. This study identifies the transportation and traffic impacts of the BioMarin R&D buildings only as well as the impacts of the BioMarin R&D buildings with the senior services and housing. In all cases, the transportation/traffic effects of these two scenarios would be similar or the same. Therefore, a single impact statement is provided that applies to both plus-project scenarios.

Project-Specific Impacts

Vehicle Travel

Vehicle trips generated by the proposed project would increase traffic volumes on study roadway segments and intersections, as described below.

Intersection Operations

All intersections would continue to operate at an acceptable LOS under Baseline Plus Project conditions.

Arterial Operations

Under baseline plus project conditions, most arterials would experience a less than significant increase in delay (City arterials) or volume to capacity (congestion management arterials). Adaptive signal implementation is planned under cumulative conditions in Downtown San Rafael, which would improve vehicle operations compared to the existing pretimed signal system. Earlier implementation would improve baseline conditions. A second exclusive eastbound right turn lane at the 2nd Street and Hetherton Street/ US 101 Southbound Ramp intersection was also reviewed to see if it would improve 2nd Street speed; however, there is limited space (less than 100 feet) between the SMART extension and the ramp, and improvements would be minor. 2nd Street cannot be widened without significant impacts to downtown.

However, 3rd Street volume to capacity would increase significantly (by 0.067) during the AM peak hour.

Impacts and Mitigation Measures

Impact-1: Vehicle trips generated by the proposed project would increase traffic levels on study arterials. These project trips would cause volume to capacity to increase unacceptably on the 3rd Street arterial during the AM peak hour. Therefore, this is considered a significant impact.

Mitigation Measure-1: Implement the BioMarin San Rafael Campus Transportation Demand Management (TDM) Plan and conduct ongoing annual monitoring.

TDM can be a mitigation measure to reduce trips, as recommended in the recent Governor's Office of Planning Research "Technical Advisory on Evaluating Transportation Impacts in CEQA" (December 2018). BioMarin has developed a TDM plan and would monitor progress of this plan with annual counts. Trip generation calculations for this project show that current TDM measures provided by the campus have helped reduce peak hour trip rates 12-15% below levels generated by R&D uses in suburban areas without trip reduction programs based on national (i.e., ITE) trip rates.

Mitigation Measure 1 refers to additional trip reduction strategies described in the BioMarin TDM Plan prepared for this project that, if implemented and monitored on an ongoing basis, would reduce peak hour trips by another 10%, based on California Air Pollution Control Officers (CAPCOA) estimates and the surrounding Downtown San Rafael transportation and land use context.

Mitigation Measure-2: Employ signal optimization technology on 3rd Street.

Adaptive signal implementation is planned under cumulative conditions in Downtown San Rafael, and this arterial would be included in implementation. By replacing the current pretimed signal control system, earlier implementation of signal optimization technology would improve baseline conditions. However, per discussion with the City of San Rafael in a meeting on November 8, 2018, the City noted that these improvements are not likely to be implemented in this timeframe.

Mitigation Measures 1 and 2 would increase traffic speed along the corridor, but the corridor would still continue to operate unacceptably. 3rd Street cannot be widened without significant impacts to downtown San Rafael.

Improvements at the 3rd Street and Hetherton Street intersection would also improve 3rd Street arterial speed. A mitigation measure that would involve converting the southbound through lane on Hetherton Street that is adjacent to the exclusive right turn lane into a second right-turn lane (i.e., resulting in two through lanes and two right turn lanes onto 3rd Street, given the approximate 50/50 balance between through and right turn movements) was evaluated. This would reduce vehicle delays, but result in a potential secondary impact to pedestrians using the west crosswalk as motorists making a right turn from the new

second right turn lane may find it difficult to see pedestrians, particularly those walking in the southbound direction. Given the potential secondary pedestrian impacts of the above mitigation measure, it is deemed to be infeasible.

Significance after Mitigation: Because this impact cannot be fully mitigated, it remains **significant and unavoidable**.

Freeway Operations

The project will add vehicle trips to US 101. Most segments are expected to operate acceptably under baseline plus project conditions. The US 101 SB weave segment from 2nd Street to I-580 EB operates at LOS F under baseline conditions. Project trips will increase volume to capacity by less than 0.01 on this segment. Therefore, this impact is considered **less than significant**.

Bicycle and Pedestrian Travel

Bicycle trips in the study area would increase as a result of the proposed project, as supported by the discussion in Project Conditions. Pedestrian trips in the study area will increase as a result of the proposed project, particularly at the 2nd Street and Lindaro Street intersection. The projected increase in vehicles at the intersections in the vicinity of the proposed project may result in an increase in vehicle-bicycle-pedestrian conflicts at intersections in the study area. However, the proposed project would not create potentially hazardous conditions for bicycles and pedestrians, or otherwise interfere with bicycle and pedestrian accessibility to the site and adjoining areas because the project does not remove existing facilities and does not prohibit the construction of proposed future facilities in the project vicinity. The project's impact to bicycle and pedestrian facilities is therefore considered less than significant.

To accommodate bicyclists, both the BioMarin R&D facilities and the senior services and housing facilities should include safe, secure bicycle parking.

Additionally, construction of the facilities proposed in the 2018 San Rafael Bicycle & Pedestrian Master Plan would support bicyclists and pedestrians accessing this project. In particular, the east-west bikeway through downtown, conceptually shown as along 4th Street, would create improved bicycle connections that would serve the project. For pedestrians, the planned improvements at and between the US 101 ramp intersections on 2nd Street would be beneficial. The other proposed US 101 undercrossing improvements would also benefit both pedestrians and bicyclists.

Construction of an additional crosswalk is recommended on the west leg of the signalized intersection of 3rd Street and Lindaro Street. This crosswalk would create a more direct connection between the project

site, Lootens Place, and business areas to the north. Vehicle level of service at the intersection would not be reduced.

Transit Travel

Transit trips in the study area would increase as a result of the project, as supported by the discussion in Project Conditions. Most employees at the project site would walk to the San Rafael Transportation Center and SMART station to access the rail and bus service provided there. A total of 22 bus routes currently stop at the San Rafael Transportation Center. A survey of BioMarin employees at the San Rafael campus in the spring of 2018 indicated that 16 percent of employees travel by transit on a typical day. The proposed project, with 550 employees, would generate 88 new daily transit trips. The BioMarin employees using transit split their trips among SMART (77 percent), Golden Gate Transit (17 percent), and Marin Transit (6 percent). The project would thus add 68 daily riders to SMART, 15 daily riders to Golden Gate Transit routes, and 5 daily riders to Marin Transit routes on a typical weekday. This level of added transit ridership would not have a significant impact on the SMART, Golden Gate Transit, or Marin Transit routes serving Downtown San Rafael. Therefore, the project impacts to transit facilities are considered less than significant.

Cumulative Impacts

Vehicle Travel

Vehicle trips generated by the proposed project would increase traffic volumes on study roadway segments and intersections, as described below.

Intersection Operations

Most study intersections would continue to operate at an acceptable LOS under cumulative plus project conditions.

Project traffic would increase the average control delay by two seconds at the 2nd Street and Hetherton Street/ US 101 Southbound Ramp intersection during the AM peak hour, when it is already expected to operate at an unacceptable LOS. Because this increase is less than five seconds, it is considered less than significant. Addition of a second exclusive eastbound right turn lane at this intersection would reduce delay at this intersection. However, there is limited space (less than 100 feet) between the SMART extension and the ramp, and improvements would be insufficient to eliminate the increase.

One intersection would experience significant impacts.

Impacts and Mitigation Measures

Impact-2: Vehicle trips generated by the proposed project would increase cumulative traffic volumes at study intersections. These project trips would cause operations to degrade from an acceptable LOS to an unacceptable LOS at the 3rd Street and Tamalpais Avenue West intersection during the AM peak hour and increase delay significantly during the PM peak hour. Therefore, this is considered a significant impact.

Mitigation Measure-1: Implement the BioMarin San Rafael Campus Transportation Demand Management (TDM) Plan and conduct ongoing annual monitoring.

Mitigation Measure-3: Reduce lane widths and add a westbound left-turn pocket at the 3rd Street and Tamalpais Avenue intersection.

This measure would provide additional capacity for the westbound through and left-turn movements. This change would improve operations to LOS D. This improvement could be accomplished during planned redesign of the transit center at the southeast corner of this intersection. However, this may not be feasible within the transit center design. TDM measures alone would not completely mitigate this impact.

Significance after Mitigation: Because the feasibility of the proposed mitigation measure is uncertain given the ongoing process of selecting a preferred alternative for the transit center and trip reduction strategies in the new TDM Plan would not reduce trips to a level that would reduce added intersection delay to a less than significant level, the impact remains **significant and unavoidable.**

Arterial Operations

Under cumulative plus project conditions, most arterials would experience a less than significant increase in delay (City arterials) or volume to capacity (congestion management arterials). Eliminating parking on Irwin Street in the AM peak hour as currently done in the PM peak hour was evaluated, but the improvement to speed was less than 1 mile per hour. Irwin Street cannot be widened without significant impacts to adjacent properties. Similarly, a second exclusive eastbound right turn lane at the 2nd Street and Hetherton Street/ US 101 Southbound Ramp intersection was reviewed to see if it would improve 2nd Street speed; however, there is limited space (less than 100 feet) between the SMART extension and the ramp, and improvements would be minor. 2nd Street cannot be widened without significant impacts to downtown.

However, 3rd Street volume to capacity would increase significantly (by 0.067) during the AM peak hour.

Impacts and Mitigation Measures

Impact-3: Vehicle trips generated by the proposed project would add vehicle trips to study arterials. These project trips would cause volume to capacity to increase unacceptably on the 3rd Street arterial during the AM peak hour. Therefore, this is considered a significant impact.

Mitigation Measure-1: Implement the BioMarin San Rafael Campus Transportation Demand Management (TDM) Plan and conduct ongoing annual monitoring.

Intersection improvements at the 3rd Street and Tamalpais Avenue West intersection would also benefit 3rd Street arterial speed. This improvement could be accomplished during planned redesign of the Transit Center at the southeast corner of this intersection. However, this may not be feasible within the Transit Center design. TDM measures alone would not completely mitigate this impact.

Intersection improvements at the 3rd Street and Hetherton Street intersection would also benefit 3rd Street arterial speed. Converting the southbound through lane on Hetherton Street that is adjacent to the exclusive right turn lane into a second right-turn lane (i.e., resulting in two through lanes and two right turn lanes onto 3rd Street, given the approximate 50/50 balance between through and right turn movements) was evaluated. This would reduce vehicle delays, but result in a potential secondary impact to pedestrians using the west crosswalk as motorists making a right turn from the new second right turn lane may find it difficult to see pedestrians, particularly those walking in the southbound direction. Given the potential secondary pedestrian impacts of the above mitigation measure, it is deemed to be infeasible.

The TDM mitigation measure described above would not result in a sufficient reduction in traffic to reduce the increase in volume to capacity to an acceptable level. 3rd Street cannot be widened without significant impacts to downtown San Rafael. Therefore, the impact is considered significant and unavoidable on this arterial.

Significance after Mitigation: Significant and unavoidable

Freeway Operations

The project will add vehicle trips to US 101. Three segments will experience unacceptable operations under cumulative plus project conditions. For two segments (US 101 NB I-580 On-Ramp to 2nd Street Off-Ramp and US 101 SB 2nd Street On-ramp to I-580 EB Off-Ramp), project trips will increase volume to capacity by less than 0.01. However, for one segment, US 101 SB Mission Avenue Off-Ramp, project trips will increase volume to capacity by more than 0.01.

Impacts and Mitigation Measures

Impact-4: Vehicle trips generated by the proposed project would add vehicle trips to study freeway segments. These project trips would cause volume to capacity to increase unacceptably on the US 101 SB Mission Avenue Off-Ramp diverge segment during the AM peak hour. Therefore, this is considered a significant impact.

Mitigation Measure-1: Implement the BioMarin San Rafael Campus Transportation Demand Management (TDM) plan and conduct ongoing annual monitoring.

TDM improvements alone would reduce the increase in volume to capacity, but not to an acceptable level. Insufficient width exists to add lanes to this segment of US 101 SB.

Significance after Mitigation: Significant and unavoidable

Vehicle Miles Traveled

A vehicle miles traveled (VMT) analysis was completed in preparation for City of San Rafael implementation of Senate Bill (SB) 743. The City has not yet adopted policies relating to SB 743. Therefore, results of this analysis are for informational purposes only. This section describes the methodology used to calculate the daily home-work VMT per employee. This VMT is that generated by an employee's trips between work and home. The results are presented along with a short discussion below.

Assumptions and Methodology

To determine the average daily home-work VMT per employee at the existing BioMarin San Rafael campus, zip code data provided by BioMarin that listed employee residential locations was analyzed. Figure 27 illustrates the existing employee residential distribution.

This data was used to calculate the distance between existing employee zip codes and the project site. The average home-work travel distance per driver was calculated by using the weighted average of distances between each zip code and the project site based on the number of employees residing in each zip code. Using the mode share data discussed in Project Conditions, this number was adjusted by reducing the number of vehicle trips to account for transit, carpooling, walking, and bicycling, resulting in the average VMT per employee.

Comparable data was not available for the senior services and housing. However, residents will not be able to own vehicles, as a restriction of the lease, and the facility manager will reside in an on-site apartment. These factors will reduce VMT for the site. BioMarin will also generate more than 80% of project site trips.

The main limitations of this approach are that distances were calculated based on zip codes, which provides an approximate estimate of distance traveled. Workers residing at longer distances may be more likely to telecommute or use transit such as SMART rail or Golden Gate Transit buses, which may cause VMT forecasts to be overestimated.

Results

The average trip driver trip length for employees at the proposed project based on existing BioMarin employee zip code data is estimated to be approximately 21.6 miles, or 43 VMT. Adjusting for mode share, the average home-work daily VMT per driver is estimated to be 37.

For comparison purposes, the average home-work VMT per worker for San Rafael and the Bay Area was determined using the Metropolitan Transportation Commission (MTC) Regional Travel Model.

The results of this analysis are presented in Table 51. BioMarin employees would have 61% greater VMT than the average San Rafael employee as determined by the MTC travel model.

TABLE 51: HOME-WORK VEHICLE MILES TRAVELED

Location	Estimated Average Home-Work VMT / Employee
BioMarin R&D[1]	37
Downtown San Rafael[2]	20
San Rafael[2]	23
Bay Area[2]	17

Notes:
1. BioMarin data based on employee survey data provided by BioMarin
2. San Rafael and Bay Area data estimated using the MTC Regional Travel Model

Source: Fehr & Peers, 2018

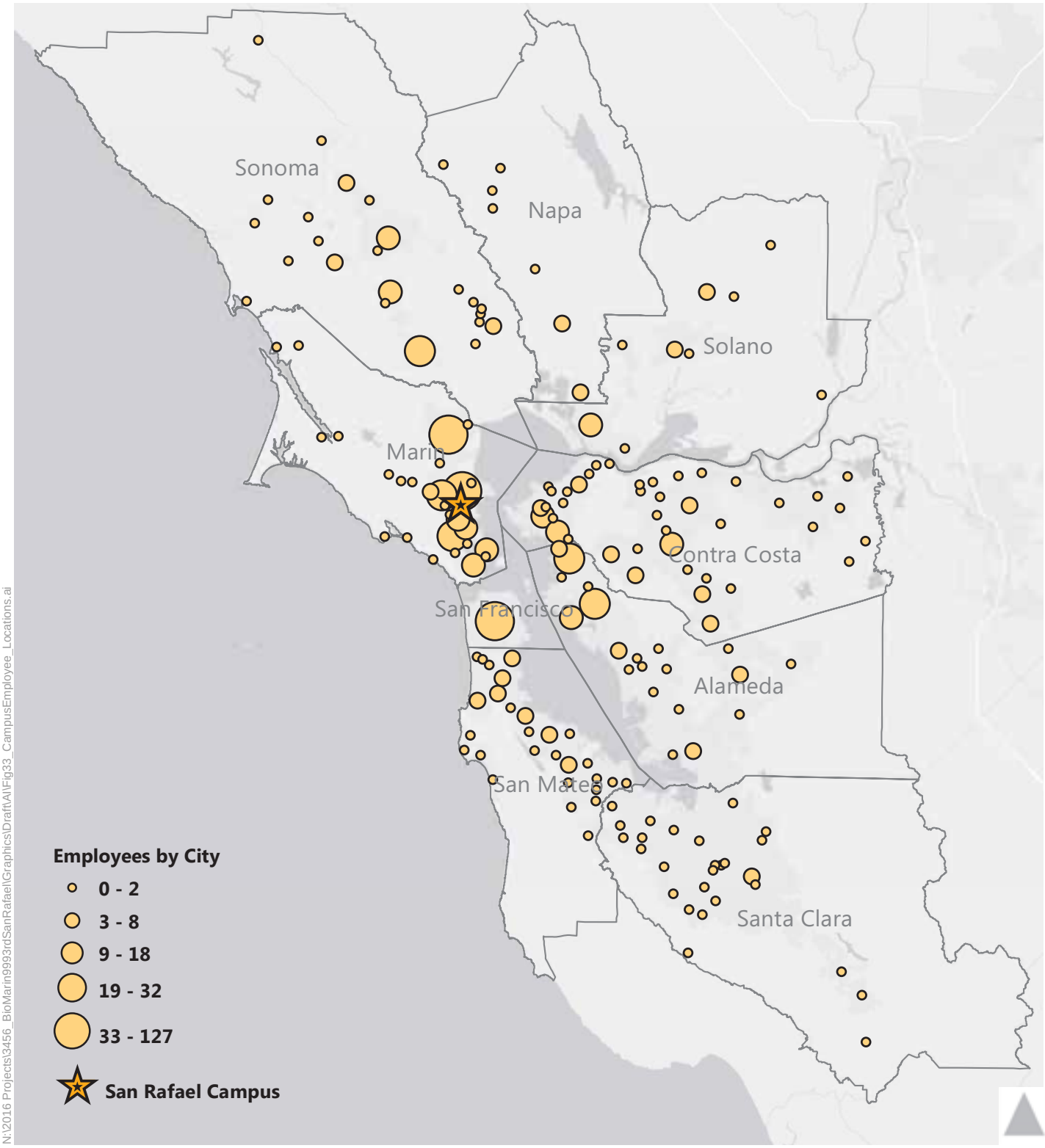


Figure 27

2018 BioMarin San Rafael Campus Employee Home Locations

Site Plan Review

This chapter analyzes site access and internal circulation for vehicles, bicycles, and pedestrians. Site recommendations are presented in Figure 28.

Access to the project would be provided from six unsignalized driveways as indicated in Figure 28. One-way driveways on Lindaro Street would provide access to the east side of the BioMarin R&D facility, and a one-way entrance driveway from 3rd Street and exit driveway to Brooks Street would provide access to the west side of the BioMarin R&D facility. Parking on the ground floor of the senior services and housing building will be accessed from one-way driveways on Brooks Street.

> ***Recommendation:*** Maintain landscaping at project driveways to avoid sight distance conflicts. Shrubs should not be higher than approximately 30 inches and tree canopies should be approximately six feet from the ground.

> ***Recommendation:*** Prohibit parking for approximately 20 feet on either side of project driveways to maintain proper sight distances.

> ***Recommendation:*** Consider adding westbound left turn pocket for the driveway at 3rd Street.

Engineering Study Guide for Evaluating Intersection Improvements, NCHRP Report 457, provides guidance for determining the need for a major-road right-turn pocket, which is comparable to a left-turn pocket on a one-way street. This location does not meet the conditions of the guidance under project conditions. However, a turn pocket could improve safety for drivers and pedestrians by allowing turning vehicles to wait for pedestrians crossing the driveway without impeding vehicle flow on 3rd Street.

> ***Recommendation:*** Consider stop sign pavement legends to control which traffic movements within the parking lot have priority.

> ***Recommendation:*** Consider vehicle activated audible and visual warning for pedestrians of cars exiting project driveways with restricted views.

> ***Recommendation:*** Update curb ramps to be ADA compliant pairs on all corners of project site. Where feasible, curb ramps should be directional.

Emergency vehicles can access the site using the Lindaro Street driveways, 3rd Street driveway, and the southernmost Brooks Street driveway. The 3rd Street driveway and Brooks Street driveway will be gated.

> ***Recommendation:*** Coordinate with San Rafael fire and police services to provide access to gated driveways on 3rd Street and Brooks Street.

Bicycle parking is planned for both the BioMarin R&D facility and the senior services and housing.

- BioMarin R&D facility
    - Short term: Bike racks accommodating four bikes are planned on Lindaro Street.
    - Long term: A bike storage room accommodating 34 bikes is planned on the first floor of Building A.
- Senior services and housing
    - Short term: Four bike racks are planned along 3rd Street.
    - Long term: A bike storage room accommodating six bikes is planned on the first floor.

This bicycle parking will meet the requirements of San Rafael Municipal Code section 14.18.090.

N:\2016 Projects\3456_BioMarin9993rdSanRafael\Graphics\Draft\AI\Fig28_SitePlanRevise.ai

Project Driveway

Consider vehicle activated audible and visual warning of cars exiting driveway for pedestrians

Consider stop sign legends to control which movements have priority

Maintain landscaping and prohibit parking 20ft on either side of driveways and sidewalks to limit sight distance issues

Figure 28

Site Plan Review

Crossing Treatments and Intersection Controls

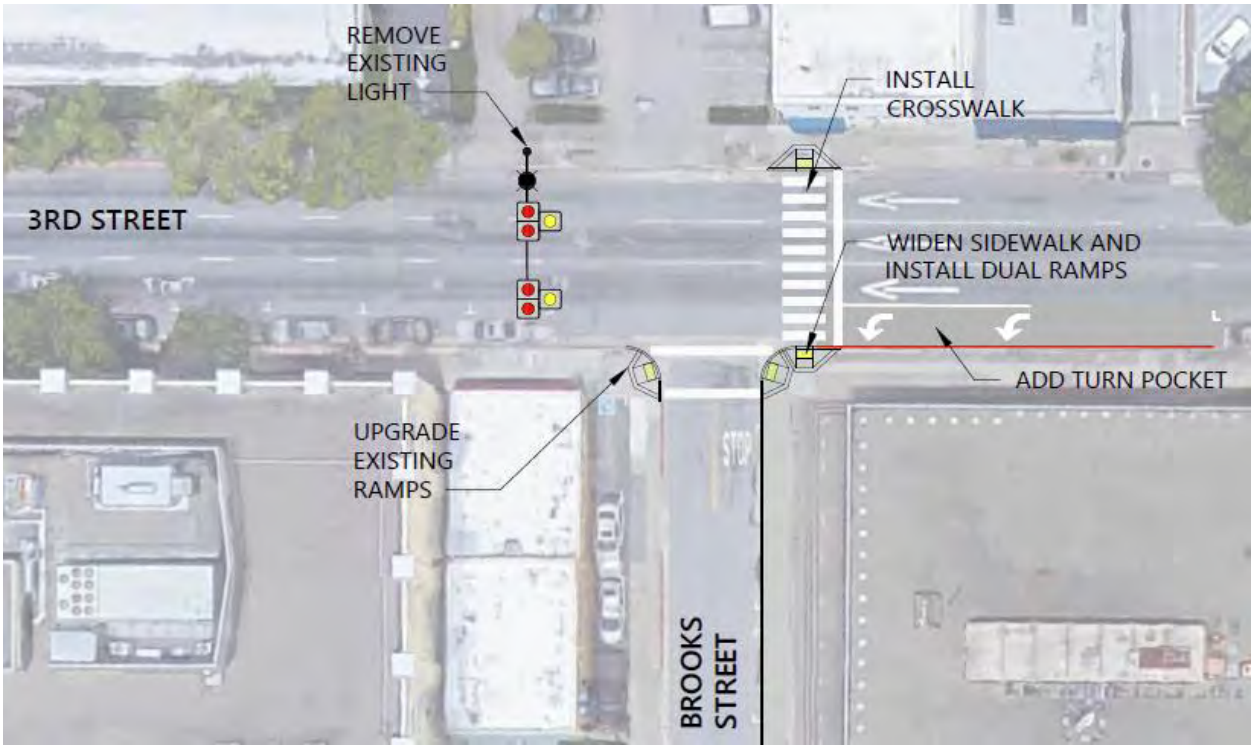
Crossing treatments and intersection controls were reviewed at the four intersections adjacent to the project site, based on the pedestrian crossings discussed in the Project Conditions chapter. The City is currently conducting the 3rd Street Corridor Rehabilitation project study, which has included discussion of a crossing at Brooks Street and other changes along the 3rd Street corridor.

3rd Street and Brooks Street

Currently, pedestrian crossing of 3rd Street at Brooks Street is prohibited. A signalized crossing is present at A Street 240 feet to the west, providing connectivity to downtown destinations. However, entrances to the senior center and housing near the intersection of 3rd Street and Brooks Street are expected to increase pedestrian crossing demands at this intersection, as described in Project Conditions. Pedestrian hybrid beacon (PHB) and signalization options were evaluated for this intersection to better accommodate pedestrians.

Installation of a Pedestrian Hybrid Beacon

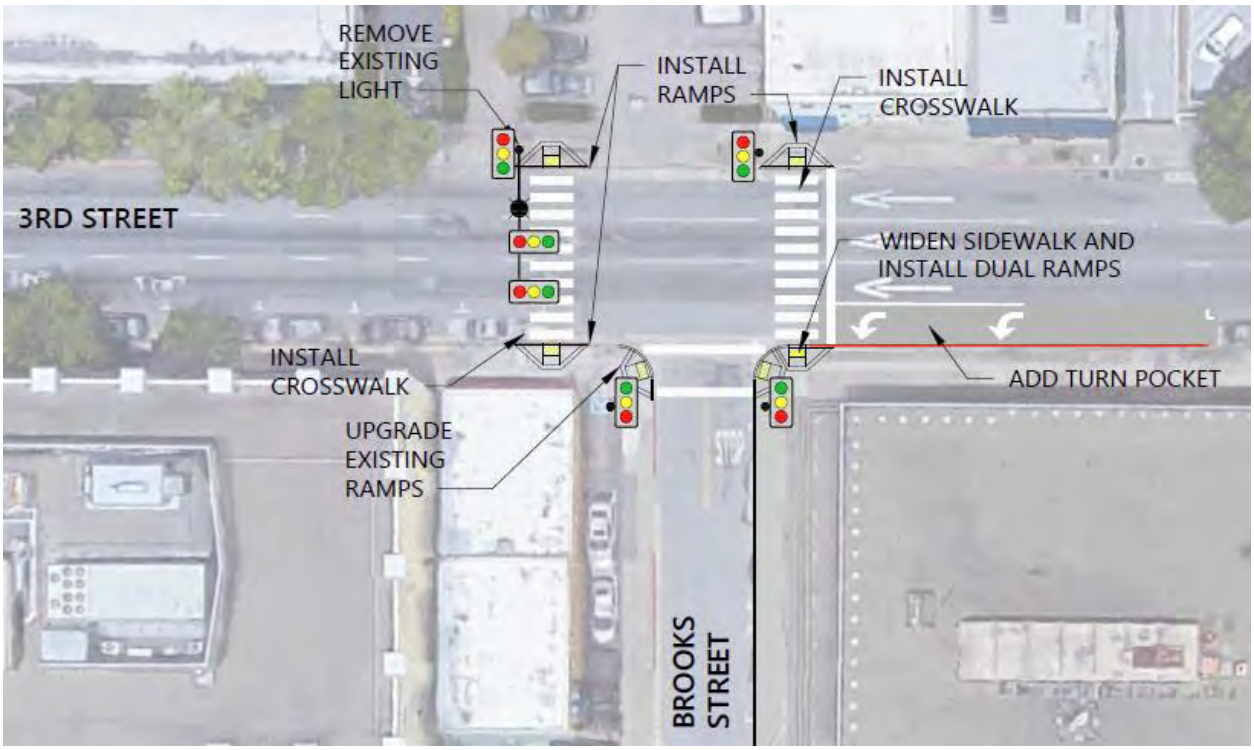
Considering current illegal crossings, new demand, and shift of some demand from the crosswalk on the east leg of the intersection of 3rd Street and A Street, 3rd Street and Brooks Street may meet the warrant for a PHB. Seven pedestrians were observed crossing illegally during the PM peak hour, and demand for another five crossings is expected to be generated by the project. Shifting eight of the 57 crossings on the east leg of the intersection of 3rd Street and A Street would meet the warrant. A PHB on the east leg of the intersection would operate at LOS A.



Conceptual - not for construction. Additional detailed analysis and engineering design required.

Signalization

The intersection is not projected to meet the peak hour warrant for signalization. However, the California Manual on Uniform Traffic Control Devices, 2014 Edition, notes that information about nearby facilities and activity centers that serve the elderly may also be considered as part of a full analysis. The intersection would operate at LOS A if signalized.



Conceptual - not for construction. Additional detailed analysis and engineering design required.

Intersection operations impacts are shown in Table 52. The intersection would operate at LOS A under both options.

TABLE 52: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 3RD STREET AND BROOKS STREET

Intersection	LOS/Average Delay[1,2]					
	SSSC		SSSC with PHB		Signal	
	AM	PM	AM	PM	AM	PM
15. 3rd Street and Brooks Street	A (B) / 2.3 (10.6)	A (B) / 2.8 (13.3)	A (C) / 3.7 (11.7)	A (C) / 7.6 (16.7)	A / 6.5	A / 5.0

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.

1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

Arterial operations impacts are shown in Table 53. Both options would change speed on 3rd Street by less than one mile per hour in the AM and PM peak hours.

TABLE 53: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 3RD STREET AND BROOKS STREET (ARTERIAL RESULTS)

Arterial	Standard	LOS / Average Speed [1,2]					
		SSSC		SSSC with PHB		Signal	
		AM	PM	AM	PM	AM	PM
3rd Street WB from Hetherton Street to D Street	D	**F / 5**	**F / 5**	**F /5**	**F / 5**	**F /5**	**F / 5**

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.
3. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

To assess the effects of pedestrian crossings of 3rd Street during the lunch hour, an analysis of the intersection of 3rd Street and Brooks Street was conducted based on the application of alternative traffic control devices. Table 54 shows that the intersection would operate at level of service A/B with each traffic control alternative. For additional information on the number of new lunchtime pedestrian crossings, see Table 22.

TABLE 54: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 3RD STREET AND BROOKS STREET (LUNCHTIME PEAK HOUR)			
Intersection	**LOS/Average Delay[1,2]**		
	SSSC	**SSSC with PHB**	**Signal**
15. 3rd Street and Brooks Street	A (B) / 1.4 (14.9)	A (B) / 3.5 (10.4)	A / 4.2

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.

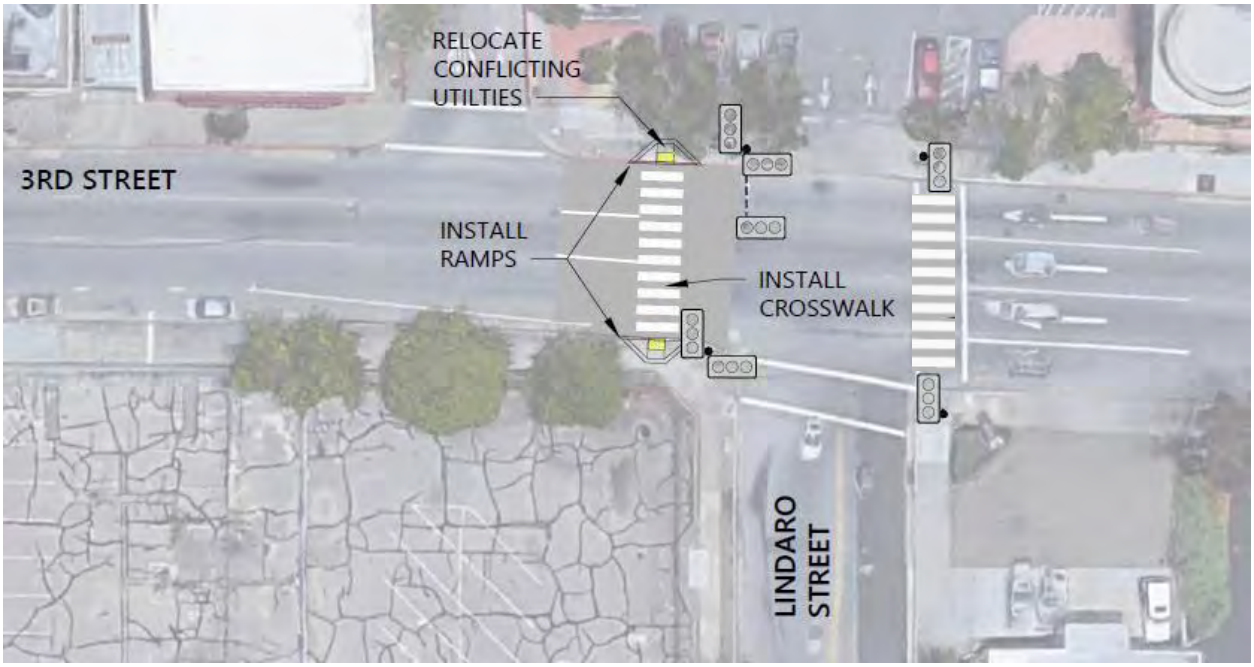
1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

3rd Street and Lindaro Street

Currently a marked crosswalk is not present on the west leg of the 3rd Street and Lindaro Street intersection. Pedestrians walking between the project site (or existing pedestrians arriving at the southwest corner of the intersection) and downtown would need to cross the other three legs of the intersection. Creating a more direct connection would also improve pedestrian safety by reducing the number of pedestrian/vehicle conflict point exposures. In all cases, pedestrian signals should be updated to meet current ADA standards, including countdown timers.

Adding a crosswalk on the west leg of the intersection would create a more direct connection to downtown. Although the northbound movements at the intersection would experience approximately three seconds greater delay, most of the vehicle volume is on the westbound movements, and overall operations for the intersection would improve (Table 55).



Conceptual - not for construction. Additional detailed analysis and engineering design required.

TABLE 55: COMPARISON OF CROSSWALK OPTIONS FOR INTERSECTION OF 3RD STREET AND LINDARO STREET

Intersection	LOS/Average Delay[1,2]			
	No crosswalk on west leg		Crosswalk on west leg	
	AM	PM	AM	PM
16. 3rd Street and Lindaro Street	B / 15.3	A / 9.4	B / 11.7	A / 8.5

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.

1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches.
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

Arterial operations impacts are shown below in Table 56. Adding the crosswalk would change speed on 3rd Street by less than one mile per hour in the AM and PM peak hours.

TABLE 56: COMPARISON OF CROSSWALK OPTIONS FOR INTERSECTION OF 3RD STREET AND LINDARO STREET (ARTERIAL RESULTS)					
Arterial	**Standard**	**LOS / Average Speed [1,2]**			
		No crosswalk on west leg		**Crosswalk on west leg**	
		AM	**PM**	**AM**	**PM**
3rd Street WB from Hetherton Street to D Street	D	**F / 5**	**F / 5**	**F / 5**	**F / 5**

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.
3. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

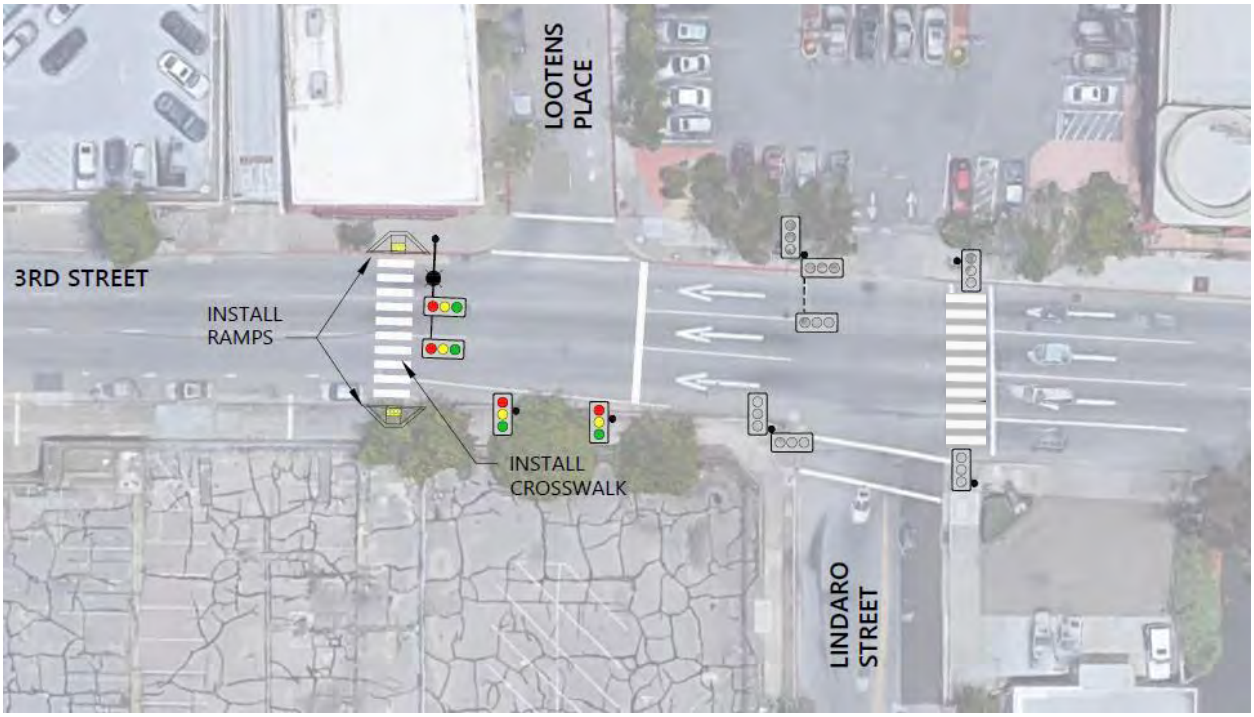
To assess the effects of pedestrian crossings of 3rd Street during the lunch hour, an analysis of the intersection of 3rd Street and Lindaro Street was conducted for each crosswalk option. Table 57 shows that the intersection would operate at level of service A with each crosswalk alternative. For additional information on the number of new lunchtime pedestrian crossings, see Table 22.

TABLE 57: COMPARISON OF CROSSWALK OPTIONS FOR INTERSECTION OF 3RD STREET AND LINDARO STREET (LUNCHTIME PEAK HOUR)		
Intersection	**LOS/Average Delay[1,2]**	
	No crosswalk on west leg	**Crosswalk on west leg**
16. 3rd Street and Lindaro Street	A / 9.1	A / 9.1

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control. **Bold** indicates unacceptable operations.
1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches.
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

Alternatively, the Lindaro intersection and Lootens Place intersections could be configured with clustered signals, with a crosswalk on the west leg of the Lootens Place intersection. The intersection would operate acceptably at LOS C under Cumulative Plus Project conditions, though delay would increase somewhat. Removing the Walgreens driveway from the intersection would reduce delay somewhat in the AM peak hour and leave it essentially unchanged in the PM peak hour. These options are summarized in Table 58.



Conceptual - not for construction. Additional detailed analysis and engineering design required.

TABLE 58: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 3RD STREET AND LINDARO STREET

Intersection	LOS/Average Delay[1,2]					
	Signal at Lindaro Street only		Signals at Lindaro and Lootens Place		Signals at Lindaro and Lootens Place, no Walgreens driveway	
	AM	PM	AM	PM	AM	PM
16. 3rd Street and Lindaro Street	B / 15.3	A / 9.4	C / 31.3	C / 22.7	C / 25.0	C / 24.1

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control.

1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches.
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

Arterial operations impacts are shown below (Table 59). Signalizing Lootens Place would change speed on 3rd Street by less than one mile per hour in the AM and PM peak hours.

TABLE 59: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 3RD STREET AND LINDARO STREET (ARTERIAL RESULTS)							
Arterial	**Standard**	**LOS / Average Speed [1]**					
		Signal at Lindaro Street only		**Signals at Lindaro and Lootens Place**		**Signals at Lindaro and Lootens Place, no Walgreens driveway**	
		AM	**PM**	**AM**	**PM**	**AM**	**PM**
3rd Street WB from Hetherton Street to D Street	D	**F / 5**	**F / 5**	**F / 5**	**F / 5**	**F / 5**	**F / 5**

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.
3. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

To assess the effects of pedestrian crossings of 3rd Street during the lunch hour, an analysis of the intersection of 3rd Street and Lindaro Street was conducted for each control option. Table 60 shows that the intersection would operate at level of service A without a signal at Lootens Place and at level of service D with a signal at Lootens Place. For additional information on the number of new lunchtime pedestrian crossings, see Table 22.

TABLE 60: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 3RD STREET AND LINDARO STREET (LUNCHTIME PEAK HOUR)			
Intersection	**LOS/Average Delay[1,2]**		
	Signal at Lindaro Street only	**Signals at Lindaro and Lootens Place**	**Signals at Lindaro and Lootens Place, no Walgreens driveway**
16. 3rd Street and Lindaro Street	A / 9.1	D / 38.3	D / 38.1

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control.
1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches.
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

2nd Street and Brooks Street

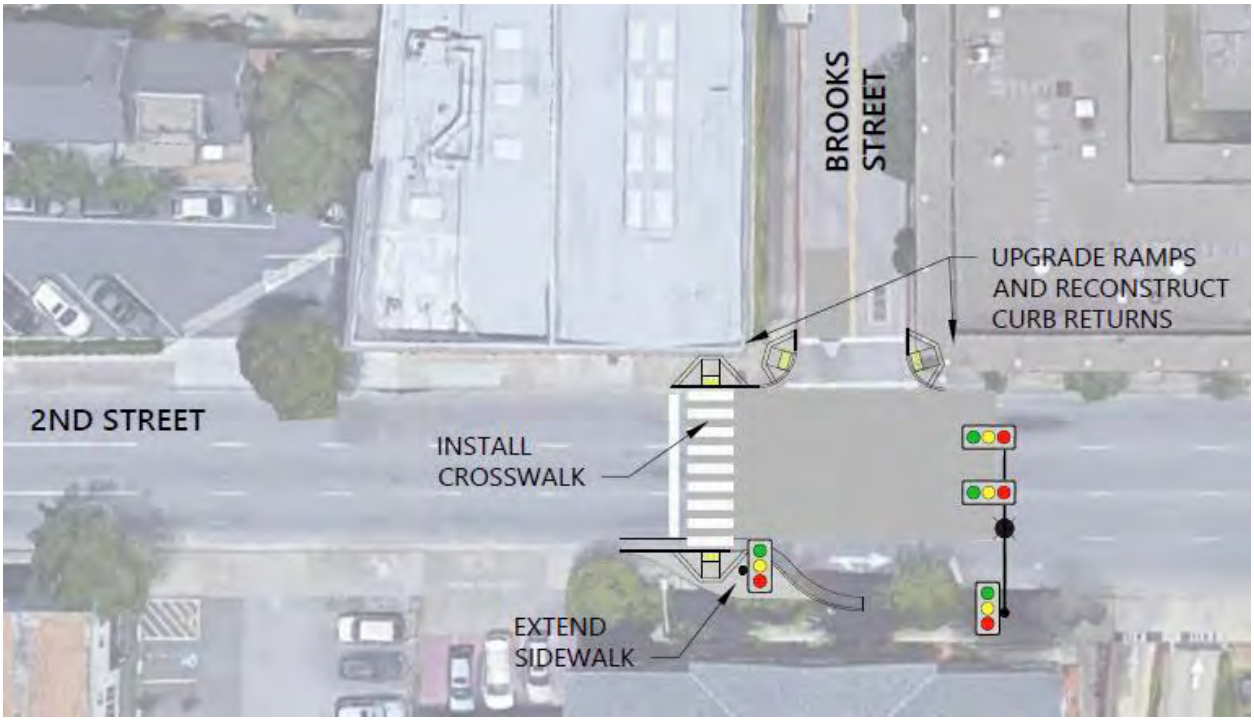
Vehicles turning from southbound Brooks Street to eastbound 2nd Street currently have limited visibility to eastbound vehicles at this side-street stop controlled intersection because of the siting of the building on the northwest corner of the intersection. Southbound vehicles must proceed into the crosswalk on the north leg of the intersection, blocking pedestrian crossings, to increase the view of eastbound traffic.

Although a marked crosswalk across 2nd Street is not provided at this intersection, pedestrian crossings are not prohibited. However, due to the proximity of the signalized crossing at A Street (200 feet to the west) and the locations of likely pedestrian destinations, little demand is expected for a crossing at this location.

Two options for improving the visibility concern were evaluated: signalization of the intersection and conversion of Brooks Street to one-way northbound. A PHB was considered for this intersection, as was conversion of Brooks Street to one-way southbound, but neither of these options would resolve the visibility issue, so they were not evaluated.

Signalization

Although a peak hour signal warrant is not met for this intersection, adding a signal would improve safety at this intersection by addressing limited sight distance. The overall impacts of installing a traffic signal at this location on adjacent intersections would be small (Table 61).



Conceptual - not for construction. Additional detailed analysis and engineering design required.

TABLE 61: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 2ND STREET AND BROOKS STREET				
Intersection	**LOS/Average Delay[1,2]**			
	SSSC		**Signal**	
	AM	**PM**	**AM**	**PM**
25. 2nd Street and Brooks Street	A (C) / 2.9 (22.0)	A (D) / 3.8 (27.7)	A / 6.4	A / 8.1

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control.

1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

Arterial operations impacts are shown below (Table 62). Addition of the signal would reduce speed on 2nd Street by one mile per hour in the AM peak hour and less than one mile per hour in the PM peak hour.

TABLE 62: COMPARISON OF CONTROL OPTIONS FOR INTERSECTION OF 2ND STREET AND BROOKS STREET (ARTERIAL RESULTS)					
Arterial	**Standard**	**LOS / Average Speed [1,2]**			
		SSSC		**Signal**	
		AM	**PM**	**AM**	**PM**
2nd Street from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 5**	**F / 5**	**F / 5**

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.
3. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

Conversion of Brooks to One-Way Northbound

By removing southbound traffic on Brooks Street, the limited visibility condition for vehicles turning from southbound Brooks Street to eastbound 2nd Street would be eliminated. Some traffic would have to make additional turns; however, overall impacts on adjacent intersections would be small (Table 63), with some improvements due to one-way flows.

TABLE 63: EFFECT OF ONE-WAY CONVERSION OF BROOKS STREET

Intersection	Control Type	LOS/Average Delay[1,2]			
		Two-Way		One-Way Northbound	
		AM	PM	AM	PM
14. 3rd Street and A Street	Signal	B / 18.2	C / 24.6	B / 18.3	C / 24.2
15. 3rd Street and Brooks Street	SSSC	A (B) / 2.3 (10.6)	A (B) / 2.8 (13.3)	A (B) / 2.1 (13.4)	A (C) / 3.9 (22.6)
16. 3rd Street and Lindaro Street	Signal	B / 15.3	A / 9.4	B / 13.0	A / 8.7
24. 2nd Street and A Street	Signal	C / 27.5	C / 30.5	C / 27.9	C / 34.6
25. 2nd Street and Brooks Street	SSSC	A (C) / 2.9 (22.0)	A (D) / 3.8 (27.7)	A (A) / 2.7 (2.9)	A (A) / 2.7 (3.0)
26. 2nd Street and Lindaro Street	Signal	B / 18.6	C / 21.0	B / 18.0	B / 18.5

Notes:
LOS = Level of Service. SSSC = Side-Street Stop Control.

1. For signalized and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side-street stop controlled intersections, the delay and LOS is reported for the entire intersection and the highest delay movement (shown in parentheses).
2. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

Arterial operations impacts are shown in Table 64. Addition of the signal would reduce speed on 2nd Street by less than one mile per hour in the AM and PM peak hours.

TABLE 64: EFFECT OF ONE-WAY CONVERSION OF BROOKS STREET (ARTERIAL RESULTS)

Arterial	Standard	LOS / Average Speed [1,2]			
		SSSC		Signal	
		AM	PM	AM	PM
2nd Street from D Street to Hetherton Street/US 101 SB Ramp	D	**F / 6**	**F / 5**	**F / 6**	**F / 5**

Notes:
1. LOS = Level of Service. **Bold** indicates unacceptable operations.
2. Arterial speed is reported in miles per hour as the average speed for a vehicle traveling from one end of the arterial to the other.
3. Cumulative Plus Project Conditions (R&D and Senior Services and Housing)

Source: Fehr & Peers, 2019

2nd Street and Lindaro Street

Crosswalks are present on all four legs of this intersection, and the intersection operates acceptably during the AM and PM peak hours. An analysis was also conducted to assess the effects of pedestrian crossings during the lunch hour. The analysis showed that the intersection would operate at LOS B and with average delay of 15.7 seconds under Cumulative Plus Project Conditions (R&D and Senior Services and Housing).

(For additional information on the number of new lunchtime pedestrian crossings, see Table 22.) No changes to the intersection are recommended.

Appendix A:
Existing Conditions –
Technical Calculations

Transportation Impact Study

for BioMarin 999 3rd Street

San Rafael Campus Expansion

April 5, 2019

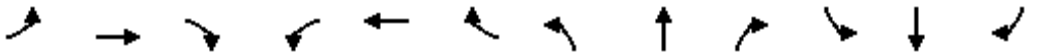
FEHR PEERS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	437	14	59	525	40	9	194	35	53	354	341
Future Volume (veh/h)	103	437	14	59	525	40	9	194	35	53	354	341
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1660	1660	1710	1660	1660	1710	1800	1678	1728	1800	1748	1728
Adj Flow Rate, veh/h	112	475	14	64	571	39	10	211	29	58	385	151
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	148	876	26	395	634	43	58	538	72	146	871	329
Arrive On Green	0.09	0.55	0.55	0.55	0.55	0.55	0.85	0.85	0.85	0.43	0.43	0.43
Sat Flow, veh/h	1581	1602	47	840	1533	105	19	1261	168	208	2042	771
Grp Volume(v), veh/h	112	0	489	64	0	610	250	0	0	320	0	274
Grp Sat Flow(s),veh/h/ln	1581	0	1649	840	0	1638	1448	0	0	1625	0	1396
Q Serve(g_s), s	5.2	0.0	14.3	3.4	0.0	24.9	0.0	0.0	0.0	1.1	0.0	10.5
Cycle Q Clear(g_c), s	5.2	0.0	14.3	7.7	0.0	24.9	2.8	0.0	0.0	9.8	0.0	10.5
Prop In Lane	1.00		0.03	1.00		0.06	0.04		0.12	0.18		0.55
Lane Grp Cap(c), veh/h	148	0	902	395	0	677	668	0	0	750	0	596
V/C Ratio(X)	0.76	0.00	0.54	0.16	0.00	0.90	0.37	0.00	0.00	0.43	0.00	0.46
Avail Cap(c_a), veh/h	148	0	902	395	0	677	668	0	0	750	0	596
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.76	0.00	0.76	0.92	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.2	0.0	11.0	12.9	0.0	15.5	3.4	0.0	0.0	15.1	0.0	15.3
Incr Delay (d2), s/veh	30.1	0.0	2.3	0.7	0.0	14.1	1.5	0.0	0.0	1.8	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	7.1	0.8	0.0	13.8	1.3	0.0	0.0	5.0	0.0	4.4
LnGrp Delay(d),s/veh	63.2	0.0	13.3	13.6	0.0	29.6	4.8	0.0	0.0	16.9	0.0	17.9
LnGrp LOS	E		B	B		C	A			B		B
Approach Vol, veh/h		601			674			250			594	
Approach Delay, s/veh		22.6			28.1			4.8			17.3	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.2		36.8	10.0	35.2		36.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 41		25.4	7.0	* 31		25.4
Max Q Clear Time (g_c+I1), s		16.3		4.8	7.2	26.9		12.5
Green Ext Time (p_c), s		4.9		2.1	0.0	2.1		4.3

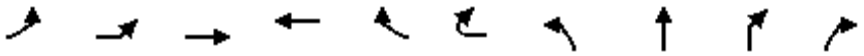
Intersection Summary	
HCM 2010 Ctrl Delay	20.8
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	461	74	33	201	0	0	0	0	211	931	436
Future Volume (vph)	0	461	74	33	201	0	0	0	0	211	931	436
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.97
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.98			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2717			1767						2961	1302
Flt Permitted		1.00			0.88						0.99	1.00
Satd. Flow (perm)		2717			1573						2961	1302
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	501	80	36	218	0	0	0	0	229	1012	474
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	564	0	0	254	0	0	0	0	0	1241	474
Confl. Peds. (#/hr)	15		22	22		15			16			1
Confl. Bikes (#/hr)			3			2			1			3
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1188			687						1318	458
v/s Ratio Prot		c0.21									c0.42	
v/s Ratio Perm					0.16							c0.36
v/c Ratio		0.47			0.37						0.94	1.03
Uniform Delay, d1		15.0			14.2						19.9	24.3
Progression Factor		0.55			1.50						1.00	1.00
Incremental Delay, d2		1.1			1.3						14.3	51.4
Delay (s)		9.4			22.5						34.1	75.7
Level of Service		A			C						C	E
Approach Delay (s)		9.4			22.5			0.0			45.6	
Approach LOS		A			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



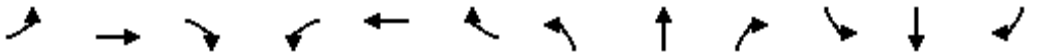
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	358	19	295	149	309	3	97	1008	121	29
Future Volume (vph)	358	19	295	149	309	3	97	1008	121	29
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1494	1794	1615	1471			3430	1295	
Flt Permitted		0.62	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		969	1794	1615	1471			3430	1295	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	389	21	321	162	336	3	105	1096	132	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0
Lane Group Flow (vph)	0	410	321	162	339	0	0	1201	120	0
Confl. Peds. (#/hr)							13			6
Confl. Bikes (#/hr)					2	2				2
Parking (#/hr)				0				2		
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Effective Green, g (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Actuated g/C Ratio		0.45	0.45	0.25	0.25			0.44	0.44	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		512	808	404	368			1500	566	
v/s Ratio Prot		c0.12	0.18	0.10	c0.23					
v/s Ratio Perm		0.25						0.35	0.09	
v/c Ratio		0.80	0.40	0.40	0.92			0.80	0.21	
Uniform Delay, d1		18.6	13.8	23.4	27.4			18.3	13.1	
Progression Factor		0.96	0.90	1.00	1.00			0.76	0.66	
Incremental Delay, d2		9.9	1.1	3.0	30.7			2.6	0.5	
Delay (s)		27.7	13.6	26.4	58.0			16.5	9.1	
Level of Service		C	B	C	E			B	A	
Approach Delay (s)			21.5	47.8				15.6		
Approach LOS			C	D				B		

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	285	34	55	265	27	7	193	38	30	361	38
Future Volume (veh/h)	29	285	34	55	265	27	7	193	38	30	361	38
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.98		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1398	1545	1530	1398	1485	1530	1440	1485	1469	1440	1485	1469
Adj Flow Rate, veh/h	32	310	32	60	288	24	8	210	31	33	392	36
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	257	538	56	271	529	44	55	535	77	75	544	48
Arrive On Green	0.39	0.39	0.39	0.13	0.13	0.13	0.97	0.97	0.97	0.97	0.97	0.97
Sat Flow, veh/h	840	1372	142	816	1349	112	12	1102	158	49	1120	99
Grp Volume(v), veh/h	32	0	342	60	0	312	249	0	0	461	0	0
Grp Sat Flow(s),veh/h/ln	840	0	1513	816	0	1461	1272	0	0	1268	0	0
Q Serve(g_s), s	2.4	0.0	13.3	5.2	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	17.4	0.0	13.3	18.6	0.0	15.0	0.7	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.08	0.03		0.12	0.07		0.08
Lane Grp Cap(c), veh/h	257	0	593	271	0	573	667	0	0	667	0	0
V/C Ratio(X)	0.12	0.00	0.58	0.22	0.00	0.54	0.37	0.00	0.00	0.69	0.00	0.00
Avail Cap(c_a), veh/h	257	0	593	271	0	573	667	0	0	667	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.96	0.00	0.96	0.91	0.00	0.00	0.62	0.00	0.00
Uniform Delay (d), s/veh	25.5	0.0	17.9	34.3	0.0	26.4	0.6	0.0	0.0	0.6	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	4.0	1.8	0.0	3.5	1.5	0.0	0.0	3.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	6.2	1.3	0.0	6.6	0.5	0.0	0.0	1.1	0.0	0.0
LnGrp Delay(d),s/veh	26.4	0.0	22.0	36.1	0.0	29.9	2.0	0.0	0.0	4.3	0.0	0.0
LnGrp LOS	C		C	D		C	A			A		
Approach Vol, veh/h		374			372			249			461	
Approach Delay, s/veh		22.3			30.9			2.0			4.3	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		34.0		41.0		34.0		41.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		29.4		36.4		29.4		36.4
Max Q Clear Time (g_c+I1), s		19.4		2.7		20.6		4.7
Green Ext Time (p_c), s		1.2		1.1		1.1		2.2

Intersection Summary		
HCM 2010 Ctrl Delay		15.3
HCM 2010 LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	217	150	32	228	0	0	0	0	42	892	104
Future Volume (vph)	0	217	150	32	228	0	0	0	0	42	892	104
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1665			1770						4119	1127
Flt Permitted		1.00			0.93						1.00	1.00
Satd. Flow (perm)		1665			1648						4119	1127
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	236	163	35	248	0	0	0	0	46	970	113
RTOR Reduction (vph)	0	32	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	367	0	0	283	0	0	0	0	0	1016	113
Confl. Peds. (#/hr)			15	15		14			22	22		10
Confl. Bikes (#/hr)			4			2			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		728			720						1834	396
v/s Ratio Prot		c0.22										
v/s Ratio Perm					0.17						0.25	0.10
v/c Ratio		0.50			0.39						0.55	0.29
Uniform Delay, d1		15.2			14.3						15.3	17.5
Progression Factor		0.38			1.23						0.17	0.24
Incremental Delay, d2		2.4			1.1						0.5	0.8
Delay (s)		8.3			18.7						3.1	5.0
Level of Service		A			B						A	A
Approach Delay (s)		8.3			18.7			0.0			3.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	89	0	0	141	113	146	1051	10	0	0	0
Future Volume (veh/h)	120	89	0	0	141	113	146	1051	10	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1620	1573	1620			
Adj Flow Rate, veh/h	130	97	0	0	153	81	159	1142	10			
Adj No. of Lanes	1	1	0	0	1	0	0	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0			
Cap, veh/h	260	491	0	0	266	141	182	1377	13			
Arrive On Green	0.10	0.10	0.00	0.00	0.31	0.31	0.19	0.19	0.19			
Sat Flow, veh/h	1014	1573	0	0	853	452	322	2435	22			
Grp Volume(v), veh/h	130	97	0	0	0	234	684	0	627			
Grp Sat Flow(s),veh/h/ln	1014	1573	0	0	0	1305	1384	0	1396			
Q Serve(g_s), s	9.5	4.2	0.0	0.0	0.0	11.3	36.0	0.0	32.2			
Cycle Q Clear(g_c), s	20.8	4.2	0.0	0.0	0.0	11.3	36.0	0.0	32.2			
Prop In Lane	1.00		0.00	0.00		0.35	0.23		0.02			
Lane Grp Cap(c), veh/h	260	491	0	0	0	407	782	0	789			
V/C Ratio(X)	0.50	0.20	0.00	0.00	0.00	0.57	0.87	0.00	0.79			
Avail Cap(c_a), veh/h	260	491	0	0	0	407	782	0	789			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	38.0	25.0	0.0	0.0	0.0	21.6	27.9	0.0	26.3			
Incr Delay (d2), s/veh	6.7	0.9	0.0	0.0	0.0	5.8	13.0	0.0	8.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.2	2.0	0.0	0.0	0.0	4.7	16.6	0.0	14.2			
LnGrp Delay(d),s/veh	44.8	25.9	0.0	0.0	0.0	27.4	40.9	0.0	34.5			
LnGrp LOS	D	C				C	D		C			
Approach Vol, veh/h		227			234			1311				
Approach Delay, s/veh		36.7			27.4			37.8				
Approach LOS		D			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		23.4		42.4		23.4		
Max Q Clear Time (g_c+I1), s		22.8		38.0		13.3		
Green Ext Time (p_c), s		0.1		2.5		0.7		

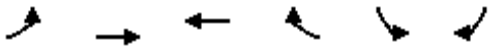
Intersection Summary		
HCM 2010 Ctrl Delay		36.3
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	237	18	68	293	24	15	193	50	66	323	65
Future Volume (veh/h)	31	237	18	68	293	24	15	193	50	66	323	65
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)	0.99		0.92	0.98		0.92	0.96		0.91	0.98		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1573	1510	1620	1573	1573	1620	1620	1573	1555	1620	1573	1555
Adj Flow Rate, veh/h	34	258	16	74	318	22	16	210	42	72	351	62
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	257	537	33	330	555	38	67	541	104	123	496	83
Arrive On Green	0.38	0.38	0.38	0.13	0.13	0.13	0.17	0.17	0.17	1.00	1.00	1.00
Sat Flow, veh/h	912	1399	87	958	1445	100	32	1073	205	135	984	164
Grp Volume(v), veh/h	34	0	274	74	0	340	268	0	0	485	0	0
Grp Sat Flow(s),veh/h/ln	912	0	1485	958	0	1545	1311	0	0	1283	0	0
Q Serve(g_s), s	2.4	0.0	10.5	5.5	0.0	15.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	17.9	0.0	10.5	15.9	0.0	15.5	13.4	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.06	0.06		0.16	0.15		0.13
Lane Grp Cap(c), veh/h	257	0	570	330	0	593	712	0	0	702	0	0
V/C Ratio(X)	0.13	0.00	0.48	0.22	0.00	0.57	0.38	0.00	0.00	0.69	0.00	0.00
Avail Cap(c_a), veh/h	257	0	570	330	0	593	712	0	0	702	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.93	0.00	0.93	0.81	0.00	0.00	0.61	0.00	0.00
Uniform Delay (d), s/veh	26.4	0.0	17.4	32.1	0.0	27.0	21.1	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	2.9	1.5	0.0	3.7	1.2	0.0	0.0	3.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	4.7	1.6	0.0	7.3	5.2	0.0	0.0	0.7	0.0	0.0
LnGrp Delay(d),s/veh	27.5	0.0	20.3	33.5	0.0	30.7	22.3	0.0	0.0	3.4	0.0	0.0
LnGrp LOS	C		C	C		C	C			A		
Approach Vol, veh/h		308			414			268			485	
Approach Delay, s/veh		21.1			31.2			22.3			3.4	
Approach LOS		C			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		42.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 29		* 38		* 29		* 38
Max Q Clear Time (g_c+I1), s		19.9		15.4		17.9		2.0
Green Ext Time (p_c), s		1.6		2.4		2.7		5.6

Intersection Summary	
HCM 2010 Ctrl Delay	18.3
HCM 2010 LOS	B

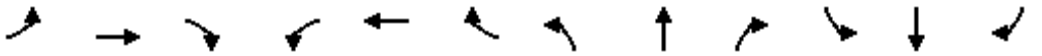
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	374	370	21	0	21
Future Volume (vph)	0	374	370	21	0	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6	5.6			5.2
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.99			0.87
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.99			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1573	1552			1188
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1573	1552			1188
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	407	402	23	0	23
RTOR Reduction (vph)	0	0	2	0	0	19
Lane Group Flow (vph)	0	407	423	0	0	4
Confl. Peds. (#/hr)				39		46
Confl. Bikes (#/hr)				4		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		51.1	52.3			11.9
Effective Green, g (s)		51.1	52.3			11.9
Actuated g/C Ratio		0.68	0.70			0.16
Clearance Time (s)						5.2
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1071	1082			188
v/s Ratio Prot		c0.26	c0.27			
v/s Ratio Perm						0.00
v/c Ratio		0.38	0.39			0.02
Uniform Delay, d1		5.1	4.7			26.6
Progression Factor		1.66	0.42			1.00
Incremental Delay, d2		0.2	0.2			0.0
Delay (s)		8.7	2.2			26.7
Level of Service		A	A			C
Approach Delay (s)		8.7	2.2		26.7	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	259	119	174	269	0	0	0	0	99	800	175
Future Volume (vph)	0	259	119	174	269	0	0	0	0	99	800	175
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	0.89
Flpb, ped/bikes		1.00	1.00	0.98	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1625	1180	1604	1520						4262	1185
Flt Permitted		1.00	1.00	0.52	1.00						0.99	1.00
Satd. Flow (perm)		1625	1180	880	1520						4262	1185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	282	129	189	292	0	0	0	0	108	870	190
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	282	91	189	292	0	0	0	0	0	978	190
Confl. Peds. (#/hr)			40	40		22			9	9		30
Confl. Bikes (#/hr)			8			4						2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		32.8	32.8	32.8	32.8						33.4	26.4
Effective Green, g (s)		32.8	32.8	32.8	32.8						33.4	26.4
Actuated g/C Ratio		0.44	0.44	0.44	0.44						0.45	0.35
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		710	516	384	664						1898	417
v/s Ratio Prot		0.17			0.19							
v/s Ratio Perm			0.08	c0.21							0.23	0.16
v/c Ratio		0.40	0.18	0.49	0.44						0.52	0.46
Uniform Delay, d1		14.4	12.9	15.1	14.7						15.0	18.8
Progression Factor		0.40	0.18	0.99	1.00						0.33	0.42
Incremental Delay, d2		1.6	0.7	3.5	1.6						0.9	3.0
Delay (s)		7.3	3.0	18.5	16.3						5.8	10.9
Level of Service		A	A	B	B						A	B
Approach Delay (s)		5.9			17.2			0.0			6.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	214	0	0	328	60	118	1039	44	0	0	0
Future Volume (veh/h)	139	214	0	0	328	60	118	1039	44	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1510	1573	1620			
Adj Flow Rate, veh/h	151	233	0	0	357	55	128	1129	44			
Adj No. of Lanes	1	1	0	0	1	0	1	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	173	604	0	0	452	70	725	1394	54			
Arrive On Green	0.77	0.77	0.00	0.00	0.13	0.13	0.17	0.17	0.17			
Sat Flow, veh/h	864	1573	0	0	1176	181	1438	2766	108			
Grp Volume(v), veh/h	151	233	0	0	0	412	128	610	563			
Grp Sat Flow(s),veh/h/ln	864	1573	0	0	0	1358	1438	1494	1380			
Q Serve(g_s), s	6.7	3.7	0.0	0.0	0.0	22.1	5.7	29.5	29.5			
Cycle Q Clear(g_c), s	28.8	3.7	0.0	0.0	0.0	22.1	5.7	29.5	29.5			
Prop In Lane	1.00		0.00	0.00		0.13	1.00		0.08			
Lane Grp Cap(c), veh/h	173	604	0	0	0	521	725	753	696			
V/C Ratio(X)	0.87	0.39	0.00	0.00	0.00	0.79	0.18	0.81	0.81			
Avail Cap(c_a), veh/h	173	604	0	0	0	521	725	753	696			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.92	0.92	0.00	0.00	0.00	1.00	0.43	0.43	0.43			
Uniform Delay (d), s/veh	21.4	5.8	0.0	0.0	0.0	29.8	17.9	27.8	27.8			
Incr Delay (d2), s/veh	38.8	1.7	0.0	0.0	0.0	11.6	0.2	4.1	4.5			
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	4.9	1.8	0.0	0.0	0.0	10.0	2.3	13.1	12.1			
LnGrp Delay(d),s/veh	60.2	7.5	0.0	0.0	0.0	41.4	18.1	31.9	32.3			
LnGrp LOS	E	A				D	B	C	C			
Approach Vol, veh/h		384			412			1301				
Approach Delay, s/veh		28.2			41.4			30.7				
Approach LOS		C			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 29		* 38		* 29		
Max Q Clear Time (g_c+I1), s		30.8		31.5		24.1		
Green Ext Time (p_c), s		0.0		3.3		0.8		

Intersection Summary	
HCM 2010 Ctrl Delay	32.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	273	1077	0	0	0	0	0	217	21
Future Volume (veh/h)	0	0	0	273	1077	0	0	0	0	0	217	21
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.99
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1530	1485	0				0	1485	1530
Adj Flow Rate, veh/h				297	1171	0				0	236	12
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				494	1728	0				0	804	41
Arrive On Green				0.19	0.19	0.00				0.00	0.31	0.31
Sat Flow, veh/h				734	3149	0				0	2652	130
Grp Volume(v), veh/h				527	941	0				0	129	119
Grp Sat Flow(s),veh/h/ln				1302	1230	0				0	1411	1297
Q Serve(g_s), s				28.4	26.7	0.0				0.0	5.2	5.2
Cycle Q Clear(g_c), s				28.4	26.7	0.0				0.0	5.2	5.2
Prop In Lane				0.56		0.00				0.00		0.10
Lane Grp Cap(c), veh/h				818	1404	0				0	440	405
V/C Ratio(X)				0.64	0.67	0.00				0.00	0.29	0.30
Avail Cap(c_a), veh/h				818	1404	0				0	440	405
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				24.6	23.9	0.0				0.0	19.5	19.6
Incr Delay (d2), s/veh				3.9	2.6	0.0				0.0	1.7	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				11.1	9.6	0.0				0.0	2.2	2.1
LnGrp Delay(d),s/veh				28.5	26.5	0.0				0.0	21.2	21.4
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1468						248	
Approach Delay, s/veh					27.2						21.3	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		47.0		28.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 43		23.4				
Max Q Clear Time (g_c+I1), s		30.4		7.2				
Green Ext Time (p_c), s		6.0		0.8				

Intersection Summary		
HCM 2010 Ctrl Delay		26.3
HCM 2010 LOS		C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1246	107	91	223	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1246	107	91	223	0	0	0	0
Number				5	2	12	7	4	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				0	1398	1398	1440	1398	0			
Adj Flow Rate, veh/h				0	1354	77	99	242	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	2229	679	259	561	0			
Arrive On Green				0.00	0.19	0.19	0.10	0.10	0.00			
Sat Flow, veh/h				0	3943	1163	609	1909	0			
Grp Volume(v), veh/h				0	1354	77	185	156	0			
Grp Sat Flow(s),veh/h/ln				0	1272	1163	1246	1209	0			
Q Serve(g_s), s				0.0	24.3	4.1	8.7	9.1	0.0			
Cycle Q Clear(g_c), s				0.0	24.3	4.1	10.4	9.1	0.0			
Prop In Lane				0.00		1.00	0.53		0.00			
Lane Grp Cap(c), veh/h				0	2229	679	452	367	0			
V/C Ratio(X)				0.00	0.61	0.11	0.41	0.42	0.00			
Avail Cap(c_a), veh/h				0	2229	679	452	367	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.4	14.2	28.1	27.6	0.0			
Incr Delay (d2), s/veh				0.0	1.2	0.3	2.7	3.6	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	8.8	1.4	4.0	3.4	0.0			
LnGrp Delay(d),s/veh				0.0	23.7	14.6	30.8	31.1	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1431			341				
Approach Delay, s/veh					23.2			31.0				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 44		* 23				
Max Q Clear Time (g_c+I1), s		26.3		12.4				
Green Ext Time (p_c), s		7.5		1.0				

Intersection Summary		
HCM 2010 Ctrl Delay		24.7
HCM 2010 LOS		C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	81	1304	0	0	0	0	0	180	46
Future Volume (veh/h)	0	0	0	81	1304	0	0	0	0	0	180	46
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.87
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1398	0				0	1398	1440
Adj Flow Rate, veh/h				88	1417	0				0	196	17
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				157	2141	0				0	640	54
Arrive On Green				0.20	0.20	0.00				0.00	0.28	0.28
Sat Flow, veh/h				167	3620	0				0	2378	196
Grp Volume(v), veh/h				560	945	0				0	111	102
Grp Sat Flow(s),veh/h/ln				1356	1158	0				0	1328	1176
Q Serve(g_s), s				18.7	28.3	0.0				0.0	5.0	5.1
Cycle Q Clear(g_c), s				28.4	28.3	0.0				0.0	5.0	5.1
Prop In Lane				0.16		0.00				0.00		0.17
Lane Grp Cap(c), veh/h				884	1414	0				0	368	326
V/C Ratio(X)				0.63	0.67	0.00				0.00	0.30	0.31
Avail Cap(c_a), veh/h				884	1414	0				0	368	326
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				22.9	22.9	0.0				0.0	21.4	21.4
Incr Delay (d2), s/veh				3.4	2.5	0.0				0.0	2.1	2.5
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	9.6	0.0				0.0	2.0	1.9
LnGrp Delay(d),s/veh				26.3	25.5	0.0				0.0	23.5	23.9
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1505						213	
Approach Delay, s/veh					25.8						23.7	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		50.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 46		* 21				
Max Q Clear Time (g_c+I1), s		30.4		7.1				
Green Ext Time (p_c), s		7.0		0.6				

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	34	1173	69	181	112	0	0	119	21
Future Volume (veh/h)	0	0	0	34	1173	69	181	112	0	0	119	21
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.96		1.00	1.00		0.93
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				37	1275	66	197	122	0	0	129	13
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				65	2380	127	389	685	0	0	377	38
Arrive On Green				0.17	0.17	0.17	0.02	0.12	0.00	0.00	0.26	0.26
Sat Flow, veh/h				127	4637	248	1748	1835	0	0	1449	146
Grp Volume(v), veh/h				509	423	447	197	122	0	0	0	142
Grp Sat Flow(s),veh/h/ln				1741	1590	1681	1748	1835	0	0	0	1595
Q Serve(g_s), s				20.1	18.1	18.2	0.0	4.5	0.0	0.0	0.0	5.4
Cycle Q Clear(g_c), s				20.1	18.1	18.2	0.0	4.5	0.0	0.0	0.0	5.4
Prop In Lane				0.07		0.15	1.00		0.00	0.00		0.09
Lane Grp Cap(c), veh/h				894	816	863	389	685	0	0	0	415
V/C Ratio(X)				0.57	0.52	0.52	0.51	0.18	0.00	0.00	0.00	0.34
Avail Cap(c_a), veh/h				894	816	863	389	685	0	0	0	415
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				23.5	22.7	22.7	28.7	22.6	0.0	0.0	0.0	22.5
Incr Delay (d2), s/veh				2.6	2.3	2.2	4.6	0.6	0.0	0.0	0.0	2.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.4	8.5	9.0	4.5	2.4	0.0	0.0	0.0	2.6
LnGrp Delay(d),s/veh				26.1	25.0	24.9	33.4	23.1	0.0	0.0	0.0	24.8
LnGrp LOS				C	C	C	C	C				C
Approach Vol, veh/h					1378			319			142	
Approach Delay, s/veh					25.4			29.5			24.8	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.0	24.0		43.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			4.0	19.5		38.5		28.0
Max Q Clear Time (g_c+I1), s			2.0	7.4		22.1		6.5
Green Ext Time (p_c), s			0.3	0.7		10.8		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	26.1
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	12	10	85.9%	13.3	4.0	B
	Through						
	Right Turn						
	Subtotal	12	10	85.9%	13.3	4.0	B
SB	Left Turn						
	Through						
	Right Turn	1	1	73.6%	0.7	1.5	A
	Subtotal	1	1	73.6%	0.7	1.5	A
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	21	18	85.9%	1.8	0.5	A
	Through	1,271	1,260	99.1%	1.6	0.2	A
	Right Turn	8	8	101.2%	1.4	1.8	A
	Subtotal	1,300	1,286	98.9%	1.6	0.2	A
Total		1,313	1,297	98.8%	1.7	0.2	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	65	69	106.4%	14.9	3.9	B
	Through	9	8	85.9%	12.2	15.3	B
	Right Turn						
	Subtotal	74	77	103.9%	14.7	4.6	B
SB	Left Turn						
	Through	34	28	82.3%	15.8	8.5	B
	Right Turn	8	8	101.2%	8.7	8.7	A
	Subtotal	42	36	85.9%	14.7	6.3	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	297	303	102.1%	7.5	1.7	A
	Through	1,227	1,210	98.6%	4.5	0.3	A
	Right Turn	22	24	108.7%	4.3	1.2	A
	Subtotal	1,546	1,537	99.4%	5.1	0.6	A
Total		1,662	1,650	99.3%	5.7	0.7	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	147	1452	42	27	154	0	0	253	143
Future Volume (veh/h)	0	0	0	147	1452	42	27	154	0	0	253	143
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.92	1.00		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1620	1573	1620	1620	1573	0	0	1510	1555
Adj Flow Rate, veh/h				160	1578	42	29	167	0	0	275	143
Adj No. of Lanes				0	3	0	0	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				212	2232	61	55	208	0	0	261	136
Arrive On Green				0.18	0.18	0.18	0.11	0.11	0.00	0.00	0.11	0.11
Sat Flow, veh/h				383	4034	110	0	635	0	0	798	415
Grp Volume(v), veh/h				649	544	587	196	0	0	0	0	418
Grp Sat Flow(s),veh/h/ln				1554	1431	1542	635	0	0	0	0	1213
Q Serve(g_s), s				29.7	26.6	26.7	0.0	0.0	0.0	0.0	0.0	24.5
Cycle Q Clear(g_c), s				29.7	26.6	26.7	24.5	0.0	0.0	0.0	0.0	24.5
Prop In Lane				0.25		0.07	0.15		0.00	0.00		0.34
Lane Grp Cap(c), veh/h				860	792	853	263	0	0	0	0	396
V/C Ratio(X)				0.76	0.69	0.69	0.75	0.00	0.00	0.00	0.00	1.06
Avail Cap(c_a), veh/h				860	792	853	263	0	0	0	0	396
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				25.8	24.6	24.6	26.9	0.0	0.0	0.0	0.0	33.5
Incr Delay (d2), s/veh				6.1	4.8	4.5	17.5	0.0	0.0	0.0	0.0	60.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.3	11.6	12.5	5.1	0.0	0.0	0.0	0.0	14.9
LnGrp Delay(d),s/veh				32.0	29.4	29.1	44.4	0.0	0.0	0.0	0.0	93.9
LnGrp LOS				C	C	C	D					F
Approach Vol, veh/h					1780			196			418	
Approach Delay, s/veh					30.2			44.4			93.9	
Approach LOS					C			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.0		46.0		29.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				24.5		41.5		24.5
Max Q Clear Time (g_c+I1), s				26.5		31.7		26.5
Green Ext Time (p_c), s				0.0		5.9		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		42.5
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	219	1574	14	45	37	0	0	40	9
Future Volume (veh/h)	0	0	0	219	1574	14	45	37	0	0	40	9
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.92	0.91		1.00	1.00		0.88
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1440	1398	1440	1398	1398	0	0	1398	1440
Adj Flow Rate, veh/h				238	1711	14	49	40	0	0	43	2
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				293	2261	19	314	350	0	0	292	14
Arrive On Green				0.21	0.21	0.21	0.25	0.25	0.00	0.00	0.25	0.25
Sat Flow, veh/h				460	3547	30	982	1398	0	0	1165	54
Grp Volume(v), veh/h				712	598	654	49	40	0	0	0	45
Grp Sat Flow(s),veh/h/ln				1375	1272	1390	982	1398	0	0	0	1219
Q Serve(g_s), s				37.0	32.9	33.0	3.1	1.7	0.0	0.0	0.0	2.2
Cycle Q Clear(g_c), s				37.0	32.9	33.0	5.2	1.7	0.0	0.0	0.0	2.2
Prop In Lane				0.33		0.02	1.00		0.00	0.00		0.04
Lane Grp Cap(c), veh/h				876	811	886	314	350	0	0	0	306
V/C Ratio(X)				0.81	0.74	0.74	0.16	0.11	0.00	0.00	0.00	0.15
Avail Cap(c_a), veh/h				876	811	886	314	350	0	0	0	306
HCM Platoon Ratio				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	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				25.3	23.7	23.8	23.9	21.7	0.0	0.0	0.0	21.9
Incr Delay (d2), s/veh				8.1	5.9	5.5	1.1	0.7	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				16.0	12.9	14.0	0.9	0.7	0.0	0.0	0.0	0.8
LnGrp Delay(d),s/veh				33.4	29.7	29.2	25.0	22.3	0.0	0.0	0.0	22.9
LnGrp LOS				C	C	C	C	C				C
Approach Vol, veh/h					1963			89			45	
Approach Delay, s/veh					30.9			23.8			22.9	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				23.0		52.0		23.0
Change Period (Y+Rc), s				* 4.2		4.2		* 4.2
Max Green Setting (Gmax), s				* 19		47.8		* 19
Max Q Clear Time (g_c+I1), s				7.2		39.0		4.2
Green Ext Time (p_c), s				0.2		6.0		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		30.4
HCM 2010 LOS		C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	408	1378	0	0	0	0	0	729	364
Future Volume (veh/h)	0	0	0	408	1378	0	0	0	0	0	729	364
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1545	1573	0				0	1573	1485
Adj Flow Rate, veh/h				443	1498	0				0	792	383
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				861	2454	0				0	1546	393
Arrive On Green				0.17	0.17	0.00				0.00	0.12	0.12
Sat Flow, veh/h				1471	4718	0				0	4435	1092
Grp Volume(v), veh/h				443	1498	0				0	792	383
Grp Sat Flow(s),veh/h/ln				1471	1573	0				0	1431	1092
Q Serve(g_s), s				20.8	22.0	0.0				0.0	13.0	26.2
Cycle Q Clear(g_c), s				20.8	22.0	0.0				0.0	13.0	26.2
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				861	2454	0				0	1546	393
V/C Ratio(X)				0.51	0.61	0.00				0.00	0.51	0.97
Avail Cap(c_a), veh/h				861	2454	0				0	1546	393
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.5	24.0	0.0				0.0	26.9	32.7
Incr Delay (d2), s/veh				2.2	1.1	0.0				0.0	1.2	39.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.0	9.8	0.0				0.0	5.3	12.2
LnGrp Delay(d),s/veh				25.7	25.2	0.0				0.0	28.1	72.1
LnGrp LOS				C	C						C	E
Approach Vol, veh/h					1941						1175	
Approach Delay, s/veh					25.3						42.4	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						43.0		32.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						39.0		27.0
Max Q Clear Time (g_c+I1), s						24.0		28.2
Green Ext Time (p_c), s						9.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	963	109	833	1097	0	0	0	0
Future Volume (veh/h)	0	0	0	0	963	109	833	1097	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1485	1485	1398	1398	0			
Adj Flow Rate, veh/h				0	1047	81	917	1175	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	1379	403	1438	1510	0			
Arrive On Green				0.00	0.34	0.34	0.18	0.18	0.00			
Sat Flow, veh/h				0	4189	1186	2663	2796	0			
Grp Volume(v), veh/h				0	1047	81	917	1175	0			
Grp Sat Flow(s),veh/h/ln				0	1352	1186	1331	1398	0			
Q Serve(g_s), s				0.0	17.2	3.6	23.9	30.1	0.0			
Cycle Q Clear(g_c), s				0.0	17.2	3.6	23.9	30.1	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1379	403	1438	1510	0			
V/C Ratio(X)				0.00	0.76	0.20	0.64	0.78	0.00			
Avail Cap(c_a), veh/h				0	1379	403	1438	1510	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.0	17.5	24.0	26.5	0.0			
Incr Delay (d2), s/veh				0.0	4.0	1.1	2.2	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				0.0	6.9	1.3	9.3	12.5	0.0			
LnGrp Delay(d),s/veh				0.0	26.0	18.7	26.2	30.6	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1128			2092				
Approach Delay, s/veh					25.5			28.6				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				45.0		30.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				40.5		25.5		
Max Q Clear Time (g_c+I1), s				32.1		19.2		
Green Ext Time (p_c), s				6.3		3.1		

Intersection Summary		
HCM 2010 Ctrl Delay		27.5
HCM 2010 LOS		C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1838	76	0	0	0	0	0	240	64	423	0
Future Volume (veh/h)	0	1838	76	0	0	0	0	0	240	64	423	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	0.99		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	0	1660	1710				0	1573	1620	1748	1748	0
Adj Flow Rate, veh/h	0	1998	76				0	0	245	70	460	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1126	1141	1488	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1323	1111	1748	0
Grp Volume(v), veh/h		0.0					0	0	245	70	460	0
Grp Sat Flow(s),veh/h/ln							0	0	1323	1111	1748	0
Q Serve(g_s), s							0.0	0.0	1.0	1.5	6.4	0.0
Cycle Q Clear(g_c), s							0.0	0.0	1.0	2.5	6.4	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1126	1141	1488	0
V/C Ratio(X)							0.00	0.00	0.22	0.06	0.31	0.00
Avail Cap(c_a), veh/h							0	0	1126	1141	1488	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	2.9	4.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.4	0.1	0.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.5	0.5	3.4	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.9	3.0	4.5	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								245			530	
Approach Delay, s/veh								0.9			4.3	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				26.4				26.4
Max Q Clear Time (g_c+I1), s				8.4				3.0
Green Ext Time (p_c), s				1.3				0.7

Intersection Summary	
HCM 2010 Ctrl Delay	3.2
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	2045	0	0	0	0	0	192	85	0	0	0
Future Volume (veh/h)	98	2045	0	0	0	0	0	192	85	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1485	0				0	1485	1440			
Adj Flow Rate, veh/h	107	2223	0				0	209	87			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	149	2417	0				0	556	222			
Arrive On Green	0.20	0.20	0.00				0.00	0.28	0.28			
Sat Flow, veh/h	157	3993	0				0	2004	801			
Grp Volume(v), veh/h	821	1509	0				0	153	143			
Grp Sat Flow(s),veh/h/ln	1446	1352	0				0	1485	1320			
Q Serve(g_s), s	34.4	41.1	0.0				0.0	6.2	6.6			
Cycle Q Clear(g_c), s	41.9	41.1	0.0				0.0	6.2	6.6			
Prop In Lane	0.13		0.00				0.00		0.61			
Lane Grp Cap(c), veh/h	930	1637	0				0	412	366			
V/C Ratio(X)	0.88	0.92	0.00				0.00	0.37	0.39			
Avail Cap(c_a), veh/h	930	1637	0				0	412	366			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	28.5	28.3	0.0				0.0	21.8	22.0			
Incr Delay (d2), s/veh	11.9	10.1	0.0				0.0	2.5	3.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	19.9	17.7	0.0				0.0	2.8	2.7			
LnGrp Delay(d),s/veh	40.5	38.4	0.0				0.0	24.4	25.1			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2330						296				
Approach Delay, s/veh		39.1						24.7				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				25.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		45.4		
Max Q Clear Time (g_c+I1), s				8.6		43.9		
Green Ext Time (p_c), s				1.9		1.5		

Intersection Summary	
HCM 2010 Ctrl Delay	37.5
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2064	59	0	0	0	0	0	152	62	207	0
Future Volume (veh/h)	0	2064	59	0	0	0	0	0	152	62	207	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97	0.99		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	0	1485	1382				0	1573	1591	1545	1485	0
Adj Flow Rate, veh/h	0	2243	60				0	0	148	67	225	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1077	1135	1238	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.83	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1292	1070	1485	0
Grp Volume(v), veh/h		0.0					0	0	148	67	225	0
Grp Sat Flow(s),veh/h/ln							0	0	1292	1070	1485	0
Q Serve(g_s), s							0.0	0.0	0.6	1.3	3.1	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.6	1.8	3.1	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1077	1135	1238	0
V/C Ratio(X)							0.00	0.00	0.14	0.06	0.18	0.00
Avail Cap(c_a), veh/h							0	0	1077	1135	1238	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	2.5	2.8	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.3	0.1	0.3	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.2	0.4	1.4	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.7	2.6	3.1	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								148			292	
Approach Delay, s/veh								0.7			3.0	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				27.0				27.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				22.5				22.5
Max Q Clear Time (g_c+I1), s				5.1				2.6
Green Ext Time (p_c), s				0.7				0.4

Intersection Summary	
HCM 2010 Ctrl Delay	2.2
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	2006	178	0	0	0	0	225	13	45	103	0
Future Volume (veh/h)	85	2006	178	0	0	0	0	225	13	45	103	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	92	2180	179				0	245	9	49	112	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	100	2506	210				0	692	25	293	530	0
Arrive On Green	0.19	0.19	0.19				0.00	0.22	0.22	0.01	0.11	0.00
Sat Flow, veh/h	177	4445	372				0	3182	113	1581	1660	0
Grp Volume(v), veh/h	901	748	801				0	124	130	49	112	0
Grp Sat Flow(s),veh/h/ln	1739	1590	1666				0	1577	1635	1581	1660	0
Q Serve(g_s), s	38.3	34.1	35.0				0.0	5.0	5.0	0.0	4.6	0.0
Cycle Q Clear(g_c), s	38.3	34.1	35.0				0.0	5.0	5.0	0.0	4.6	0.0
Prop In Lane	0.10		0.22				0.00		0.07	1.00		0.00
Lane Grp Cap(c), veh/h	980	897	939				0	352	365	293	530	0
V/C Ratio(X)	0.92	0.83	0.85				0.00	0.35	0.36	0.17	0.21	0.00
Avail Cap(c_a), veh/h	980	897	939				0	352	365	293	530	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.9	27.2	27.6				0.0	24.6	24.6	28.0	25.0	0.0
Incr Delay (d2), s/veh	14.9	9.0	9.7				0.0	2.8	2.7	1.2	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.4	17.3	18.7				0.0	2.4	2.5	1.0	2.3	0.0
LnGrp Delay(d),s/veh	43.8	36.3	37.3				0.0	27.4	27.3	29.2	25.9	0.0
LnGrp LOS	D	D	D					C	C	C	C	
Approach Vol, veh/h		2451						254			161	
Approach Delay, s/veh		39.4						27.3			26.9	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		47.0		28.2			7.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		42.4		* 24			* 3	* 17
Max Q Clear Time (g_c+I1), s		40.3		6.6			2.0	7.0
Green Ext Time (p_c), s		2.1		0.7			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	21	19	89.4%	15.6	8.1	C
	Through						
	Right Turn						
	Subtotal	21	19	89.4%	15.6	8.1	C
EB	Left Turn	12	9	76.7%	3.3	0.7	A
	Through	2,054	2,053	100.0%	2.4	0.2	A
	Right Turn						
	Subtotal	2,066	2,063	99.8%	2.4	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,087	2,081	99.7%	2.5	0.2	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	44	49	112.1%	16.5	5.9	B
	Right Turn	226	227	100.6%	15.0	3.5	B
	Subtotal	270	277	102.5%	15.3	3.2	B
SB	Left Turn	56	50	88.7%	28.1	3.7	C
	Through	275	281	102.1%	26.9	2.9	C
	Right Turn						
	Subtotal	331	330	99.8%	27.1	2.8	C
EB	Left Turn	30	27	90.8%	11.3	3.7	B
	Through	2,046	2,031	99.3%	11.3	1.0	B
	Right Turn	39	40	101.9%	9.0	3.5	A
	Subtotal	2,115	2,098	99.2%	11.2	1.0	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,716	2,706	99.6%	13.6	0.9	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	113	2181	34	0	0	0	0	85	43	114	231	0
Future Volume (veh/h)	113	2181	34	0	0	0	0	85	43	114	231	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1398	1382	1342	0
Adj Flow Rate, veh/h	123	2371	19				0	92	35	124	251	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	122	2528	598				0	500	411	289	558	0
Arrive On Green	0.18	0.18	0.18				0.00	0.36	0.36	0.12	0.12	0.00
Sat Flow, veh/h	230	4763	1126				0	1398	1151	591	1621	0
Grp Volume(v), veh/h	741	1753	19				0	92	35	196	179	0
Grp Sat Flow(s),veh/h/ln	1387	1202	1126				0	1398	1151	991	1160	0
Q Serve(g_s), s	39.8	35.8	1.0				0.0	3.4	1.5	11.6	10.8	0.0
Cycle Q Clear(g_c), s	39.8	35.8	1.0				0.0	3.4	1.5	15.0	10.8	0.0
Prop In Lane	0.17		1.00				0.00		1.00	0.63		0.00
Lane Grp Cap(c), veh/h	736	1914	598				0	500	411	432	415	0
V/C Ratio(X)	1.01	0.92	0.03				0.00	0.18	0.09	0.45	0.43	0.00
Avail Cap(c_a), veh/h	736	1914	598				0	500	411	432	415	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.9	29.3	15.0				0.0	16.6	16.0	28.6	26.0	0.0
Incr Delay (d2), s/veh	34.9	8.4	0.1				0.0	0.8	0.4	3.4	3.3	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
%ile BackOfQ(50%),veh/ln	22.4	13.4	0.3				0.0	1.4	0.5	4.3	3.8	0.0
LnGrp Delay(d),s/veh	65.9	37.7	15.0				0.0	17.4	16.4	32.0	29.3	0.0
LnGrp LOS	F	D	B					B	B	C	C	
Approach Vol, veh/h		2513						127			375	
Approach Delay, s/veh		45.8						17.1			30.7	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		44.0		31.0				31.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 40		* 27				* 27
Max Q Clear Time (g_c+I1), s		41.8		5.4				17.0
Green Ext Time (p_c), s		0.0		0.4				1.1

Intersection Summary	
HCM 2010 Ctrl Delay	42.7
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	2224	57	0	0	0	0	43	240	93	173	0
Future Volume (veh/h)	41	2224	57	0	0	0	0	43	240	93	173	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1454	1398	1398	0
Adj Flow Rate, veh/h	45	2417	33				0	47	246	101	188	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	44	2523	549				0	513	442	391	513	0
Arrive On Green	0.17	0.17	0.17				0.00	0.37	0.37	0.12	0.12	0.00
Sat Flow, veh/h	85	4915	1069				0	1398	1206	857	1398	0
Grp Volume(v), veh/h	734	1728	33				0	47	246	101	188	0
Grp Sat Flow(s),veh/h/ln	1394	1202	1069				0	1398	1206	857	1398	0
Q Serve(g_s), s	38.5	35.4	1.9				0.0	1.7	12.2	8.2	9.3	0.0
Cycle Q Clear(g_c), s	38.5	35.4	1.9				0.0	1.7	12.2	9.8	9.3	0.0
Prop In Lane	0.06		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	715	1852	549				0	513	442	391	513	0
V/C Ratio(X)	1.03	0.93	0.06				0.00	0.09	0.56	0.26	0.37	0.00
Avail Cap(c_a), veh/h	715	1852	549				0	513	442	391	513	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.1	29.9	16.0				0.0	15.6	18.9	25.9	25.0	0.0
Incr Delay (d2), s/veh	40.4	10.2	0.2				0.0	0.4	5.0	1.6	2.0	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
%ile BackOfQ(50%),veh/ln	22.9	13.5	0.6				0.0	0.7	4.6	2.1	3.9	0.0
LnGrp Delay(d),s/veh	71.5	40.0	16.2				0.0	15.9	23.9	27.5	27.0	0.0
LnGrp LOS	F	D	B					B	C	C	C	
Approach Vol, veh/h		2495						293			289	
Approach Delay, s/veh		49.0						22.6			27.2	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		43.0		32.0				32.0
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		38.5		27.5				27.5
Max Q Clear Time (g_c+I1), s		40.5		14.2				11.8
Green Ext Time (p_c), s		0.0		1.1				1.3

Intersection Summary	
HCM 2010 Ctrl Delay	44.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1112	1285	0	0	0	0	0	0	190	947	0
Future Volume (veh/h)	0	1112	1285	0	0	0	0	0	0	190	947	0
Number	5	2	12							3	8	18
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	0	1485	1485							1485	1485	0
Adj Flow Rate, veh/h	0	1209	1371							207	1029	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.92	0.92	0.92							0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3							3	3	0
Cap, veh/h	0	2288	1296							519	1089	0
Arrive On Green	0.00	0.17	0.17							0.12	0.12	0.00
Sat Flow, veh/h	0	4456	2525							1415	2971	0
Grp Volume(v), veh/h	0	1209	1371							207	1029	0
Grp Sat Flow(s),veh/h/ln	0	1485	1263							1415	1485	0
Q Serve(g_s), s	0.0	18.6	38.5							10.1	25.8	0.0
Cycle Q Clear(g_c), s	0.0	18.6	38.5							10.1	25.8	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2288	1296							519	1089	0
V/C Ratio(X)	0.00	0.53	1.06							0.40	0.94	0.00
Avail Cap(c_a), veh/h	0	2288	1296							519	1089	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	1.00	1.00							1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	22.9	31.1							25.3	32.2	0.0
Incr Delay (d2), s/veh	0.0	0.9	41.8							2.3	16.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.8	21.0							4.3	13.2	0.0
LnGrp Delay(d),s/veh	0.0	23.7	72.9							27.6	49.0	0.0
LnGrp LOS		C	F							C	D	
Approach Vol, veh/h		2580									1236	
Approach Delay, s/veh		49.9									45.4	
Approach LOS		D									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2						8
Phs Duration (G+Y+Rc), s		43.0						32.0
Change Period (Y+Rc), s		4.5						4.5
Max Green Setting (Gmax), s		38.5						27.5
Max Q Clear Time (g_c+I1), s		40.5						27.8
Green Ext Time (p_c), s		0.0						0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.4
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	678	794	0	0	0	0	0	1262	447	0	0	0
Future Volume (veh/h)	678	794	0	0	0	0	0	1262	447	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1454	1485	0				0	1398	1398			
Adj Flow Rate, veh/h	737	863	0				0	1372	433			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	1440	1339	0				0	1618	499			
Arrive On Green	0.15	0.15	0.00				0.00	0.42	0.42			
Sat Flow, veh/h	2769	2971	0				0	3943	1176			
Grp Volume(v), veh/h	737	863	0				0	1372	433			
Grp Sat Flow(s),veh/h/ln	1385	1485	0				0	1272	1176			
Q Serve(g_s), s	18.6	20.5	0.0				0.0	24.2	25.2			
Cycle Q Clear(g_c), s	18.6	20.5	0.0				0.0	24.2	25.2			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1440	1339	0				0	1618	499			
V/C Ratio(X)	0.51	0.64	0.00				0.00	0.85	0.87			
Avail Cap(c_a), veh/h	1440	1339	0				0	1618	499			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	25.5	26.3	0.0				0.0	19.4	19.7			
Incr Delay (d2), s/veh	1.3	2.4	0.0				0.0	5.7	18.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	7.4	8.9	0.0				0.0	9.2	10.6			
LnGrp Delay(d),s/veh	26.8	28.7	0.0				0.0	25.1	37.9			
LnGrp LOS	C	C						C	D			
Approach Vol, veh/h		1600						1805				
Approach Delay, s/veh		27.8						28.2				
Approach LOS		C						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		38.0		37.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 34		* 32				
Max Q Clear Time (g_c+I1), s		22.5		27.2				
Green Ext Time (p_c), s		9.0		4.2				

Intersection Summary	
HCM 2010 Ctrl Delay	28.0
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	15	298	39	1	70	200	41	46	255	138	58	194	10
Future Volume (veh/h)	15	298	39	1	70	200	41	46	255	138	58	194	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		0.94		1.00		0.97	1.00		0.97	1.00		0.91
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	2019	2019	2000		1942	1942	2000	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	16	324	37		76	217	36	50	277	126	63	211	9
Adj No. of Lanes	1	1	0		1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3		3	3	3	3	3	3	3	3	3
Cap, veh/h	45	419	48		154	480	80	148	359	163	170	551	23
Arrive On Green	0.02	0.24	0.24		0.08	0.30	0.30	0.08	0.30	0.30	0.10	0.31	0.31
Sat Flow, veh/h	1923	1767	202		1849	1617	268	1757	1188	540	1757	1749	75
Grp Volume(v), veh/h	16	0	361		76	0	253	50	0	403	63	0	220
Grp Sat Flow(s),veh/h/ln	1923	0	1969		1849	0	1885	1757	0	1728	1757	0	1823
Q Serve(g_s), s	0.5	0.0	10.4		2.4	0.0	6.6	1.6	0.0	12.9	2.0	0.0	5.7
Cycle Q Clear(g_c), s	0.5	0.0	10.4		2.4	0.0	6.6	1.6	0.0	12.9	2.0	0.0	5.7
Prop In Lane	1.00		0.10		1.00		0.14	1.00		0.31	1.00		0.04
Lane Grp Cap(c), veh/h	45	0	466		154	0	559	148	0	523	170	0	574
V/C Ratio(X)	0.36	0.00	0.77		0.49	0.00	0.45	0.34	0.00	0.77	0.37	0.00	0.38
Avail Cap(c_a), veh/h	253	0	715		304	0	746	260	0	761	260	0	802
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	21.7		26.7	0.0	17.4	26.3	0.0	19.3	25.8	0.0	16.3
Incr Delay (d2), s/veh	1.8	0.0	2.9		0.9	0.0	0.6	0.5	0.0	3.0	0.5	0.0	0.4
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	0.3	0.0	6.0		1.3	0.0	3.5	0.8	0.0	6.6	1.0	0.0	2.9
LnGrp Delay(d),s/veh	31.1	0.0	24.6		27.6	0.0	18.0	26.8	0.0	22.3	26.3	0.0	16.7
LnGrp LOS	C		C		C		B	C		C	C		B
Approach Vol, veh/h		377				329			453			283	
Approach Delay, s/veh		24.9				20.2			22.8			18.8	
Approach LOS		C				C			C			B	

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	9.1	19.3	9.1	23.4	5.4	23.0	9.9	22.6
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	22.1	9.0	* 27	8.0	24.1	9.0	* 27
Max Q Clear Time (g_c+I1), s	4.4	12.4	3.6	7.7	2.5	8.6	4.0	14.9
Green Ext Time (p_c), s	0.0	1.1	0.0	0.8	0.0	0.8	0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	22.0
HCM 2010 LOS	C

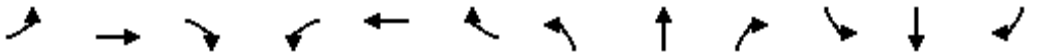
Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	246	420	12	40	496	62	8	454	42	0	348	288
Future Volume (veh/h)	246	420	12	40	496	62	8	454	42	0	348	288
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	0.99		0.93	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1800	1694	1728	0	1765	1728
Adj Flow Rate, veh/h	256	438	11	42	517	59	8	473	36	0	362	104
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	180	956	24	476	645	74	52	1136	85	0	987	279
Arrive On Green	0.11	0.59	0.59	0.87	0.87	0.87	0.77	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1597	1627	41	887	1474	168	14	2932	220	0	2636	719
Grp Volume(v), veh/h	256	0	449	42	0	576	274	0	243	0	236	230
Grp Sat Flow(s),veh/h/ln	1597	0	1668	887	0	1642	1681	0	1485	0	1676	1590
Q Serve(g_s), s	9.0	0.0	12.2	0.5	0.0	11.8	0.0	0.0	4.4	0.0	8.0	8.3
Cycle Q Clear(g_c), s	9.0	0.0	12.2	0.7	0.0	11.8	4.3	0.0	4.4	0.0	8.0	8.3
Prop In Lane	1.00		0.02	1.00		0.10	0.03		0.15	0.00		0.45
Lane Grp Cap(c), veh/h	180	0	980	476	0	718	698	0	575	0	650	616
V/C Ratio(X)	1.43	0.00	0.46	0.09	0.00	0.80	0.39	0.00	0.42	0.00	0.36	0.37
Avail Cap(c_a), veh/h	180	0	980	476	0	718	698	0	575	0	650	616
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.84	0.00	0.84	0.87	0.00	0.87	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	9.3	2.9	0.0	3.5	6.0	0.0	6.0	0.0	17.5	17.5
Incr Delay (d2), s/veh	220.5	0.0	1.5	0.3	0.0	7.8	1.4	0.0	2.0	0.0	1.6	1.7
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	14.9	0.0	5.9	0.2	0.0	6.0	2.1	0.0	2.1	0.0	4.0	3.9
LnGrp Delay(d),s/veh	256.0	0.0	10.9	3.2	0.0	11.4	7.4	0.0	8.0	0.0	19.0	19.3
LnGrp LOS	F		B	A		B	A		A		B	B
Approach Vol, veh/h		705			618			517			466	
Approach Delay, s/veh		99.9			10.8			7.7			19.2	
Approach LOS		F			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.2		35.8	12.0	39.2		35.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 47		24.4	9.0	* 35		24.4
Max Q Clear Time (g_c+I1), s		14.2		6.4	11.0	13.8		10.3
Green Ext Time (p_c), s		4.7		4.3	0.0	6.2		3.4

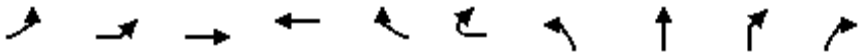
Intersection Summary	
HCM 2010 Ctrl Delay	39.0
HCM 2010 LOS	D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	445	37	31	157	0	0	0	0	224	1100	425
Future Volume (vph)	0	445	37	31	157	0	0	0	0	224	1100	425
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		1.00			1.00						1.00	0.98
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.99			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2777			1783						2992	1321
Flt Permitted		1.00			0.88						0.99	1.00
Satd. Flow (perm)		2777			1589						2992	1321
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	464	39	32	164	0	0	0	0	233	1146	443
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	495	0	0	196	0	0	0	0	0	1379	443
Confl. Peds. (#/hr)			15	15		4			11			
Confl. Bikes (#/hr)			3			3			3			2
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		30.8			30.8						40.4	33.4
Effective Green, g (s)		30.8			30.8						40.4	33.4
Actuated g/C Ratio		0.39			0.39						0.50	0.42
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1069			611						1510	551
v/s Ratio Prot		c0.18									c0.46	
v/s Ratio Perm					0.12							0.34
v/c Ratio		0.46			0.32						0.91	0.80
Uniform Delay, d1		18.4			17.3						18.2	20.4
Progression Factor		0.27			0.34						1.00	1.00
Incremental Delay, d2		1.3			1.2						10.0	11.8
Delay (s)		6.3			7.1						28.2	32.2
Level of Service		A			A						C	C
Approach Delay (s)		6.3			7.1			0.0			29.2	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	360	18	291	123	288	13	58	1409	178	42
Future Volume (vph)	360	18	291	123	288	13	58	1409	178	42
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1509	1812	1812	1485			3679	1316	
Flt Permitted		0.65	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		1039	1812	1812	1485			3679	1316	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	375	19	303	128	300	14	60	1468	185	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	394	303	128	314	0	0	1528	191	0
Confl. Peds. (#/hr)							8			3
Confl. Bikes (#/hr)					4	4				
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Effective Green, g (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Actuated g/C Ratio		0.41	0.41	0.21	0.21			0.48	0.48	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		495	742	380	311			1784	638	
v/s Ratio Prot		c0.12	0.17	0.07	c0.21					
v/s Ratio Perm		0.21						0.42	0.15	
v/c Ratio		0.80	0.41	0.34	1.01			0.86	0.30	
Uniform Delay, d1		20.9	16.7	26.9	31.6			18.1	12.4	
Progression Factor		0.72	0.76	1.00	1.00			0.47	0.24	
Incremental Delay, d2		10.1	1.3	2.4	53.5			3.8	0.8	
Delay (s)		25.1	14.0	29.3	85.1			12.3	3.7	
Level of Service		C	B	C	F			B	A	
Approach Delay (s)			20.3	68.9				11.2		
Approach LOS			C	E				B		

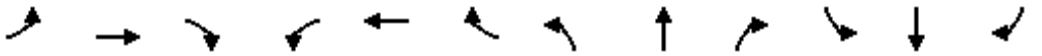
Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	355	35	25	235	40	30	389	44	52	316	32
Future Volume (veh/h)	74	355	35	25	235	40	30	389	44	52	316	32
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)	0.99		0.98	1.00		0.98	0.97		0.92	0.98		0.92
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	1412	1560	1530	1412	1500	1530	1440	1500	1469	1440	1500	1469
Adj Flow Rate, veh/h	77	370	32	26	245	34	31	405	36	54	329	25
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	529	713	62	347	649	90	90	918	80	155	822	62
Arrive On Green	0.50	0.50	0.50	1.00	1.00	1.00	0.76	0.76	0.76	0.76	0.76	0.76
Sat Flow, veh/h	870	1413	122	782	1285	178	103	2415	210	258	2163	164
Grp Volume(v), veh/h	77	0	402	26	0	279	247	0	225	207	0	201
Grp Sat Flow(s),veh/h/ln	870	0	1535	782	0	1463	1421	0	1307	1265	0	1320
Q Serve(g_s), s	3.8	0.0	14.1	1.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	4.2
Cycle Q Clear(g_c), s	3.8	0.0	14.1	15.0	0.0	0.0	4.7	0.0	5.0	3.7	0.0	4.2
Prop In Lane	1.00		0.08	1.00		0.12	0.13		0.16	0.26		0.12
Lane Grp Cap(c), veh/h	529	0	775	347	0	739	591	0	497	537	0	502
V/C Ratio(X)	0.15	0.00	0.52	0.07	0.00	0.38	0.42	0.00	0.45	0.38	0.00	0.40
Avail Cap(c_a), veh/h	529	0	775	347	0	739	591	0	497	537	0	502
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.00	0.98	0.88	0.00	0.88	0.77	0.00	0.77
Uniform Delay (d), s/veh	10.8	0.0	13.3	2.6	0.0	0.0	6.5	0.0	6.6	6.4	0.0	6.5
Incr Delay (d2), s/veh	0.6	0.0	2.5	0.4	0.0	1.4	1.9	0.0	2.6	1.6	0.0	1.8
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	1.0	0.0	6.5	0.2	0.0	0.3	2.1	0.0	2.1	1.6	0.0	1.7
LnGrp Delay(d),s/veh	11.3	0.0	15.8	3.0	0.0	1.4	8.4	0.0	9.2	8.0	0.0	8.3
LnGrp LOS	B		B	A		A	A		A	A		A
Approach Vol, veh/h		479			305			472			408	
Approach Delay, s/veh		15.0			1.6			8.8			8.1	
Approach LOS		B			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		40.4		30.4		40.4		30.4
Max Q Clear Time (g_c+I1), s		16.1		7.0		17.0		6.2
Green Ext Time (p_c), s		2.3		2.0		1.3		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	307	167	56	160	0	0	0	0	45	1003	120
Future Volume (vph)	0	307	167	56	160	0	0	0	0	45	1003	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.96
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1698			1775						4164	1148
Flt Permitted		1.00			0.74						1.00	1.00
Satd. Flow (perm)		1698			1323						4164	1148
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	320	174	58	167	0	0	0	0	47	1045	125
RTOR Reduction (vph)	0	24	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	470	0	0	225	0	0	0	0	0	1092	125
Confl. Peds. (#/hr)	12		12	12		12			12	12		7
Confl. Bikes (#/hr)			6			4			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		35.8			35.8						35.4	28.4
Effective Green, g (s)		35.8			35.8						35.4	28.4
Actuated g/C Ratio		0.45			0.45						0.44	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		759			592						1842	407
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.17						0.26	0.11
v/c Ratio		0.62			0.38						0.59	0.31
Uniform Delay, d1		16.9			14.7						16.9	18.7
Progression Factor		0.28			1.05						0.32	0.40
Incremental Delay, d2		3.6			1.6						0.6	0.9
Delay (s)		8.4			17.0						6.0	8.3
Level of Service		A			B						A	A
Approach Delay (s)		8.4			17.0			0.0			6.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	232	140	0	0	120	103	86	1338	14	0	0	0
Future Volume (veh/h)	232	140	0	0	120	103	86	1338	14	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.97	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1620	1588	1620			
Adj Flow Rate, veh/h	242	146	0	0	125	95	90	1394	14			
Adj No. of Lanes	1	1	0	0	1	0	0	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	379	643	0	0	291	221	125	2061	21			
Arrive On Green	0.68	0.68	0.00	0.00	0.41	0.41	0.16	0.16	0.16			
Sat Flow, veh/h	1035	1588	0	0	718	545	260	4295	44			
Grp Volume(v), veh/h	242	146	0	0	0	220	545	455	497			
Grp Sat Flow(s),veh/h/ln	1035	1588	0	0	0	1263	1575	1445	1578			
Q Serve(g_s), s	16.4	2.8	0.0	0.0	0.0	10.0	26.3	23.7	23.7			
Cycle Q Clear(g_c), s	26.4	2.8	0.0	0.0	0.0	10.0	26.3	23.7	23.7			
Prop In Lane	1.00		0.00	0.00		0.43	0.17		0.03			
Lane Grp Cap(c), veh/h	379	643	0	0	0	512	756	694	758			
V/C Ratio(X)	0.64	0.23	0.00	0.00	0.00	0.43	0.72	0.66	0.66			
Avail Cap(c_a), veh/h	379	643	0	0	0	512	756	694	758			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	16.4	8.2	0.0	0.0	0.0	17.1	28.6	27.5	27.5			
Incr Delay (d2), s/veh	8.0	0.8	0.0	0.0	0.0	2.6	5.9	4.8	4.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.4	1.4	0.0	0.0	0.0	3.9	12.7	10.4	11.3			
LnGrp Delay(d),s/veh	24.3	9.0	0.0	0.0	0.0	19.8	34.5	32.3	31.9			
LnGrp LOS	C	A				B	C	C	C			
Approach Vol, veh/h		388			220			1498				
Approach Delay, s/veh		18.6			19.8			32.9				
Approach LOS		B			B			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		37.0		43.0		37.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		32.4		38.4		32.4		
Max Q Clear Time (g_c+I1), s		28.4		28.3		12.0		
Green Ext Time (p_c), s		0.8		5.1		0.9		

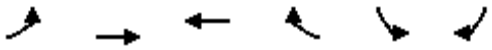
Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	216	31	90	238	65	27	366	78	43	271	62
Future Volume (veh/h)	45	216	31	90	238	65	27	366	78	43	271	62
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)	0.98		0.91	0.97		0.91	0.92		0.83	0.95		0.83
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	1588	1525	1620	1588	1588	1620	1620	1588	1555	1620	1588	1555
Adj Flow Rate, veh/h	47	225	26	94	248	56	28	381	60	45	282	43
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	676	78	490	626	141	85	907	138	128	735	118
Arrive On Green	0.51	0.51	0.51	0.17	0.17	0.17	0.13	0.13	0.13	0.77	0.77	0.77
Sat Flow, veh/h	948	1326	153	977	1228	277	91	2356	358	188	1909	305
Grp Volume(v), veh/h	47	0	251	94	0	304	252	0	217	184	0	186
Grp Sat Flow(s),veh/h/ln	948	0	1479	977	0	1505	1512	0	1293	1084	0	1318
Q Serve(g_s), s	2.8	0.0	8.0	6.9	0.0	14.4	0.0	0.0	12.4	2.5	0.0	3.6
Cycle Q Clear(g_c), s	17.2	0.0	8.0	14.9	0.0	14.4	11.7	0.0	12.4	14.9	0.0	3.6
Prop In Lane	1.00		0.10	1.00		0.18	0.11		0.28	0.24		0.23
Lane Grp Cap(c), veh/h	403	0	754	490	0	768	632	0	498	473	0	507
V/C Ratio(X)	0.12	0.00	0.33	0.19	0.00	0.40	0.40	0.00	0.44	0.39	0.00	0.37
Avail Cap(c_a), veh/h	403	0	754	490	0	768	632	0	498	473	0	507
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	0.91	0.00	0.91	0.89	0.00	0.89
Uniform Delay (d), s/veh	18.9	0.0	11.6	26.1	0.0	22.3	26.6	0.0	26.9	6.7	0.0	6.1
Incr Delay (d2), s/veh	0.6	0.0	1.2	0.8	0.0	1.4	1.7	0.0	2.5	2.1	0.0	1.8
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	0.8	0.0	3.5	2.0	0.0	6.3	5.4	0.0	4.8	1.4	0.0	1.5
LnGrp Delay(d),s/veh	19.5	0.0	12.8	26.9	0.0	23.7	28.3	0.0	29.4	8.8	0.0	7.9
LnGrp LOS	B		B	C		C	C		C	A		A
Approach Vol, veh/h		298			398			469			370	
Approach Delay, s/veh		13.8			24.5			28.8			8.3	
Approach LOS		B			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 41		* 31		* 41		* 31
Max Q Clear Time (g_c+I1), s		19.2		14.4		16.9		16.9
Green Ext Time (p_c), s		2.6		3.8		3.9		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	19.8
HCM 2010 LOS	B

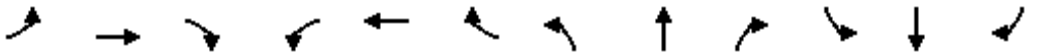
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	348	363	45	0	40
Future Volume (vph)	0	348	363	45	0	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0			5.6
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.98			0.78
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.99			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1588	1533			1074
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1588	1533			1074
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	362	378	47	0	42
RTOR Reduction (vph)	0	0	5	0	0	36
Lane Group Flow (vph)	0	363	420	0	0	6
Confl. Peds. (#/hr)				59		78
Confl. Bikes (#/hr)				14		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		55.4	56.1			12.3
Effective Green, g (s)		55.4	56.1			12.3
Actuated g/C Ratio		0.69	0.70			0.15
Clearance Time (s)						5.6
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1099	1075			165
v/s Ratio Prot		c0.23	c0.27			
v/s Ratio Perm						0.01
v/c Ratio		0.33	0.39			0.04
Uniform Delay, d1		4.9	4.9			28.8
Progression Factor		0.92	0.13			1.00
Incremental Delay, d2		0.2	0.2			0.1
Delay (s)		4.7	0.8			28.9
Level of Service		A	A			C
Approach Delay (s)		4.7	0.8		28.9	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	247	104	71	224	0	0	0	0	118	913	195
Future Volume (vph)	0	247	104	71	224	0	0	0	0	118	913	195
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.93	1.00	1.00						1.00	0.92
Flpb, ped/bikes		1.00	1.00	0.97	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1641	1173	1602	1535						4143	1102
Flt Permitted		1.00	1.00	0.54	1.00						0.99	1.00
Satd. Flow (perm)		1641	1173	915	1535						4143	1102
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	257	108	74	233	0	0	0	0	123	951	203
RTOR Reduction (vph)	0	0	34	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	257	74	74	233	0	0	0	0	0	1074	203
Confl. Peds. (#/hr)			51	51		28			11	11		19
Confl. Bikes (#/hr)			10			16			1			1
Parking (#/hr)											2	2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		34.8	34.8	34.8	34.8						36.4	29.4
Effective Green, g (s)		34.8	34.8	34.8	34.8						36.4	29.4
Actuated g/C Ratio		0.43	0.43	0.43	0.43						0.45	0.37
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		713	510	398	667						1885	404
v/s Ratio Prot		c0.16			0.15							
v/s Ratio Perm			0.06	0.08							0.26	0.18
v/c Ratio		0.36	0.15	0.19	0.35						0.57	0.50
Uniform Delay, d1		15.1	13.6	13.9	15.1						16.0	19.6
Progression Factor		0.53	0.37	0.88	0.92						0.38	0.47
Incremental Delay, d2		1.4	0.6	1.0	1.3						1.0	3.6
Delay (s)		9.5	5.6	13.2	15.2						7.1	12.9
Level of Service		A	A	B	B						A	B
Approach Delay (s)		8.3			14.7			0.0			8.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	203	0	0	182	79	111	1210	153	0	0	0
Future Volume (veh/h)	154	203	0	0	182	79	111	1210	153	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1525	1588	1620			
Adj Flow Rate, veh/h	160	211	0	0	190	61	116	1260	138			
Adj No. of Lanes	1	1	0	0	1	0	1	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	256	552	0	0	343	110	795	2170	238			
Arrive On Green	0.11	0.11	0.00	0.00	0.11	0.11	0.18	0.18	0.18			
Sat Flow, veh/h	1005	1588	0	0	988	317	1452	3963	434			
Grp Volume(v), veh/h	160	211	0	0	0	251	116	919	479			
Grp Sat Flow(s),veh/h/ln	1005	1588	0	0	0	1305	1452	1445	1506			
Q Serve(g_s), s	12.7	9.8	0.0	0.0	0.0	14.5	5.4	23.3	23.3			
Cycle Q Clear(g_c), s	27.3	9.8	0.0	0.0	0.0	14.5	5.4	23.3	23.3			
Prop In Lane	1.00		0.00	0.00		0.24	1.00		0.29			
Lane Grp Cap(c), veh/h	256	552	0	0	0	453	795	1583	825			
V/C Ratio(X)	0.62	0.38	0.00	0.00	0.00	0.55	0.15	0.58	0.58			
Avail Cap(c_a), veh/h	256	552	0	0	0	453	795	1583	825			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.94	0.94	0.00	0.00	0.00	1.00	0.43	0.43	0.43			
Uniform Delay (d), s/veh	42.4	27.5	0.0	0.0	0.0	29.5	17.0	24.4	24.4			
Incr Delay (d2), s/veh	10.3	1.9	0.0	0.0	0.0	4.8	0.2	0.7	1.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.3	4.6	0.0	0.0	0.0	5.9	2.2	9.5	10.0			
LnGrp Delay(d),s/veh	52.8	29.3	0.0	0.0	0.0	34.4	17.2	25.0	25.7			
LnGrp LOS	D	C				C	B	C	C			
Approach Vol, veh/h		371			251			1514				
Approach Delay, s/veh		39.4			34.4			24.6				
Approach LOS		D			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		32.0		48.0		32.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 28		* 44		* 28		
Max Q Clear Time (g_c+I1), s		29.3		25.3		16.5		
Green Ext Time (p_c), s		0.0		7.6		0.8		

Intersection Summary	
HCM 2010 Ctrl Delay	28.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	291	1425	0	0	0	0	0	269	47
Future Volume (veh/h)	0	0	0	291	1425	0	0	0	0	0	269	47
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.95
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.82
Adj Sat Flow, veh/h/ln				1530	1500	0				0	1500	1530
Adj Flow Rate, veh/h				303	1484	0				0	280	30
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				459	1989	0				0	630	67
Arrive On Green				0.21	0.21	0.00				0.00	0.27	0.27
Sat Flow, veh/h				632	3318	0				0	2430	249
Grp Volume(v), veh/h				644	1143	0				0	168	142
Grp Sat Flow(s),veh/h/ln				1342	1242	0				0	1425	1179
Q Serve(g_s), s				36.2	34.5	0.0				0.0	7.8	8.0
Cycle Q Clear(g_c), s				36.2	34.5	0.0				0.0	7.8	8.0
Prop In Lane				0.47		0.00				0.00		0.21
Lane Grp Cap(c), veh/h				902	1546	0				0	381	315
V/C Ratio(X)				0.71	0.74	0.00				0.00	0.44	0.45
Avail Cap(c_a), veh/h				902	1546	0				0	381	315
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				26.4	25.7	0.0				0.0	24.3	24.4
Incr Delay (d2), s/veh				4.8	3.2	0.0				0.0	3.7	4.6
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.7	12.6	0.0				0.0	3.5	3.0
LnGrp Delay(d),s/veh				31.2	28.9	0.0				0.0	28.0	29.0
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1787						310	
Approach Delay, s/veh					29.7						28.5	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.0		26.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 50		21.4				
Max Q Clear Time (g_c+I1), s		38.2		10.0				
Green Ext Time (p_c), s		7.0		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1597	141	128	298	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1597	141	128	298	0	0	0	0
Number				5	2	12	7	4	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				0	1412	1412	1440	1412	0			
Adj Flow Rate, veh/h				0	1664	111	133	310	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2351	717	255	519	0			
Arrive On Green				0.00	0.20	0.20	0.09	0.09	0.00			
Sat Flow, veh/h				0	3981	1175	649	1885	0			
Grp Volume(v), veh/h				0	1664	111	239	204	0			
Grp Sat Flow(s),veh/h/ln				0	1285	1175	1250	1220	0			
Q Serve(g_s), s				0.0	32.2	6.2	13.4	12.8	0.0			
Cycle Q Clear(g_c), s				0.0	32.2	6.2	14.7	12.8	0.0			
Prop In Lane				0.00		1.00	0.56		0.00			
Lane Grp Cap(c), veh/h				0	2351	717	426	348	0			
V/C Ratio(X)				0.00	0.71	0.15	0.56	0.59	0.00			
Avail Cap(c_a), veh/h				0	2351	717	426	348	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	25.3	14.9	32.5	31.7	0.0			
Incr Delay (d2), s/veh				0.0	1.8	0.5	5.3	7.1	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	11.9	2.1	5.7	5.0	0.0			
LnGrp Delay(d),s/veh				0.0	27.1	15.4	37.8	38.8	0.0			
LnGrp LOS					C	B	D	D				
Approach Vol, veh/h					1775			443				
Approach Delay, s/veh					26.4			38.2				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		53.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 49		* 23				
Max Q Clear Time (g_c+I1), s		34.2		16.7				
Green Ext Time (p_c), s		8.5		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	28.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	169	1659	0	0	0	0	0	263	84
Future Volume (veh/h)	0	0	0	169	1659	0	0	0	0	0	263	84
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1412	0				0	1412	1440
Adj Flow Rate, veh/h				176	1728	0				0	274	69
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				256	2131	0				0	507	123
Arrive On Green				0.21	0.21	0.00				0.00	0.26	0.26
Sat Flow, veh/h				315	3472	0				0	2021	471
Grp Volume(v), veh/h				701	1203	0				0	185	158
Grp Sat Flow(s),veh/h/ln				1333	1169	0				0	1341	1081
Q Serve(g_s), s				37.3	39.2	0.0				0.0	9.5	10.1
Cycle Q Clear(g_c), s				40.2	39.2	0.0				0.0	9.5	10.1
Prop In Lane				0.25		0.00				0.00		0.44
Lane Grp Cap(c), veh/h				903	1485	0				0	349	281
V/C Ratio(X)				0.78	0.81	0.00				0.00	0.53	0.56
Avail Cap(c_a), veh/h				903	1485	0				0	349	281
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				27.3	27.0	0.0				0.0	25.4	25.7
Incr Delay (d2), s/veh				6.5	4.9	0.0				0.0	5.7	7.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				16.5	13.7	0.0				0.0	4.0	3.7
LnGrp Delay(d),s/veh				33.8	31.9	0.0				0.0	31.1	33.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1904						343	
Approach Delay, s/veh					32.6						32.2	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		55.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 51		* 21				
Max Q Clear Time (g_c+I1), s		42.2		12.1				
Green Ext Time (p_c), s		5.9		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	65	1523	83	220	146	0	0	160	45
Future Volume (veh/h)	0	0	0	65	1523	83	220	146	0	0	160	45
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				68	1586	79	229	152	0	0	167	35
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				102	2519	130	310	649	0	0	301	63
Arrive On Green				0.18	0.18	0.18	0.10	0.58	0.00	0.00	0.23	0.23
Sat Flow, veh/h				187	4632	238	1765	1853	0	0	1300	273
Grp Volume(v), veh/h				639	532	562	229	152	0	0	0	202
Grp Sat Flow(s),veh/h/ln				1755	1606	1696	1765	1853	0	0	0	1573
Q Serve(g_s), s				27.2	24.4	24.4	0.3	3.2	0.0	0.0	0.0	9.1
Cycle Q Clear(g_c), s				27.2	24.4	24.4	0.3	3.2	0.0	0.0	0.0	9.1
Prop In Lane				0.11		0.14	1.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				954	873	922	310	649	0	0	0	364
V/C Ratio(X)				0.67	0.61	0.61	0.74	0.23	0.00	0.00	0.00	0.56
Avail Cap(c_a), veh/h				954	873	922	310	649	0	0	0	364
HCM Platoon Ratio				0.33	0.33	0.33	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				26.1	25.0	25.0	31.8	11.5	0.0	0.0	0.0	27.1
Incr Delay (d2), s/veh				3.7	3.2	3.0	14.6	0.8	0.0	0.0	0.0	6.0
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				14.2	11.6	12.2	5.8	1.8	0.0	0.0	0.0	4.5
LnGrp Delay(d),s/veh				29.8	28.1	28.0	46.4	12.3	0.0	0.0	0.0	33.1
LnGrp LOS				C	C	C	D	B				C
Approach Vol, veh/h					1733			381			202	
Approach Delay, s/veh					28.7			32.8			33.1	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.0	23.0		48.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			5.0	18.5		43.5		28.0
Max Q Clear Time (g_c+I1), s			2.3	11.1		29.2		5.2
Green Ext Time (p_c), s			0.4	0.8		11.5		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

SimTraffic Post-Processor **BioMarin**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	35	29	83.1%	9.0	2.1	A
	Through						
	Right Turn						
	Subtotal	35	29	83.1%	9.0	2.1	A
SB	Left Turn						
	Through	4	4	92.0%	15.2	19.7	C
	Right Turn	3	3	85.9%	6.9	13.5	A
	Subtotal	7	6	89.4%	13.9	18.1	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	60	49	81.6%	2.0	0.3	A
	Through	1,640	1,571	95.8%	1.4	0.3	A
	Right Turn	4	4	92.0%	0.6	0.7	A
	Subtotal	1,704	1,624	95.3%	1.4	0.3	A
Total		1,746	1,659	95.0%	1.6	0.3	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	99	95	96.3%	25.1	3.1	C
	Through	18	18	98.1%	24.2	5.2	C
	Right Turn						
	Subtotal	117	113	96.6%	24.9	2.4	C
SB	Left Turn						
	Through	39	36	91.5%	19.5	6.2	B
	Right Turn	8	7	87.4%	15.2	9.7	B
	Subtotal	47	43	90.8%	18.6	5.5	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	200	193	96.4%	10.5	2.1	B
	Through	1,681	1,588	94.5%	8.5	1.8	A
	Right Turn	35	38	109.3%	7.2	2.1	A
	Subtotal	1,916	1,819	95.0%	8.7	1.8	A
Total		2,080	1,975	95.0%	9.8	1.7	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	199	1681	35	98	18	0	0	39	8
Future Volume (veh/h)	0	0	0	199	1681	35	98	18	0	0	39	8
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	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				1412	1412	1440	1440	1412	0	0	1412	1440
Adj Flow Rate, veh/h				207	1751	33	102	19	0	0	41	2
Adj No. of Lanes				1	3	0	0	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				820	2372	45	332	53	0	0	381	19
Arrive On Green				0.20	0.20	0.20	0.28	0.28	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1345	3889	73	875	186	0	0	1335	65
Grp Volume(v), veh/h				207	1157	627	121	0	0	0	0	43
Grp Sat Flow(s),veh/h/ln				1345	1285	1393	1061	0	0	0	0	1400
Q Serve(g_s), s				10.4	33.8	33.8	6.6	0.0	0.0	0.0	0.0	1.8
Cycle Q Clear(g_c), s				10.4	33.8	33.8	8.4	0.0	0.0	0.0	0.0	1.8
Prop In Lane				1.00		0.05	0.84		0.00	0.00		0.05
Lane Grp Cap(c), veh/h				820	1567	850	385	0	0	0	0	399
V/C Ratio(X)				0.25	0.74	0.74	0.31	0.00	0.00	0.00	0.00	0.11
Avail Cap(c_a), veh/h				820	1567	850	385	0	0	0	0	399
HCM Platoon Ratio				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	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				16.6	26.0	26.0	23.9	0.0	0.0	0.0	0.0	21.1
Incr Delay (d2), s/veh				0.7	3.1	5.7	2.1	0.0	0.0	0.0	0.0	0.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.0	12.7	14.4	2.4	0.0	0.0	0.0	0.0	0.8
LnGrp Delay(d),s/veh				17.3	29.1	31.7	26.0	0.0	0.0	0.0	0.0	21.6
LnGrp LOS				B	C	C	C					C
Approach Vol, veh/h					1991			121			43	
Approach Delay, s/veh					28.7			26.0			21.6	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				27.0		53.0		27.0
Change Period (Y+Rc), s				* 4.2		4.2		* 4.2
Max Green Setting (Gmax), s				* 23		48.8		* 23
Max Q Clear Time (g_c+I1), s				10.4		35.8		3.8
Green Ext Time (p_c), s				0.3		8.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	28.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	1633	122	36	296	0	0	236	135
Future Volume (veh/h)	0	0	0	90	1633	122	36	296	0	0	236	135
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.96		1.00	1.00		0.83
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				1620	1588	1620	1620	1588	0	0	1525	1555
Adj Flow Rate, veh/h				94	1701	117	38	308	0	0	246	133
Adj No. of Lanes				0	3	0	0	2	0	0	2	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				119	2296	163	106	758	0	0	554	277
Arrive On Green				0.19	0.19	0.19	0.64	0.64	0.00	0.00	0.11	0.11
Sat Flow, veh/h				210	4037	286	160	2451	0	0	1814	869
Grp Volume(v), veh/h				706	588	618	175	171	0	0	202	177
Grp Sat Flow(s),veh/h/ln				1578	1445	1511	1166	1373	0	0	1448	1159
Q Serve(g_s), s				34.1	30.6	30.7	1.6	4.8	0.0	0.0	10.5	11.5
Cycle Q Clear(g_c), s				34.1	30.6	30.7	13.2	4.8	0.0	0.0	10.5	11.5
Prop In Lane				0.13		0.19	0.22		0.00	0.00		0.75
Lane Grp Cap(c), veh/h				897	822	859	426	438	0	0	462	369
V/C Ratio(X)				0.79	0.72	0.72	0.41	0.39	0.00	0.00	0.44	0.48
Avail Cap(c_a), veh/h				897	822	859	426	438	0	0	462	369
HCM Platoon Ratio				0.33	0.33	0.33	2.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				27.9	26.4	26.5	11.0	10.7	0.0	0.0	29.1	29.5
Incr Delay (d2), s/veh				6.9	5.3	5.2	2.9	2.6	0.0	0.0	3.0	4.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				16.6	13.4	14.1	2.1	2.0	0.0	0.0	4.6	4.1
LnGrp Delay(d),s/veh				34.8	31.7	31.6	13.9	13.4	0.0	0.0	32.0	34.0
LnGrp LOS				C	C	C	B	B			C	C
Approach Vol, veh/h					1912			346			379	
Approach Delay, s/veh					32.8			13.6			32.9	
Approach LOS					C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				30.0		50.0		30.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				25.5		45.5		25.5
Max Q Clear Time (g_c+I1), s				15.2		36.1		13.5
Green Ext Time (p_c), s				1.1		6.1		1.4

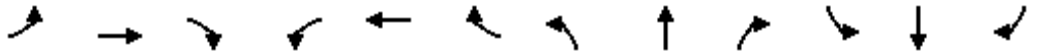
Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	273	1701	27	108	38	0	0	28	21
Future Volume (veh/h)	0	0	0	273	1701	27	108	38	0	0	28	21
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.90	0.94		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1440	1412	1440	1412	1412	0	0	1412	1440
Adj Flow Rate, veh/h				284	1772	26	112	40	0	0	29	4
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				344	2305	35	310	332	0	0	249	34
Arrive On Green				0.22	0.22	0.22	0.23	0.23	0.00	0.00	0.23	0.23
Sat Flow, veh/h				521	3493	52	1033	1412	0	0	1060	146
Grp Volume(v), veh/h				755	635	691	112	40	0	0	0	33
Grp Sat Flow(s),veh/h/ln				1386	1285	1396	1033	1412	0	0	0	1206
Q Serve(g_s), s				41.6	37.0	37.1	7.7	1.8	0.0	0.0	0.0	1.7
Cycle Q Clear(g_c), s				41.6	37.0	37.1	9.4	1.8	0.0	0.0	0.0	1.7
Prop In Lane				0.38		0.04	1.00		0.00	0.00		0.12
Lane Grp Cap(c), veh/h				915	848	921	310	332	0	0	0	283
V/C Ratio(X)				0.83	0.75	0.75	0.36	0.12	0.00	0.00	0.00	0.12
Avail Cap(c_a), veh/h				915	848	921	310	332	0	0	0	283
HCM Platoon Ratio				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	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				26.9	25.1	25.1	27.8	24.1	0.0	0.0	0.0	24.1
Incr Delay (d2), s/veh				8.4	6.0	5.6	3.2	0.7	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				18.1	14.5	15.8	2.5	0.8	0.0	0.0	0.0	0.6
LnGrp Delay(d),s/veh				35.3	31.1	30.7	31.0	24.8	0.0	0.0	0.0	24.9
LnGrp LOS				D	C	C	C	C				C
Approach Vol, veh/h					2082			152			33	
Approach Delay, s/veh					32.5			29.4			24.9	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				23.0		57.0		23.0
Change Period (Y+Rc), s				* 4.2		4.2		* 4.2
Max Green Setting (Gmax), s				* 19		52.8		* 19
Max Q Clear Time (g_c+I1), s				11.4		43.6		3.7
Green Ext Time (p_c), s				0.4		6.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	462	1511	0	0	0	0	0	641	447
Future Volume (veh/h)	0	0	0	462	1511	0	0	0	0	0	641	447
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.90
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1560	1588	0				0	1588	1500
Adj Flow Rate, veh/h				481	1574	0				0	668	450
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				926	2680	0				0	1409	374
Arrive On Green				0.19	0.19	0.00				0.00	0.11	0.11
Sat Flow, veh/h				1486	4765	0				0	4479	1150
Grp Volume(v), veh/h				481	1574	0				0	668	450
Grp Sat Flow(s),veh/h/ln				1486	1588	0				0	1445	1150
Q Serve(g_s), s				23.6	24.2	0.0				0.0	11.6	26.0
Cycle Q Clear(g_c), s				23.6	24.2	0.0				0.0	11.6	26.0
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				926	2680	0				0	1409	374
V/C Ratio(X)				0.52	0.59	0.00				0.00	0.47	1.20
Avail Cap(c_a), veh/h				926	2680	0				0	1409	374
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.9	24.1	0.0				0.0	29.3	35.7
Incr Delay (d2), s/veh				2.1	1.0	0.0				0.0	1.1	114.6
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.3	10.9	0.0				0.0	4.8	20.2
LnGrp Delay(d),s/veh				26.0	25.0	0.0				0.0	30.4	150.3
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2055						1118	
Approach Delay, s/veh					25.3						78.7	
Approach LOS					C						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						49.0		31.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						45.0		26.0
Max Q Clear Time (g_c+I1), s						26.2		28.0
Green Ext Time (p_c), s						11.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	44.1
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1102	183	865	1289	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1102	183	865	1289	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1500	1500	1398	1398	0			
Adj Flow Rate, veh/h				0	1148	172	978	1235	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	3	3	0			
Cap, veh/h				0	1510	441	1381	1450	0			
Arrive On Green				0.00	0.37	0.37	0.17	0.17	0.00			
Sat Flow, veh/h				0	4230	1195	2663	2796	0			
Grp Volume(v), veh/h				0	1148	172	978	1235	0			
Grp Sat Flow(s),veh/h/ln				0	1365	1195	1331	1398	0			
Q Serve(g_s), s				0.0	19.7	8.5	27.7	34.3	0.0			
Cycle Q Clear(g_c), s				0.0	19.7	8.5	27.7	34.3	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1510	441	1381	1450	0			
V/C Ratio(X)				0.00	0.76	0.39	0.71	0.85	0.00			
Avail Cap(c_a), veh/h				0	1510	441	1381	1450	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.1	18.6	27.4	30.2	0.0			
Incr Delay (d2), s/veh				0.0	3.7	2.6	3.1	6.5	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	7.8	3.1	10.8	14.6	0.0			
LnGrp Delay(d),s/veh				0.0	25.8	21.2	30.5	36.6	0.0			
LnGrp LOS					C	C	C	D				
Approach Vol, veh/h					1320			2213				
Approach Delay, s/veh					25.2			33.9				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				46.0		34.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				41.5		29.5		
Max Q Clear Time (g_c+I1), s				36.3		21.7		
Green Ext Time (p_c), s				4.3		4.2		

Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1453	93	0	0	0	0	0	389	161	418	0
Future Volume (veh/h)	0	1453	93	0	0	0	0	0	389	161	418	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		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	0	1676	1710				0	1588	1620	1765	1765	0
Adj Flow Rate, veh/h	0	1514	88				0	0	390	168	435	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1145	1003	1526	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.86	0.29	0.29	0.00
Sat Flow, veh/h		0					0	0	1324	979	1765	0
Grp Volume(v), veh/h		0.0					0	0	390	168	435	0
Grp Sat Flow(s),veh/h/ln							0	0	1324	979	1765	0
Q Serve(g_s), s							0.0	0.0	1.9	4.5	6.5	0.0
Cycle Q Clear(g_c), s							0.0	0.0	1.9	6.5	6.5	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1145	1003	1526	0
V/C Ratio(X)							0.00	0.00	0.34	0.17	0.29	0.00
Avail Cap(c_a), veh/h							0	0	1145	1003	1526	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.7	4.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.8	0.4	0.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.9	1.4	3.5	0.0
LnGrp Delay(d),s/veh							0.0	0.0	1.3	5.1	4.4	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								390			603	
Approach Delay, s/veh								1.3			4.6	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				34.0				34.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				29.4				29.4
Max Q Clear Time (g_c+I1), s				8.5				3.9
Green Ext Time (p_c), s				1.7				1.2

Intersection Summary	
HCM 2010 Ctrl Delay	3.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	1833	0	0	0	0	0	232	108	0	0	0
Future Volume (veh/h)	173	1833	0	0	0	0	0	232	108	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1500	0				0	1500	1440			
Adj Flow Rate, veh/h	180	1909	0				0	242	105			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	245	2164	0				0	644	269			
Arrive On Green	0.19	0.19	0.00				0.00	0.32	0.32			
Sat Flow, veh/h	333	3814	0				0	1995	835			
Grp Volume(v), veh/h	727	1362	0				0	180	167			
Grp Sat Flow(s),veh/h/ln	1417	1365	0				0	1500	1331			
Q Serve(g_s), s	37.9	38.8	0.0				0.0	7.4	7.8			
Cycle Q Clear(g_c), s	40.1	38.8	0.0				0.0	7.4	7.8			
Prop In Lane	0.25		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	860	1549	0				0	484	429			
V/C Ratio(X)	0.84	0.88	0.00				0.00	0.37	0.39			
Avail Cap(c_a), veh/h	860	1549	0				0	484	429			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	30.3	29.8	0.0				0.0	20.9	21.0			
Incr Delay (d2), s/veh	10.0	7.4	0.0				0.0	2.2	2.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	18.1	16.3	0.0				0.0	3.3	3.2			
LnGrp Delay(d),s/veh	40.3	37.3	0.0				0.0	23.0	23.7			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2089						347				
Approach Delay, s/veh		38.3						23.3				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				30.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 26		45.4		
Max Q Clear Time (g_c+I1), s				9.8		42.1		
Green Ext Time (p_c), s				2.6		3.1		

Intersection Summary	
HCM 2010 Ctrl Delay	36.2
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1875	73	0	0	0	0	0	223	186	259	0
Future Volume (veh/h)	0	1875	73	0	0	0	0	0	223	186	259	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1500	1382				0	1588	1591	1560	1500	0
Adj Flow Rate, veh/h	0	1953	71				0	0	216	194	270	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1101	1065	1282	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1288	1008	1500	0
Grp Volume(v), veh/h		0.0					0	0	216	194	270	0
Grp Sat Flow(s),veh/h/ln							0	0	1288	1008	1500	0
Q Serve(g_s), s							0.0	0.0	0.9	4.6	4.3	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.9	5.5	4.3	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1101	1065	1282	0
V/C Ratio(X)							0.00	0.00	0.20	0.18	0.21	0.00
Avail Cap(c_a), veh/h							0	0	1101	1065	1282	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.0	3.1	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.4	0.4	0.4	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.4	1.4	1.9	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.8	4.3	3.5	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								216			464	
Approach Delay, s/veh								0.8			3.9	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				26.5				26.5
Max Q Clear Time (g_c+I1), s				7.5				2.9
Green Ext Time (p_c), s				1.3				0.6

Intersection Summary	
HCM 2010 Ctrl Delay	2.9
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	2036	157	0	0	0	0	286	25	106	119	0
Future Volume (veh/h)	91	2036	157	0	0	0	0	286	25	106	119	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.92	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	95	2121	153				0	298	18	110	124	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	111	2617	193				0	636	38	264	543	0
Arrive On Green	0.19	0.19	0.19				0.00	0.21	0.21	0.03	0.21	0.00
Sat Flow, veh/h	191	4523	334				0	3120	182	1597	1744	0
Grp Volume(v), veh/h	871	724	774				0	155	161	110	124	0
Grp Sat Flow(s),veh/h/ln	1755	1606	1687				0	1593	1625	1597	1744	0
Q Serve(g_s), s	38.5	34.4	35.1				0.0	6.8	7.0	0.0	4.7	0.0
Cycle Q Clear(g_c), s	38.5	34.4	35.1				0.0	6.8	7.0	0.0	4.7	0.0
Prop In Lane	0.11		0.20				0.00		0.11	1.00		0.00
Lane Grp Cap(c), veh/h	1015	929	976				0	334	340	264	543	0
V/C Ratio(X)	0.86	0.78	0.79				0.00	0.47	0.47	0.42	0.23	0.00
Avail Cap(c_a), veh/h	1015	929	976				0	334	340	264	543	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	27.6	27.9				0.0	27.8	27.8	33.5	23.7	0.0
Incr Delay (d2), s/veh	9.3	6.4	6.6				0.0	4.6	4.6	4.8	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.4	16.9	18.2				0.0	3.4	3.6	2.7	2.4	0.0
LnGrp Delay(d),s/veh	38.6	34.0	34.4				0.0	32.4	32.4	38.2	24.7	0.0
LnGrp LOS	D	C	C					C	C	D	C	
Approach Vol, veh/h		2369						316			234	
Approach Delay, s/veh		35.8						32.4			31.1	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		51.0		29.2			8.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		46.4		* 25			* 4	* 17
Max Q Clear Time (g_c+I1), s		40.5		6.7			2.0	9.0
Green Ext Time (p_c), s		5.7		0.8			0.1	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	35.1
HCM 2010 LOS	D

Notes

SimTraffic Post-Processor **BioMarin**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	64	52	81.7%	26.0	4.3	D
	Through						
	Right Turn						
	Subtotal	64	52	81.7%	26.0	4.3	D
EB	Left Turn	35	30	85.2%	3.0	0.4	A
	Through	2,165	2,050	94.7%	2.3	0.2	A
	Right Turn						
	Subtotal	2,200	2,080	94.5%	2.4	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,264	2,132	94.2%	2.9	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	70	63	89.4%	17.1	4.4	B
	Right Turn	277	254	91.7%	13.0	2.5	B
	Subtotal	347	316	91.2%	13.7	2.4	B
SB	Left Turn	91	85	93.4%	20.2	4.2	C
	Through	148	143	96.5%	16.3	3.3	B
	Right Turn						
	Subtotal	239	228	95.3%	17.8	2.7	B
EB	Left Turn	47	44	93.2%	14.6	2.5	B
	Through	2,120	1,979	93.4%	12.9	1.1	B
	Right Turn	32	26	82.8%	9.0	2.9	A
	Subtotal	2,199	2,049	93.2%	12.8	1.1	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,785	2,594	93.1%	13.4	1.0	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	2182	46	0	0	0	0	182	123	114	155	0
Future Volume (veh/h)	200	2182	46	0	0	0	0	182	123	114	155	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1412	1382	1355	0
Adj Flow Rate, veh/h	208	2273	26				0	190	118	119	161	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	216	2540	642				0	491	404	269	440	0
Arrive On Green	0.18	0.18	0.18				0.00	0.35	0.35	0.69	0.69	0.00
Sat Flow, veh/h	394	4640	1172				0	1412	1162	532	1328	0
Grp Volume(v), veh/h	734	1747	26				0	190	118	137	143	0
Grp Sat Flow(s),veh/h/ln	1392	1214	1172				0	1412	1162	627	1172	0
Q Serve(g_s), s	41.9	37.3	1.5				0.0	8.1	5.9	8.7	3.9	0.0
Cycle Q Clear(g_c), s	41.9	37.3	1.5				0.0	8.1	5.9	16.9	3.9	0.0
Prop In Lane	0.28		1.00				0.00		1.00	0.87		0.00
Lane Grp Cap(c), veh/h	762	1994	642				0	491	404	302	407	0
V/C Ratio(X)	0.96	0.88	0.04				0.00	0.39	0.29	0.45	0.35	0.00
Avail Cap(c_a), veh/h	762	1994	642				0	491	404	302	407	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.0	30.1	15.4				0.0	19.7	19.0	13.0	8.6	0.0
Incr Delay (d2), s/veh	24.8	5.8	0.1				0.0	2.3	1.8	4.9	2.4	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	21.4	13.6	0.5				0.0	3.5	2.1	2.5	1.5	0.0
LnGrp Delay(d),s/veh	56.8	35.9	15.5				0.0	22.0	20.8	17.9	10.9	0.0
LnGrp LOS	E	D	B					C	C	B	B	
Approach Vol, veh/h		2507						308			280	
Approach Delay, s/veh		41.8						21.5			14.3	
Approach LOS		D						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.0		32.0				32.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 44		* 28				* 28
Max Q Clear Time (g_c+I1), s		43.9		10.1				18.9
Green Ext Time (p_c), s		0.0		1.2				0.8

Intersection Summary	
HCM 2010 Ctrl Delay	37.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	2283	109	0	0	0	0	128	330	75	217	0
Future Volume (veh/h)	27	2283	109	0	0	0	0	128	330	75	217	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1468	1412	1412	0
Adj Flow Rate, veh/h	28	2378	64				0	133	330	78	226	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	29	2654	593				0	503	434	304	503	0
Arrive On Green	0.18	0.18	0.18				0.00	0.36	0.36	0.71	0.71	0.00
Sat Flow, veh/h	55	4996	1117				0	1412	1217	740	1412	0
Grp Volume(v), veh/h	718	1688	64				0	133	330	78	226	0
Grp Sat Flow(s),veh/h/ln	1409	1214	1117				0	1412	1217	740	1412	0
Q Serve(g_s), s	40.4	36.1	3.9				0.0	5.4	19.2	4.5	5.4	0.0
Cycle Q Clear(g_c), s	40.4	36.1	3.9				0.0	5.4	19.2	9.9	5.4	0.0
Prop In Lane	0.04		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	749	1935	593				0	503	434	304	503	0
V/C Ratio(X)	0.96	0.87	0.11				0.00	0.26	0.76	0.26	0.45	0.00
Avail Cap(c_a), veh/h	749	1935	593				0	503	434	304	503	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.1	30.3	17.1				0.0	18.3	22.7	10.3	8.2	0.0
Incr Delay (d2), s/veh	24.3	5.8	0.4				0.0	1.3	11.9	2.0	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.8	13.2	1.3				0.0	2.2	7.8	1.1	2.4	0.0
LnGrp Delay(d),s/veh	56.4	36.1	17.4				0.0	19.6	34.6	12.3	11.1	0.0
LnGrp LOS	E	D	B					B	C	B	B	
Approach Vol, veh/h		2470						463			304	
Approach Delay, s/veh		41.5						30.3			11.4	
Approach LOS		D						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		47.0		33.0				33.0
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		42.5		28.5				28.5
Max Q Clear Time (g_c+I1), s		42.4		21.2				11.9
Green Ext Time (p_c), s		0.1		1.3				1.4

Intersection Summary	
HCM 2010 Ctrl Delay	37.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1717	965	0	0	0	0	0	0	347	756	0
Future Volume (veh/h)	0	1717	965	0	0	0	0	0	0	347	756	0
Number	5	2	12							3	8	18
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	0	1500	1500							1500	1500	0
Adj Flow Rate, veh/h	0	1731	973							361	788	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.96	0.96	0.96							0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2							2	2	0
Cap, veh/h	0	2278	1291							545	1144	0
Arrive On Green	0.00	0.17	0.17							0.13	0.13	0.00
Sat Flow, veh/h	0	4500	2550							1429	3000	0
Grp Volume(v), veh/h	0	1731	973							361	788	0
Grp Sat Flow(s),veh/h/ln	0	1500	1275							1429	1500	0
Q Serve(g_s), s	0.0	29.4	29.1							19.3	20.1	0.0
Cycle Q Clear(g_c), s	0.0	29.4	29.1							19.3	20.1	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2278	1291							545	1144	0
V/C Ratio(X)	0.00	0.76	0.75							0.66	0.69	0.00
Avail Cap(c_a), veh/h	0	2278	1291							545	1144	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	1.00	1.00							1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	28.7	28.6							30.1	30.4	0.0
Incr Delay (d2), s/veh	0.0	2.4	4.1							6.2	3.4	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	0.0	12.7	11.0							8.6	8.9	0.0
LnGrp Delay(d),s/veh	0.0	31.1	32.7							36.3	33.8	0.0
LnGrp LOS		C	C							D	C	
Approach Vol, veh/h		2704									1149	
Approach Delay, s/veh		31.7									34.6	
Approach LOS		C									C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2						8
Phs Duration (G+Y+Rc), s		45.0						35.0
Change Period (Y+Rc), s		4.5						4.5
Max Green Setting (Gmax), s		40.5						30.5
Max Q Clear Time (g_c+I1), s		31.4						22.1
Green Ext Time (p_c), s		7.9						3.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	855	1259	0	0	0	0	0	1318	542	0	0	0
Future Volume (veh/h)	855	1259	0	0	0	0	0	1318	542	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.94			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1468	1500	0				0	1412	1412			
Adj Flow Rate, veh/h	960	1214	0				0	1373	549			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	1501	1418	0				0	1580	464			
Arrive On Green	0.16	0.16	0.00				0.00	0.41	0.41			
Sat Flow, veh/h	2797	3000	0				0	3981	1132			
Grp Volume(v), veh/h	960	1214	0				0	1373	549			
Grp Sat Flow(s),veh/h/ln	1398	1500	0				0	1285	1132			
Q Serve(g_s), s	26.1	31.5	0.0				0.0	26.1	32.8			
Cycle Q Clear(g_c), s	26.1	31.5	0.0				0.0	26.1	32.8			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1501	1418	0				0	1580	464			
V/C Ratio(X)	0.64	0.86	0.00				0.00	0.87	1.18			
Avail Cap(c_a), veh/h	1501	1418	0				0	1580	464			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	28.8	31.1	0.0				0.0	21.6	23.6			
Incr Delay (d2), s/veh	2.1	6.8	0.0				0.0	6.8	102.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	10.6	14.4	0.0				0.0	10.1	23.4			
LnGrp Delay(d),s/veh	30.9	38.0	0.0				0.0	28.4	126.2			
LnGrp LOS	C	D						C	F			
Approach Vol, veh/h		2174						1922				
Approach Delay, s/veh		34.9						56.3				
Approach LOS		C						E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		42.0		38.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 38		* 33				
Max Q Clear Time (g_c+I1), s		33.5		34.8				
Green Ext Time (p_c), s		4.1		0.0				

Intersection Summary		
HCM 2010 Ctrl Delay		44.9
HCM 2010 LOS		D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	265	34	68	268	43	55	207	156	79	118	21
Future Volume (veh/h)	13	265	34	68	268	43	55	207	156	79	118	21
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		0.96	1.00		0.96	1.00		0.96	1.00		0.92
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	2039	2039	2000	1961	1961	2000	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	14	276	29	71	279	38	57	216	130	82	123	15
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	381	40	157	461	63	287	301	181	206	381	46
Arrive On Green	0.02	0.21	0.21	0.08	0.27	0.27	0.16	0.28	0.28	0.12	0.24	0.24
Sat Flow, veh/h	1942	1806	190	1867	1681	229	1774	1070	644	1774	1612	197
Grp Volume(v), veh/h	14	0	305	71	0	317	57	0	346	82	0	138
Grp Sat Flow(s),veh/h/ln	1942	0	1996	1867	0	1910	1774	0	1715	1774	0	1808
Q Serve(g_s), s	0.4	0.0	7.9	2.0	0.0	8.0	1.5	0.0	10.1	2.4	0.0	3.5
Cycle Q Clear(g_c), s	0.4	0.0	7.9	2.0	0.0	8.0	1.5	0.0	10.1	2.4	0.0	3.5
Prop In Lane	1.00		0.10	1.00		0.12	1.00		0.38	1.00		0.11
Lane Grp Cap(c), veh/h	41	0	422	157	0	523	287	0	483	206	0	427
V/C Ratio(X)	0.34	0.00	0.72	0.45	0.00	0.61	0.20	0.00	0.72	0.40	0.00	0.32
Avail Cap(c_a), veh/h	279	0	893	336	0	923	319	0	709	319	0	747
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	20.4	24.3	0.0	17.6	20.2	0.0	18.0	22.8	0.0	17.6
Incr Delay (d2), s/veh	1.8	0.0	2.4	0.8	0.0	1.1	0.1	0.0	2.0	0.5	0.0	0.4
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	0.2	0.0	4.6	1.1	0.0	4.4	0.8	0.0	5.0	1.2	0.0	1.8
LnGrp Delay(d),s/veh	28.7	0.0	22.8	25.0	0.0	18.7	20.3	0.0	20.0	23.3	0.0	18.0
LnGrp LOS	C		C	C		B	C		C	C		B
Approach Vol, veh/h		319			388			403			220	
Approach Delay, s/veh		23.1			19.9			20.0			20.0	
Approach LOS		C			B			C			B	

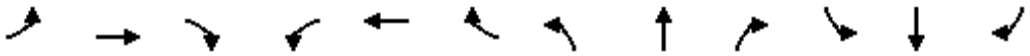
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	16.7	13.0	17.3	5.2	20.2	10.5	19.9
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	24.9	10.0	* 23	8.0	26.9	10.0	* 23
Max Q Clear Time (g_c+I1), s	4.0	9.9	3.5	5.5	2.4	10.0	4.4	12.1
Green Ext Time (p_c), s	0.0	1.1	0.0	0.4	0.0	1.1	0.1	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	460	28	0	588	6	11
Future Volume (vph)	460	28	0	588	6	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			3.0	5.6	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	0.99	
Frt	0.99			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1571			1588	1408	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1571			1588	1408	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	29	0	612	6	11
RTOR Reduction (vph)	3	0	0	0	9	0
Lane Group Flow (vph)	505	0	0	613	8	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA	Perm	
Protected Phases	2			3 4 6		
Permitted Phases					8	
Actuated Green, G (s)	34.7			55.4	13.4	
Effective Green, g (s)	34.7			49.4	13.4	
Actuated g/C Ratio	0.43			0.62	0.17	
Clearance Time (s)	6.0				5.6	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	681			980	235	
v/s Ratio Prot	c0.32			c0.39		
v/s Ratio Perm					c0.01	
v/c Ratio	0.74			0.63	0.03	
Uniform Delay, d1	18.9			9.5	27.9	
Progression Factor	0.65			0.27	0.62	
Incremental Delay, d2	6.5			0.4	0.1	
Delay (s)	18.8			3.0	17.2	
Level of Service	B			A	B	
Approach Delay (s)	18.8			3.0	17.2	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

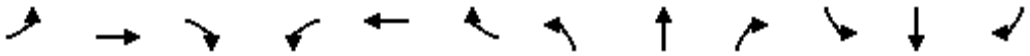


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	432	1	0	275	7	22	16	18	9	10	11
Future Volume (vph)	0	432	1	0	275	7	22	16	18	9	10	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		1.00			1.00			0.96			0.95	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1588			1581			1476			1463	
Flt Permitted		1.00			1.00			0.86			0.88	
Satd. Flow (perm)		1588			1581			1293			1308	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	450	1	0	286	7	23	17	19	9	10	11
RTOR Reduction (vph)	0	0	0	0	1	0	0	17	0	0	10	0
Lane Group Flow (vph)	0	451	0	0	292	0	0	42	0	0	20	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			4 6			8			8	
Permitted Phases							8			8		
Actuated Green, G (s)		44.2			59.5			8.5			8.5	
Effective Green, g (s)		44.2			59.5			8.5			8.5	
Actuated g/C Ratio		0.55			0.74			0.11			0.11	
Clearance Time (s)		6.0						6.0			6.0	
Vehicle Extension (s)		3.0						1.5			1.5	
Lane Grp Cap (vph)		877			1175			137			138	
v/s Ratio Prot		c0.28			c0.18							
v/s Ratio Perm								c0.03			0.02	
v/c Ratio		0.51			0.25			0.31			0.15	
Uniform Delay, d1		11.2			3.2			33.0			32.5	
Progression Factor		0.59			0.06			0.38			0.79	
Incremental Delay, d2		1.9			0.0			0.4			0.1	
Delay (s)		8.4			0.2			12.9			25.7	
Level of Service		A			A			B			C	
Approach Delay (s)		8.4			0.2			12.9			25.7	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

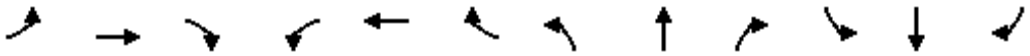
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	471	0	0	582	6	11
Future Volume (vph)	471	0	0	582	6	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			6.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1588			1588	1424	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1588			1588	1424	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	491	0	0	606	6	11
RTOR Reduction (vph)	0	0	0	0	9	0
Lane Group Flow (vph)	491	0	0	606	8	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	53.7			34.7	14.7	
Effective Green, g (s)	48.1			34.7	14.7	
Actuated g/C Ratio	0.60			0.43	0.18	
Clearance Time (s)				6.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	954			688	261	
v/s Ratio Prot	c0.31			c0.38	c0.01	
v/s Ratio Perm						
v/c Ratio	0.51			0.88	0.03	
Uniform Delay, d1	9.2			20.8	26.8	
Progression Factor	0.19			1.04	1.58	
Incremental Delay, d2	0.3			11.6	0.0	
Delay (s)	2.0			33.1	42.4	
Level of Service	A			C	D	
Approach Delay (s)	2.0			33.1	42.4	
Approach LOS	A			C	D	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	459	0	0	271	9	11	10	15	0	0	0
Future Volume (vph)	0	459	0	0	271	9	11	10	15	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.98				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			1.00			0.94				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		1588			1579			1445				
Flt Permitted		1.00			1.00			0.99				
Satd. Flow (perm)		1588			1579			1445				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	478	0	0	282	9	11	10	16	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	478	0	0	290	0	0	23	0	0	0	0
Confl. Peds. (#/hr)	10		10			10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		58.7			44.2			9.3				
Effective Green, g (s)		58.7			44.2			9.3				
Actuated g/C Ratio		0.73			0.55			0.12				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1165			872			167				
v/s Ratio Prot		c0.30			0.18			c0.02				
v/s Ratio Perm												
v/c Ratio		0.41			0.33			0.14				
Uniform Delay, d1		4.1			9.8			31.7				
Progression Factor		0.06			0.51			1.04				
Incremental Delay, d2		0.1			1.0			0.1				
Delay (s)		0.3			6.0			33.2				
Level of Service		A			A			C				
Approach Delay (s)		0.3			6.0			33.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	348	0	0	397	26	11	3	11	0	0	0
Future Volume (vph)	0	348	0	0	397	26	11	3	11	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.99			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1558			1444				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1558			1444				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	362	0	0	414	27	11	3	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	363	0	0	438	0	0	16	0	0	0	0
Confl. Peds. (#/hr)	59		21			59			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		55.4			37.1			13.0				
Effective Green, g (s)		55.4			37.1			13.0				
Actuated g/C Ratio		0.69			0.46			0.16				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1099			722			234				
v/s Ratio Prot		c0.23			c0.28			c0.01				
v/s Ratio Perm												
v/c Ratio		0.33			0.61			0.07				
Uniform Delay, d1		4.9			16.0			28.4				
Progression Factor		0.21			0.77			1.00				
Incremental Delay, d2		0.2			3.5			0.1				
Delay (s)		1.2			15.8			28.5				
Level of Service		A			B			C				
Approach Delay (s)		1.2			15.8			28.5			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	13.9	42.4	0.16	13.4	C
Tamalpais	IV	25	16.0	31.3	47.3	0.06	4.6	F
Tamalpais	IV	25	3.1	4.3	7.4	0.01	5.7	F
Hetherton	IV	25	8.7	9.6	18.3	0.03	6.5	F
Irwin	IV	25	18.9	14.0	32.9	0.07	7.8	E
Total	IV		75.2	73.1	148.3	0.33	8.1	E

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	27.0	48.6	0.10	7.3	E
101 SB Off Hetherton	IV	25	18.9	23.2	42.1	0.07	6.1	F
Tamalpais	IV	25	8.7	64.3	73.0	0.03	1.6	F
Tamalpais	IV	25	3.1	3.5	6.6	0.01	6.4	F
Lincoln	IV	25	16.0	55.9	71.9	0.06	3.0	F
Total	IV		68.3	173.9	242.2	0.27	4.1	F

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	29	24.0	35.7	59.7	0.16	9.6	D
5th	IV	25	16.3	3.1	19.4	0.06	11.4	D
4th	IV	25	14.6	5.9	20.5	0.05	9.6	D
3rd	IV	25	17.7	14.9	32.6	0.07	7.4	E
2nd	IV	25	15.6	67.6	83.2	0.06	2.5	F
Total	IV		88.2	127.2	215.4	0.40	6.7	F

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	30	25.2	25.9	51.1	0.17	11.8	D
3rd St	IV	25	14.8	15.1	29.9	0.06	6.7	F
4th	IV	25	18.3	14.9	33.2	0.07	7.5	E
5th	IV	25	14.6	7.6	22.2	0.06	8.9	E
Mission	IV	25	15.7	5.6	21.3	0.06	10.0	D
Total	IV		88.6	69.1	157.7	0.41	9.3	D

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	23.6	41.7	0.07	5.9	F
C	IV	25	18.9	9.5	28.4	0.07	9.1	D
B	IV	25	17.9	25.8	43.7	0.07	5.6	F
A	IV	25	18.5	9.5	28.0	0.07	9.0	E
Lindaro	IV	25	25.3	10.8	36.1	0.14	14.0	C
Lincoln	IV	25	21.4	38.0	59.4	0.10	5.9	F
Francisco W.	IV	25	12.2	26.6	38.8	0.05	4.3	F
101 SBOn 2nd	IV	25	14.2	8.7	22.9	0.05	8.4	E
Total	IV		146.5	152.5	299.0	0.61	7.4	E

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	11.6	30.6	0.07	8.4	E
Tamalpais	IV	25	14.4	7.1	21.5	0.05	9.1	D
Lincoln	IV	25	13.2	4.3	17.5	0.05	10.3	D
Lindaro	IV	25	21.4	3.1	24.5	0.10	14.3	C
A	IV	25	25.3	15.7	41.0	0.14	12.3	D
B	IV	25	17.9	8.1	26.0	0.07	9.3	D
C	IV	25	19.0	4.2	23.2	0.07	11.1	D
D	IV	25	18.7	2.4	21.1	0.07	12.0	D
Total	IV		148.9	56.5	205.4	0.62	10.9	D

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	16.7	34.8	0.07	7.1	E
C	IV	25	18.9	12.6	31.5	0.07	8.2	E
B	IV	25	17.9	10.1	28.0	0.07	8.7	E
A	IV	25	18.5	10.3	28.8	0.07	8.7	E
Lindaro	IV	25	25.3	9.2	34.5	0.14	14.6	C
Lincoln	IV	25	21.4	23.0	44.4	0.10	7.9	E
Francisco W.	IV	25	12.2	12.9	25.1	0.05	6.6	F
101 SBOn Hetherton	IV	25	14.2	18.3	32.5	0.05	5.9	F
Total	IV		146.5	113.1	259.6	0.61	8.5	E

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	9.4	28.4	0.07	9.1	D
Tamalpais	IV	25	14.4	8.1	22.5	0.05	8.7	E
Lincoln	IV	25	13.2	7.0	20.2	0.05	8.9	E
Lindaro	IV	25	21.4	4.4	25.8	0.10	13.6	C
A	IV	25	25.3	5.6	30.9	0.14	16.4	C
B	IV	25	17.9	5.9	23.8	0.07	10.2	D
C	IV	25	19.0	3.9	22.9	0.07	11.3	D
D	IV	25	18.7	2.5	21.2	0.07	12.0	D
Total	IV		148.9	46.8	195.7	0.62	11.5	D

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	35	22.2	29.0	51.2	0.16	11.2	D
5th	IV	25	16.3	6.1	22.4	0.06	9.9	D
4th	IV	25	14.6	7.2	21.8	0.05	9.1	D
3rd	IV	25	17.7	25.0	42.7	0.07	5.6	F
2nd	IV	25	15.6	24.2	39.8	0.06	5.3	F
Total	IV		86.4	91.5	177.9	0.40	8.1	E

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	38	19.3	29.2	48.5	0.17	12.5	D
3rd St	IV	25	14.8	16.9	31.7	0.06	6.3	F
4th	IV	25	18.9	3.6	22.5	0.07	11.4	D
5th	IV	25	14.0	11.3	25.3	0.05	7.5	E
Mission	IV	25	15.7	2.9	18.6	0.06	11.5	D
Total	IV		82.7	63.9	146.6	0.41	10.0	D

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	11.3	39.8	0.16	14.3	C
Tamalpais	IV	25	16.1	14.9	31.0	0.06	7.1	E
Tamalpais	IV	25	4.3	1.9	6.2	0.02	9.5	D
Hetherton	IV	25	7.5	7.1	14.6	0.03	7.0	F
Irwin	IV	25	18.9	13.5	32.4	0.07	7.9	E
Total	IV		75.3	48.7	124.0	0.33	9.7	D

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	29.8	51.4	0.10	6.9	F
Hetherton	IV	25	18.9	7.3	26.2	0.07	9.8	D
Tamalpais	IV	25	7.5	29.7	37.2	0.03	2.7	F
Tamalpais	IV	25	4.3	2.2	6.5	0.02	9.0	D
Lincoln	IV	25	16.1	23.6	39.7	0.06	5.5	F
Total	IV		68.4	92.6	161.0	0.27	6.1	F

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5469	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1554
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.68
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	25.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3780	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1385
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.60
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	23.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	820
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.50
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.8
Speed 2 (S_2), mi/h	0.2	Density (D_{ML}), pc/mi/ln	13.7
Speed 2 (S_3), mi/h	1.4	Level of Service (LOS)	B

HCS7 Freeway Weaving Report

Project Information

Analyst	Fehr & Peers	Date	3/18/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 NB I-580 to Second Street Weave Segment		

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Short Length (L_S), ft	2900	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	1.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Volume (V_i), veh/h	2058	1722	823	985
Peak Hour Factor (PHF)	0.99	0.93	0.93	0.95
Total Trucks, %	4.40	4.40	4.09	4.09
Heavy Vehicle Adjustment Factor (f_{HV})	0.958	0.958	0.961	0.961
Flow Rate (v_i), pc/h	2170	1933	921	1079

Weaving Flow Rate (v_w), pc/h	3012	Freeway Max Capacity (c_{IFL}), pc/h/ln	2300
Non-Weaving Flow Rate (v_{NW}), pc/h	3091	Density-Based Capacity (c_{IWL}), pc/h/ln	1928
Total Flow Rate (v), pc/h	6103	Demand Flow-Based Capacity (c_{IW}), pc/h	4858
Volume Ratio (VR)	0.494	Weaving Segment Capacity (c_W), veh/h	4654
Minimum Lane Change Rate (LC_{MIN}), lc/h	0	Adjusted Weaving Area Capacity (c_{wa}), veh/h	4654
Maximum Weaving Length (L_{MAX}), ft	7756	Volume-to-Capacity Ratio (v/c)	1.26

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	-	Average Weaving Speed (S_W), mi/h	-
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	-	Average Non-Weaving Speed (S_{NW}), mi/h	-
Weaving Lane Change Rate (LC_W), lc/h	-	Average Speed (S), mi/h	-
Total Lane Change Rate (LC_{All}), lc/h	-	Density (D), pc/mi/ln	-
Weaving Intensity Factor (W)	-	Level of Service (LOS)	F

Managed Lane Geometric Data

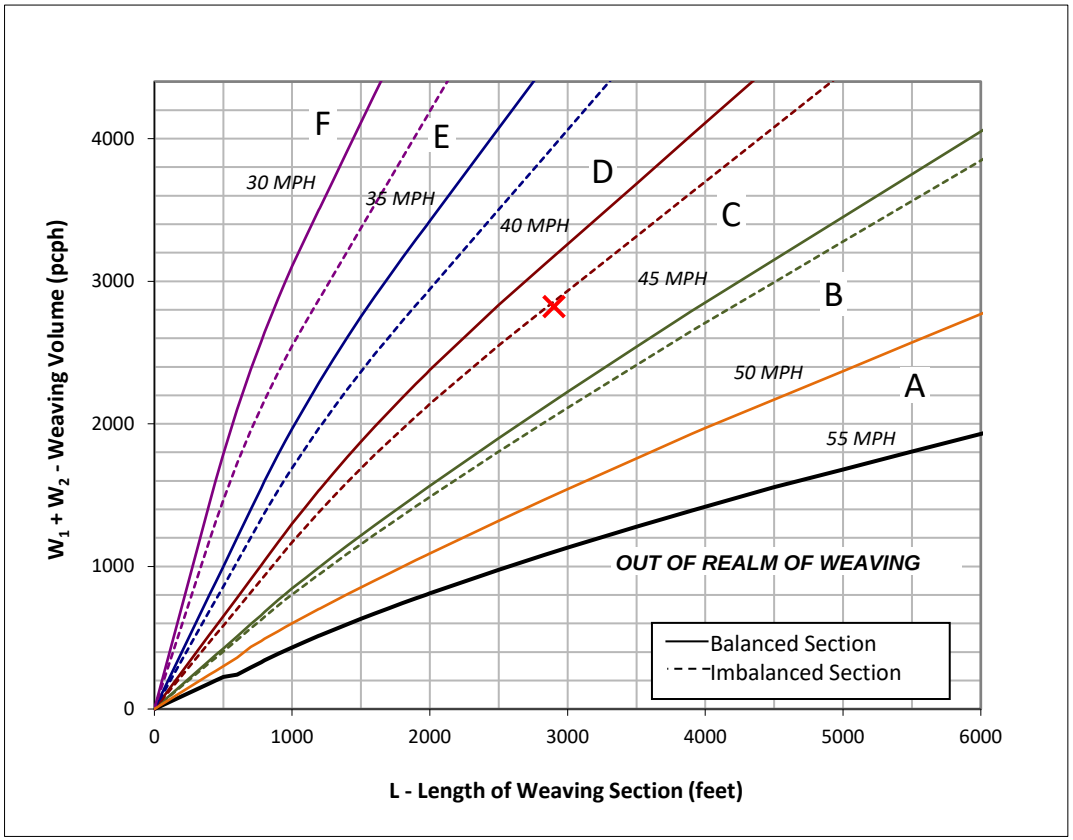
Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Level
Managed Lane Length, ft	5280	Percent Grade, %	-
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1062	Heavy Vehicle Adjustment Factor (f_{HV})	0.980
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1191
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.72
Passenger Car Equivalent (E_T)	2.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	52.0
Speed 2 (S_2), mi/h	1.4	Density (D_{ML}), pc/mi/ln	22.9
Speed 2 (S_3), mi/h	6.6	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

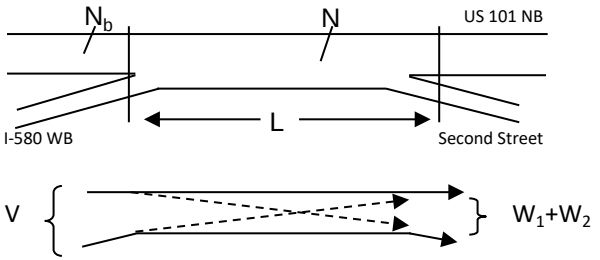
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Existing AM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,588	Volume (vph)*	1,722	Volume (vph)*	985
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	4%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	5,834	Volume (pcph)	1,798	Volume (pcph)	1,025



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	40.2
4. Weaving Intensity Factor (k)	2.51
5. Service Volume (SV, pcph) SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,477
6. Level of Service (LOS)	D

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4284	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1602
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.70
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	26.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	998	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1104
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.0
Speed 2 (S_2), mi/h	1.0	Density (D_{ML}), pc/mi/ln	18.7
Speed 2 (S_3), mi/h	5.0	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5655	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	2043
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.89
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	56.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	36.2
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	3/17/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5655	1371
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	4.40	3.72
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.958
Flow Rate (v_i), pc/h	6130	1556
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.89	0.74

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	60532.1	Density in Ramp Influence Area (D_R), pc/mi/ln	37.1
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.373
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2127
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	53.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.535	Outer Lanes Freeway Speed (S_O), mi/h	61.4
Flow in Lanes 1 and 2 (v_{12}), pc/h	4003	Ramp Junction Speed (S), mi/h	55.9
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	36.6
Level of Service (LOS)	E		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0

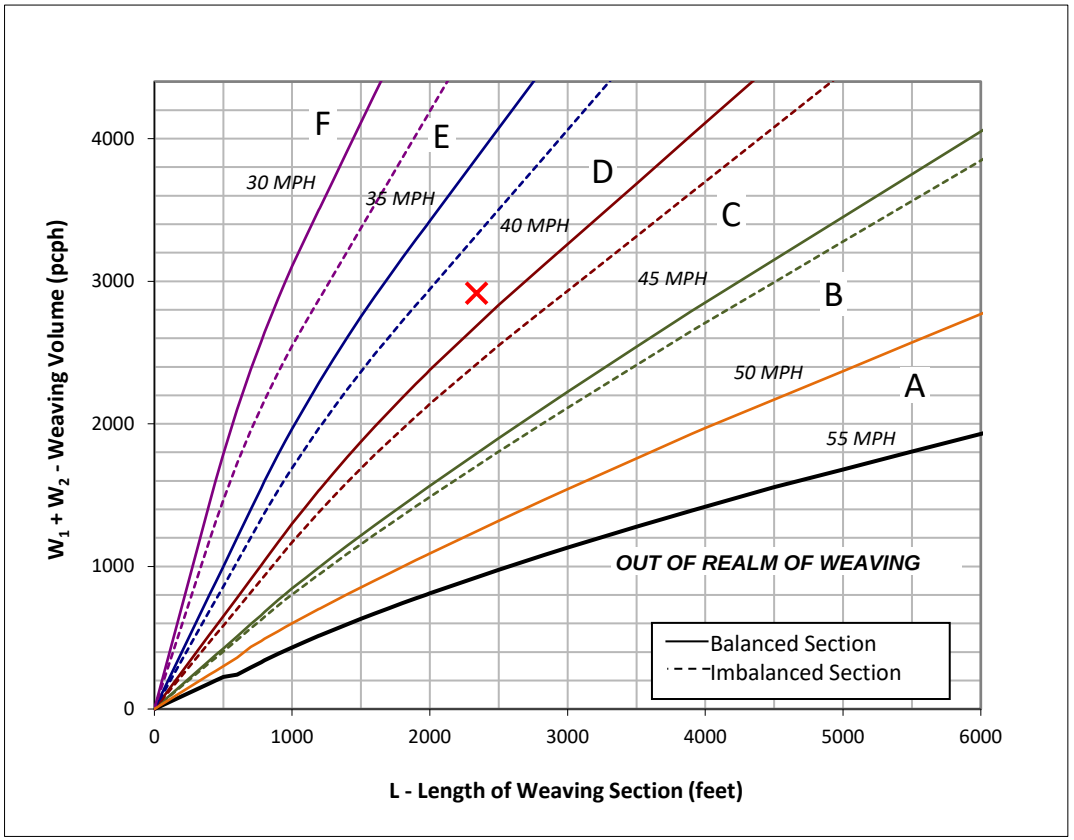
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

Leisch Method for Weaving Analysis

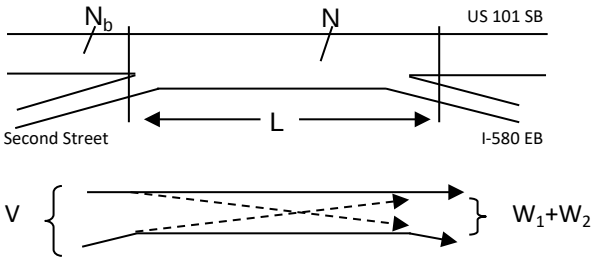
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Existing AM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,538	Volume (vph)*	1,646	Volume (vph)*	1,156
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	6,826	Volume (pcph)	1,690	Volume (pcph)	1,225



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.0
4. Weaving Intensity Factor (k)	2.59
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	2,192
6. Level of Service (LOS)	F

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6782	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1946
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.85
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	57.8
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	33.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1217	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	1342
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.81
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	57.7
Speed 2 (S_2), mi/h	2.3	Density (D_{ML}), pc/mi/ln	23.3
Speed 2 (S_3), mi/h	9.8	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4725	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1749
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.6
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	29.3
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	848	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	890
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.7
Speed 2 (S_2), mi/h	0.3	Density (D_{ML}), pc/mi/ln	14.9
Speed 2 (S_3), mi/h	2.1	Level of Service (LOS)	B

HCS7 Freeway Weaving Report

Project Information

Analyst	Fehr & Peers	Date	3/18/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 NB I-580 to Second Street Weave Segment		

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Short Length (L_S), ft	2900	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	1.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Volume (V_i), veh/h	3207	1518	598	1262
Peak Hour Factor (PHF)	0.98	0.96	0.96	0.96
Total Trucks, %	4.40	4.40	2.63	2.63
Heavy Vehicle Adjustment Factor (f_{HV})	0.958	0.958	0.974	0.974
Flow Rate (v_i), pc/h	3416	1651	640	1350

Weaving Flow Rate (v_w), pc/h	3001	Freeway Max Capacity (c_{IFL}), pc/h/ln	2300
Non-Weaving Flow Rate (v_{NW}), pc/h	4056	Density-Based Capacity (c_{IWL}), pc/h/ln	1989
Total Flow Rate (v), pc/h	7057	Demand Flow-Based Capacity (c_{IW}), pc/h	5647
Volume Ratio (VR)	0.425	Weaving Segment Capacity (c_W), veh/h	5410
Minimum Lane Change Rate (LC_{MIN}), lc/h	0	Adjusted Weaving Area Capacity (c_{wa}), veh/h	5410
Maximum Weaving Length (L_{MAX}), ft	6963	Volume-to-Capacity Ratio (v/c)	1.25

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	-	Average Weaving Speed (S_W), mi/h	-
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	-	Average Non-Weaving Speed (S_{NW}), mi/h	-
Weaving Lane Change Rate (LC_W), lc/h	-	Average Speed (S), mi/h	-
Total Lane Change Rate (LC_{All}), lc/h	-	Density (D), pc/mi/ln	-
Weaving Intensity Factor (W)	-	Level of Service (LOS)	F

Managed Lane Geometric Data

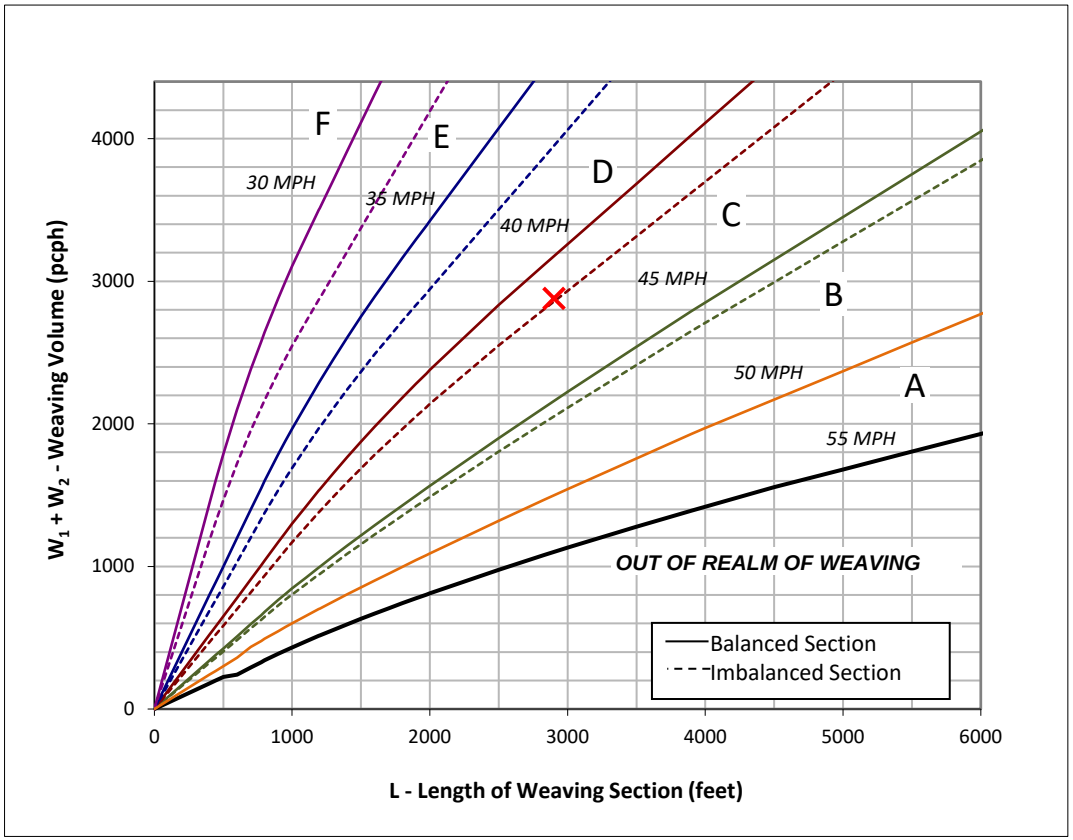
Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Level
Managed Lane Length, ft	5280	Percent Grade, %	-
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1182	Heavy Vehicle Adjustment Factor (f_{HV})	0.980
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	1218
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.74
Passenger Car Equivalent (E_T)	2.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	51.4
Speed 2 (S_2), mi/h	1.5	Density (D_{ML}), pc/mi/ln	23.7
Speed 2 (S_3), mi/h	7.1	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

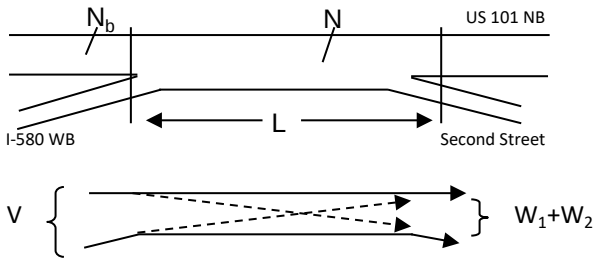
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Existing PM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,585	Volume (vph)*	1,518	Volume (vph)*	1,262
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	6,875	Volume (pcph)	1,585	Volume (pcph)	1,295



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.9
4. Weaving Intensity Factor (k)	2.53
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,771
6. Level of Service (LOS)	E

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	6/28/18
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3297	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1233
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	20.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	918	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1049
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.64
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.2
Speed 2 (S_2), mi/h	0.8	Density (D_{ML}), pc/mi/ln	17.7
Speed 2 (S_3), mi/h	4.2	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4943	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1786
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.78
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	30.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1377	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1555
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	56.0
Speed 2 (S_2), mi/h	4.0	Density (D_{ML}), pc/mi/ln	27.8
Speed 2 (S_3), mi/h	15.4	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	6/28/18
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	4943	1646
Peak Hour Factor (PHF)	0.97	0.96
Total Trucks, %	4.40	2.00
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.973
Flow Rate (v_i), pc/h	5358	1762
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.78	0.84

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	94060.4	Density in Ramp Influence Area (D_R), pc/mi/ln	34.7
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.392
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1636
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	52.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.545	Outer Lanes Freeway Speed (S_O), mi/h	63.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	3722	Ramp Junction Speed (S), mi/h	55.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	32.1
Level of Service (LOS)	D		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0

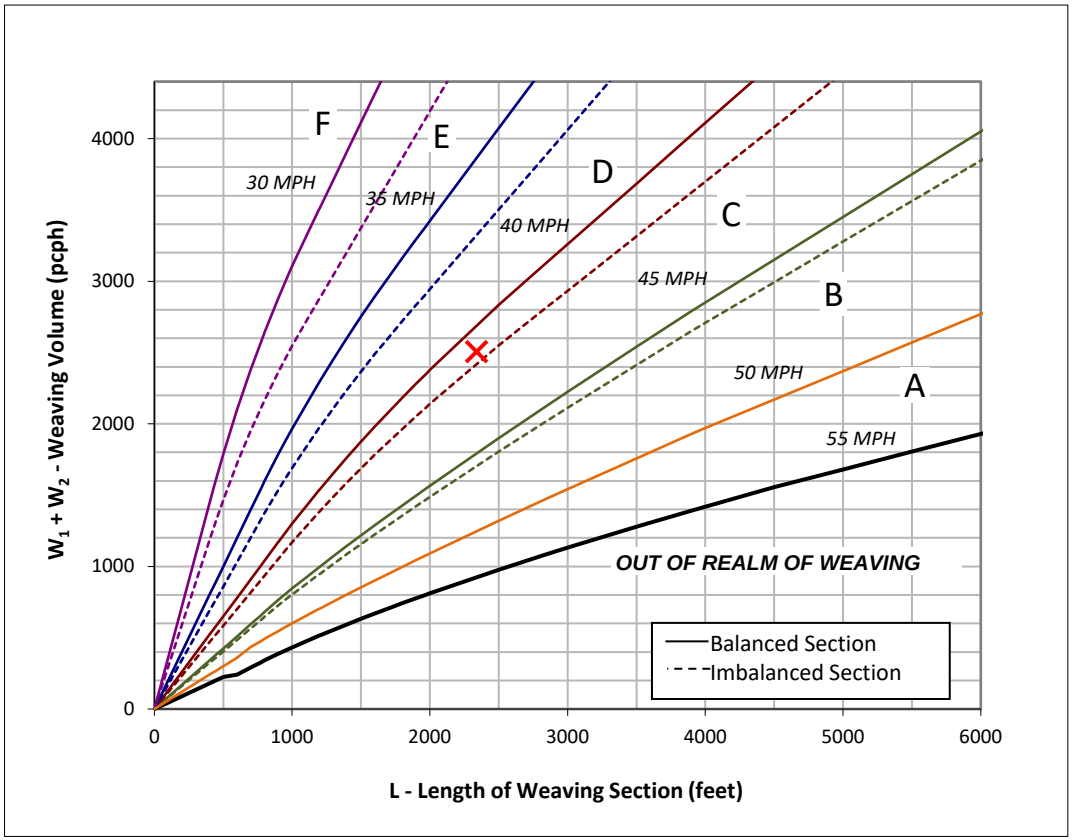
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1380	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1559
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	55.9
Speed 2 (S_2), mi/h	4.1	Density (D_{ML}), pc/mi/ln	27.9
Speed 2 (S_3), mi/h	15.5	Level of Service (LOS)	D

Leisch Method for Weaving Analysis

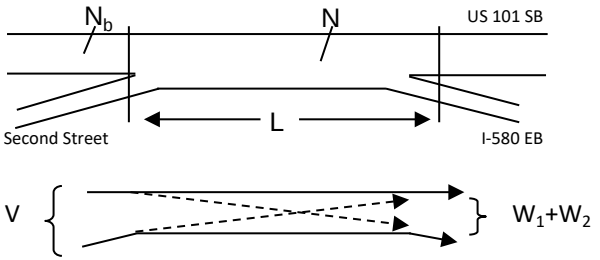
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Existing PM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,954	Volume (vph)*	961	Volume (vph)*	1,386
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	5,172	Volume (pcph)	985	Volume (pcph)	1,520



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	Y
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-". *If below the 55 MPH curve, out of the realm of weaving.*	
3. Interpolated Weaving Speed (S_w, mph)	41.0
4. Weaving Intensity Factor (k)	2.44
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,647
6. Level of Service (LOS)	E

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

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

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

Appendix B:
Baseline Conditions – Technical Calculations

Transportation Impact Study

for BioMarin 999 3rd Street

San Rafael Campus Expansion

April 5, 2019

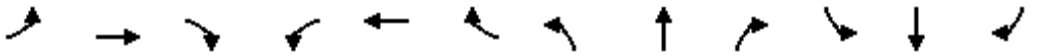
FEHR PEERS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	460	20	70	570	50	20	210	40	60	385	360
Future Volume (veh/h)	110	460	20	70	570	50	20	210	40	60	385	360
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1660	1660	1710	1660	1660	1710	1800	1678	1728	1800	1748	1728
Adj Flow Rate, veh/h	120	500	20	76	620	50	22	228	34	65	418	178
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	148	865	35	372	625	50	73	509	72	146	846	347
Arrive On Green	0.09	0.55	0.55	0.55	0.55	0.55	0.85	0.85	0.85	0.43	0.43	0.43
Sat Flow, veh/h	1581	1582	63	817	1512	122	49	1192	169	208	1983	813
Grp Volume(v), veh/h	120	0	520	76	0	670	284	0	0	358	0	303
Grp Sat Flow(s),veh/h/ln	1581	0	1646	817	0	1634	1410	0	0	1619	0	1385
Q Serve(g_s), s	5.6	0.0	15.7	4.4	0.0	30.5	0.0	0.0	0.0	2.8	0.0	12.1
Cycle Q Clear(g_c), s	5.6	0.0	15.7	10.1	0.0	30.5	3.5	0.0	0.0	11.4	0.0	12.1
Prop In Lane	1.00		0.04	1.00		0.07	0.08		0.12	0.18		0.59
Lane Grp Cap(c), veh/h	148	0	900	372	0	675	654	0	0	747	0	591
V/C Ratio(X)	0.81	0.00	0.58	0.20	0.00	0.99	0.43	0.00	0.00	0.48	0.00	0.51
Avail Cap(c_a), veh/h	148	0	900	372	0	675	654	0	0	747	0	591
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.72	0.00	0.72	0.87	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.4	0.0	11.3	14.0	0.0	16.8	3.4	0.0	0.0	15.5	0.0	15.8
Incr Delay (d2), s/veh	36.9	0.0	2.7	0.9	0.0	27.5	1.8	0.0	0.0	2.2	0.0	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	7.8	1.1	0.0	18.6	1.5	0.0	0.0	5.8	0.0	5.1
LnGrp Delay(d),s/veh	70.3	0.0	14.0	14.9	0.0	44.2	5.2	0.0	0.0	17.7	0.0	18.9
LnGrp LOS	E		B	B		D	A			B		B
Approach Vol, veh/h		640			746			284			661	
Approach Delay, s/veh		24.5			41.2			5.2			18.3	
Approach LOS		C			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.2		36.8	10.0	35.2		36.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 41		25.4	7.0	* 31		25.4
Max Q Clear Time (g_c+I1), s		17.7		5.5	7.6	32.5		14.1
Green Ext Time (p_c), s		5.1		2.4	0.0	0.0		4.5

Intersection Summary	
HCM 2010 Ctrl Delay	25.8
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	80	40	220	0	0	0	0	220	970	465
Future Volume (vph)	0	490	80	40	220	0	0	0	0	220	970	465
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.97
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.98			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2715			1766						2961	1302
Flt Permitted		1.00			0.86						0.99	1.00
Satd. Flow (perm)		2715			1534						2961	1302
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	533	87	43	239	0	0	0	0	239	1054	505
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	603	0	0	282	0	0	0	0	0	1293	505
Confl. Peds. (#/hr)	15		22	22		15			16			1
Confl. Bikes (#/hr)			3			2			1			3
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1187			670						1318	458
v/s Ratio Prot		c0.22									c0.44	
v/s Ratio Perm					0.18							c0.39
v/c Ratio		0.51			0.42						0.98	1.10
Uniform Delay, d1		15.3			14.6						20.5	24.3
Progression Factor		0.60			1.45						1.00	1.00
Incremental Delay, d2		1.3			1.6						20.7	72.9
Delay (s)		10.5			22.6						41.1	97.2
Level of Service		B			C						D	F
Approach Delay (s)		10.5			22.6			0.0			56.9	
Approach LOS		B			C			A			E	

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

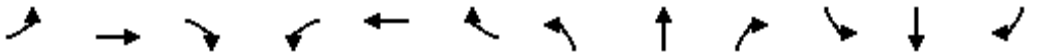
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	380	20	310	160	320	5	110	1065	130	40
Future Volume (vph)	380	20	310	160	320	5	110	1065	130	40
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1494	1794	1615	1471			3428	1295	
Flt Permitted		0.60	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		938	1794	1615	1471			3428	1295	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	22	337	174	348	5	120	1158	141	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0
Lane Group Flow (vph)	0	435	337	174	353	0	0	1278	140	0
Confl. Peds. (#/hr)							13			6
Confl. Bikes (#/hr)					2	2				2
Parking (#/hr)				0				2		
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Effective Green, g (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Actuated g/C Ratio		0.45	0.45	0.25	0.25			0.44	0.44	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		502	808	404	368			1499	566	
v/s Ratio Prot		c0.12	0.19	0.11	c0.24					
v/s Ratio Perm		0.27						0.37	0.11	
v/c Ratio		0.87	0.42	0.43	0.96			0.85	0.25	
Uniform Delay, d1		19.1	13.9	23.6	27.7			18.9	13.3	
Progression Factor		0.98	0.94	1.00	1.00			0.75	0.67	
Incremental Delay, d2		14.1	1.2	3.3	37.7			3.0	0.5	
Delay (s)		32.9	14.3	26.9	65.4			17.2	9.4	
Level of Service		C	B	C	E			B	A	
Approach Delay (s)			24.8	52.7				16.2		
Approach LOS			C	D				B		

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	300	40	70	280	30	10	220	45	40	395	40
Future Volume (veh/h)	30	300	40	70	280	30	10	220	45	40	395	40
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1398	1545	1530	1398	1485	1530	1440	1485	1469	1440	1485	1469
Adj Flow Rate, veh/h	33	326	36	76	304	28	11	239	39	43	429	39
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	243	534	59	257	524	48	58	523	83	83	533	47
Arrive On Green	0.39	0.39	0.39	0.13	0.13	0.13	0.97	0.97	0.97	0.97	0.97	0.97
Sat Flow, veh/h	825	1361	150	802	1336	123	16	1077	171	63	1098	96
Grp Volume(v), veh/h	33	0	362	76	0	332	289	0	0	511	0	0
Grp Sat Flow(s),veh/h/ln	825	0	1511	802	0	1459	1264	0	0	1257	0	0
Q Serve(g_s), s	2.6	0.0	14.4	6.9	0.0	16.1	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.6	0.0	14.4	21.2	0.0	16.1	0.9	0.0	0.0	4.1	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.08	0.04		0.13	0.08		0.08
Lane Grp Cap(c), veh/h	243	0	592	257	0	572	663	0	0	662	0	0
V/C Ratio(X)	0.14	0.00	0.61	0.30	0.00	0.58	0.44	0.00	0.00	0.77	0.00	0.00
Avail Cap(c_a), veh/h	243	0	592	257	0	572	663	0	0	662	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	0.85	0.00	0.00	0.52	0.00	0.00
Uniform Delay (d), s/veh	26.4	0.0	18.2	36.0	0.0	26.8	0.6	0.0	0.0	0.6	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	4.6	2.8	0.0	4.0	1.8	0.0	0.0	4.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	6.7	1.7	0.0	7.1	0.6	0.0	0.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	27.6	0.0	22.9	38.8	0.0	30.9	2.3	0.0	0.0	5.2	0.0	0.0
LnGrp LOS	C		C	D		C	A			A		
Approach Vol, veh/h		395			408			289			511	
Approach Delay, s/veh		23.3			32.3			2.3			5.2	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		34.0		41.0		34.0		41.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		29.4		36.4		29.4		36.4
Max Q Clear Time (g_c+I1), s		20.6		2.9		23.2		6.1
Green Ext Time (p_c), s		1.2		1.3		1.0		2.5

Intersection Summary	
HCM 2010 Ctrl Delay	16.0
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	240	165	40	245	0	0	0	0	50	925	115
Future Volume (vph)	0	240	165	40	245	0	0	0	0	50	925	115
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1665			1769						4117	1127
Flt Permitted		1.00			0.91						1.00	1.00
Satd. Flow (perm)		1665			1612						4117	1127
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	261	179	43	266	0	0	0	0	54	1005	125
RTOR Reduction (vph)	0	28	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	412	0	0	309	0	0	0	0	0	1059	125
Confl. Peds. (#/hr)			15	15		14			22	22		10
Confl. Bikes (#/hr)			4			2			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		728			704						1833	396
v/s Ratio Prot		c0.25										
v/s Ratio Perm					0.19						0.26	0.11
v/c Ratio		0.57			0.44						0.58	0.32
Uniform Delay, d1		15.8			14.7						15.5	17.7
Progression Factor		0.43			1.25						0.18	0.26
Incremental Delay, d2		3.1			1.2						0.5	0.8
Delay (s)		9.8			19.5						3.3	5.3
Level of Service		A			B						A	A
Approach Delay (s)		9.8			19.5			0.0			3.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	100	0	0	155	120	155	1115	10	0	0	0
Future Volume (veh/h)	140	100	0	0	155	120	155	1115	10	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1620	1573	1620			
Adj Flow Rate, veh/h	152	109	0	0	168	90	168	1212	10			
Adj No. of Lanes	1	1	0	0	1	0	0	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0			
Cap, veh/h	237	491	0	0	265	142	181	1378	12			
Arrive On Green	0.10	0.10	0.00	0.00	0.31	0.31	0.19	0.19	0.19			
Sat Flow, veh/h	993	1573	0	0	849	455	321	2438	21			
Grp Volume(v), veh/h	152	109	0	0	0	258	725	0	665			
Grp Sat Flow(s),veh/h/ln	993	1573	0	0	0	1304	1384	0	1396			
Q Serve(g_s), s	10.7	4.8	0.0	0.0	0.0	12.7	38.7	0.0	34.5			
Cycle Q Clear(g_c), s	23.4	4.8	0.0	0.0	0.0	12.7	38.7	0.0	34.5			
Prop In Lane	1.00		0.00	0.00		0.35	0.23		0.02			
Lane Grp Cap(c), veh/h	237	491	0	0	0	407	782	0	789			
V/C Ratio(X)	0.64	0.22	0.00	0.00	0.00	0.63	0.93	0.00	0.84			
Avail Cap(c_a), veh/h	237	491	0	0	0	407	782	0	789			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	40.4	25.3	0.0	0.0	0.0	22.1	29.0	0.0	27.3			
Incr Delay (d2), s/veh	12.5	1.0	0.0	0.0	0.0	7.3	18.7	0.0	10.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	2.2	0.0	0.0	0.0	5.4	18.9	0.0	15.6			
LnGrp Delay(d),s/veh	52.9	26.3	0.0	0.0	0.0	29.5	47.6	0.0	37.9			
LnGrp LOS	D	C				C	D		D			
Approach Vol, veh/h		261			258			1390				
Approach Delay, s/veh		41.8			29.5			43.0				
Approach LOS		D			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		23.4		42.4		23.4		
Max Q Clear Time (g_c+I1), s		25.4		40.7		14.7		
Green Ext Time (p_c), s		0.0		1.2		0.7		

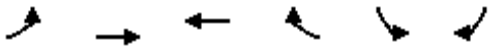
Intersection Summary	
HCM 2010 Ctrl Delay	41.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	260	20	70	310	30	20	225	65	65	365	80
Future Volume (veh/h)	30	260	20	70	310	30	20	225	65	65	365	80
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)	0.99		0.92	0.98		0.92	0.97		0.91	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1573	1510	1620	1573	1573	1620	1620	1573	1555	1620	1573	1555
Adj Flow Rate, veh/h	33	283	18	76	337	28	22	245	57	71	397	77
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	238	536	34	309	546	45	71	517	115	113	494	91
Arrive On Green	0.38	0.38	0.38	0.13	0.13	0.13	0.17	0.17	0.17	1.00	1.00	1.00
Sat Flow, veh/h	894	1396	89	937	1422	118	40	1027	228	117	980	181
Grp Volume(v), veh/h	33	0	301	76	0	365	324	0	0	545	0	0
Grp Sat Flow(s),veh/h/ln	894	0	1485	937	0	1540	1294	0	0	1278	0	0
Q Serve(g_s), s	2.4	0.0	11.7	5.8	0.0	16.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	19.3	0.0	11.7	17.5	0.0	16.8	16.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.08	0.07		0.18	0.13		0.14
Lane Grp Cap(c), veh/h	238	0	570	309	0	591	703	0	0	698	0	0
V/C Ratio(X)	0.14	0.00	0.53	0.25	0.00	0.62	0.46	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	238	0	570	309	0	591	703	0	0	698	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.50	0.00	0.00	0.47	0.00	0.00
Uniform Delay (d), s/veh	27.5	0.0	17.8	33.4	0.0	27.5	22.4	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	3.5	1.7	0.0	4.4	1.1	0.0	0.0	4.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	5.3	1.6	0.0	7.9	6.3	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	28.7	0.0	21.3	35.2	0.0	31.9	23.5	0.0	0.0	4.2	0.0	0.0
LnGrp LOS	C		C	D		C	C			A		
Approach Vol, veh/h		334			441			324			545	
Approach Delay, s/veh		22.1			32.5			23.5			4.2	
Approach LOS		C			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		42.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 29		* 38		* 29		* 38
Max Q Clear Time (g_c+I1), s		21.3		18.5		19.5		2.0
Green Ext Time (p_c), s		1.6		2.8		2.6		6.6

Intersection Summary	
HCM 2010 Ctrl Delay	19.2
HCM 2010 LOS	B

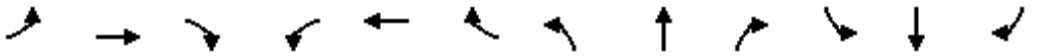
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	410	380	35	0	35
Future Volume (vph)	0	410	380	35	0	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6	5.6			5.2
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.99			0.87
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.99			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1573	1540			1188
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1573	1540			1188
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	413	38	0	38
RTOR Reduction (vph)	0	0	4	0	0	32
Lane Group Flow (vph)	0	446	447	0	0	6
Confl. Peds. (#/hr)				39		46
Confl. Bikes (#/hr)				4		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		50.7	51.8			12.4
Effective Green, g (s)		50.7	51.8			12.4
Actuated g/C Ratio		0.68	0.69			0.17
Clearance Time (s)						5.2
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1063	1063			196
v/s Ratio Prot		c0.28	c0.29			
v/s Ratio Perm						0.01
v/c Ratio		0.42	0.42			0.03
Uniform Delay, d1		5.5	5.1			26.3
Progression Factor		1.63	0.49			1.00
Incremental Delay, d2		0.2	0.2			0.1
Delay (s)		9.2	2.6			26.3
Level of Service		A	A			C
Approach Delay (s)		9.2	2.6		26.3	
Approach LOS		A	A		C	

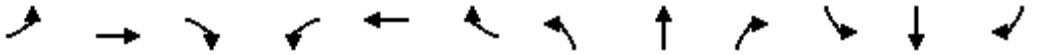
Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	285	130	185	285	0	0	0	0	105	825	200
Future Volume (vph)	0	285	130	185	285	0	0	0	0	105	825	200
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	0.89
Flpb, ped/bikes		1.00	1.00	0.98	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1625	1180	1606	1520						4262	1185
Flt Permitted		1.00	1.00	0.49	1.00						0.99	1.00
Satd. Flow (perm)		1625	1180	832	1520						4262	1185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	310	141	201	310	0	0	0	0	114	897	217
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	310	106	201	310	0	0	0	0	0	1011	217
Confl. Peds. (#/hr)			40	40		22			9	9		30
Confl. Bikes (#/hr)			8			4						2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		32.8	32.8	32.8	32.8						33.4	26.4
Effective Green, g (s)		32.8	32.8	32.8	32.8						33.4	26.4
Actuated g/C Ratio		0.44	0.44	0.44	0.44						0.45	0.35
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		710	516	363	664						1898	417
v/s Ratio Prot		0.19			0.20							
v/s Ratio Perm			0.09	c0.24							0.24	0.18
v/c Ratio		0.44	0.21	0.55	0.47						0.53	0.52
Uniform Delay, d1		14.7	13.0	15.7	14.9						15.1	19.3
Progression Factor		0.40	0.23	1.01	1.03						0.35	0.45
Incremental Delay, d2		1.8	0.8	4.4	1.7						0.9	3.8
Delay (s)		7.6	3.8	20.3	17.2						6.2	12.4
Level of Service		A	A	C	B						A	B
Approach Delay (s)		6.4			18.4			0.0			7.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	230	0	0	345	70	130	1080	50	0	0	0
Future Volume (veh/h)	160	230	0	0	345	70	130	1080	50	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1510	1573	1620			
Adj Flow Rate, veh/h	174	250	0	0	375	65	141	1174	50			
Adj No. of Lanes	1	1	0	0	1	0	1	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	152	604	0	0	443	77	725	1389	59			
Arrive On Green	0.77	0.77	0.00	0.00	0.13	0.13	0.17	0.17	0.17			
Sat Flow, veh/h	842	1573	0	0	1153	200	1438	2755	117			
Grp Volume(v), veh/h	174	250	0	0	0	440	141	636	588			
Grp Sat Flow(s),veh/h/ln	842	1573	0	0	0	1353	1438	1494	1378			
Q Serve(g_s), s	4.9	4.1	0.0	0.0	0.0	23.9	6.3	31.0	31.0			
Cycle Q Clear(g_c), s	28.8	4.1	0.0	0.0	0.0	23.9	6.3	31.0	31.0			
Prop In Lane	1.00		0.00	0.00		0.15	1.00		0.09			
Lane Grp Cap(c), veh/h	152	604	0	0	0	520	725	753	695			
V/C Ratio(X)	1.15	0.41	0.00	0.00	0.00	0.85	0.19	0.85	0.85			
Avail Cap(c_a), veh/h	152	604	0	0	0	520	725	753	695			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.00	1.00	0.36	0.36	0.36			
Uniform Delay (d), s/veh	22.2	5.8	0.0	0.0	0.0	30.6	18.1	28.4	28.4			
Incr Delay (d2), s/veh	114.7	1.9	0.0	0.0	0.0	15.6	0.2	4.4	4.7			
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	7.9	1.9	0.0	0.0	0.0	11.2	2.6	13.8	12.8			
LnGrp Delay(d),s/veh	136.9	7.7	0.0	0.0	0.0	46.2	18.4	32.8	33.2			
LnGrp LOS	F	A				D	B	C	C			
Approach Vol, veh/h		424			440			1365				
Approach Delay, s/veh		60.7			46.2			31.5				
Approach LOS		E			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 29		* 38		* 29		
Max Q Clear Time (g_c+I1), s		30.8		33.0		25.9		
Green Ext Time (p_c), s		0.0		2.8		0.6		

Intersection Summary	
HCM 2010 Ctrl Delay	39.9
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	295	1135	0	0	0	0	0	230	30
Future Volume (veh/h)	0	0	0	295	1135	0	0	0	0	0	230	30
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.99
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1530	1485	0				0	1485	1530
Adj Flow Rate, veh/h				321	1234	0				0	250	18
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				502	1718	0				0	786	56
Arrive On Green				0.19	0.19	0.00				0.00	0.31	0.31
Sat Flow, veh/h				747	3133	0				0	2593	180
Grp Volume(v), veh/h				558	997	0				0	139	129
Grp Sat Flow(s),veh/h/ln				1299	1230	0				0	1411	1288
Q Serve(g_s), s				30.5	28.5	0.0				0.0	5.6	5.7
Cycle Q Clear(g_c), s				30.5	28.5	0.0				0.0	5.6	5.7
Prop In Lane				0.58		0.00				0.00		0.14
Lane Grp Cap(c), veh/h				817	1404	0				0	440	402
V/C Ratio(X)				0.68	0.71	0.00				0.00	0.32	0.32
Avail Cap(c_a), veh/h				817	1404	0				0	440	402
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				25.4	24.6	0.0				0.0	19.7	19.7
Incr Delay (d2), s/veh				4.6	3.1	0.0				0.0	1.9	2.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.0	10.3	0.0				0.0	2.4	2.3
LnGrp Delay(d),s/veh				30.0	27.7	0.0				0.0	21.6	21.8
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1555						268	
Approach Delay, s/veh					28.5						21.7	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		47.0		28.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 43		23.4				
Max Q Clear Time (g_c+I1), s		32.5		7.7				
Green Ext Time (p_c), s		5.7		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

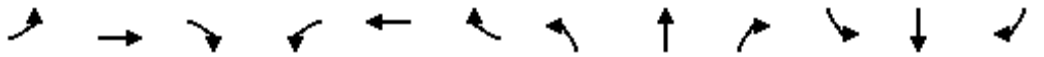
Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1315	110	100	235	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1315	110	100	235	0	0	0	0
Number				5	2	12	7	4	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				0	1398	1398	1440	1398	0			
Adj Flow Rate, veh/h				0	1429	82	109	255	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	2229	679	266	553	0			
Arrive On Green				0.00	0.19	0.19	0.10	0.10	0.00			
Sat Flow, veh/h				0	3943	1163	630	1883	0			
Grp Volume(v), veh/h				0	1429	82	197	167	0			
Grp Sat Flow(s),veh/h/ln				0	1272	1163	1241	1209	0			
Q Serve(g_s), s				0.0	25.9	4.4	9.6	9.7	0.0			
Cycle Q Clear(g_c), s				0.0	25.9	4.4	11.2	9.7	0.0			
Prop In Lane				0.00		1.00	0.55		0.00			
Lane Grp Cap(c), veh/h				0	2229	679	452	367	0			
V/C Ratio(X)				0.00	0.64	0.12	0.44	0.45	0.00			
Avail Cap(c_a), veh/h				0	2229	679	452	367	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	23.0	14.4	28.4	27.9	0.0			
Incr Delay (d2), s/veh				0.0	1.4	0.4	3.1	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				0.0	9.4	1.5	4.3	3.7	0.0			
LnGrp Delay(d),s/veh				0.0	24.5	14.7	31.5	31.9	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1511			364				
Approach Delay, s/veh					23.9			31.7				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 44		* 23				
Max Q Clear Time (g_c+I1), s		27.9		13.2				
Green Ext Time (p_c), s		7.6		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	1370	0	0	0	0	0	190	50
Future Volume (veh/h)	0	0	0	90	1370	0	0	0	0	0	190	50
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.87
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1398	0				0	1398	1440
Adj Flow Rate, veh/h				98	1489	0				0	207	25
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				167	2129	0				0	616	72
Arrive On Green				0.20	0.20	0.00				0.00	0.28	0.28
Sat Flow, veh/h				182	3601	0				0	2290	261
Grp Volume(v), veh/h				589	998	0				0	122	110
Grp Sat Flow(s),veh/h/ln				1353	1158	0				0	1328	1153
Q Serve(g_s), s				21.8	30.1	0.0				0.0	5.5	5.7
Cycle Q Clear(g_c), s				30.3	30.1	0.0				0.0	5.5	5.7
Prop In Lane				0.17		0.00				0.00		0.23
Lane Grp Cap(c), veh/h				882	1414	0				0	368	320
V/C Ratio(X)				0.67	0.71	0.00				0.00	0.33	0.34
Avail Cap(c_a), veh/h				882	1414	0				0	368	320
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.7	23.7	0.0				0.0	21.6	21.7
Incr Delay (d2), s/veh				4.0	3.0	0.0				0.0	2.4	2.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.4	10.2	0.0				0.0	2.2	2.1
LnGrp Delay(d),s/veh				27.7	26.6	0.0				0.0	24.0	24.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1587						232	
Approach Delay, s/veh					27.0						24.3	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		50.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 46		* 21				
Max Q Clear Time (g_c+I1), s		32.3		7.7				
Green Ext Time (p_c), s		6.9		0.7				

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	40	1225	80	195	120	0	0	130	30
Future Volume (veh/h)	0	0	0	40	1225	80	195	120	0	0	130	30
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.97		1.00	1.00		0.93
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				43	1332	77	212	130	0	0	141	21
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				72	2356	141	371	685	0	0	358	53
Arrive On Green				0.17	0.17	0.17	0.02	0.12	0.00	0.00	0.26	0.26
Sat Flow, veh/h				140	4590	275	1748	1835	0	0	1375	205
Grp Volume(v), veh/h				537	446	469	212	130	0	0	0	162
Grp Sat Flow(s),veh/h/ln				1741	1590	1674	1748	1835	0	0	0	1580
Q Serve(g_s), s				21.4	19.3	19.3	0.0	4.8	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s				21.4	19.3	19.3	0.0	4.8	0.0	0.0	0.0	6.3
Prop In Lane				0.08		0.16	1.00		0.00	0.00		0.13
Lane Grp Cap(c), veh/h				894	816	859	371	685	0	0	0	411
V/C Ratio(X)				0.60	0.55	0.55	0.57	0.19	0.00	0.00	0.00	0.39
Avail Cap(c_a), veh/h				894	816	859	371	685	0	0	0	411
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				24.0	23.2	23.2	30.1	22.7	0.0	0.0	0.0	22.9
Incr Delay (d2), s/veh				3.0	2.6	2.5	6.2	0.6	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				11.0	9.1	9.5	5.0	2.5	0.0	0.0	0.0	3.1
LnGrp Delay(d),s/veh				27.0	25.8	25.6	36.3	23.3	0.0	0.0	0.0	25.7
LnGrp LOS				C	C	C	D	C				C
Approach Vol, veh/h					1452			342			162	
Approach Delay, s/veh					26.2			31.4			25.7	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.0	24.0		43.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			4.0	19.5		38.5		28.0
Max Q Clear Time (g_c+I1), s			2.0	8.3		23.4		6.8
Green Ext Time (p_c), s			0.3	0.8		10.6		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	27.1
HCM 2010 LOS	C

SimTraffic Post-Processor **BioMarin**
Average Results from 10 Runs **Baseline Conditions**
Volume and Delay by Movement **AM Peak Hour**

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	20	17	82.8%	14.4	4.8	B
	Through						
	Right Turn						
	Subtotal	20	17	82.8%	14.4	4.8	B
SB	Left Turn						
	Through						
	Right Turn	5	5	95.7%	18.1	15.5	C
	Subtotal	5	5	95.7%	18.1	15.5	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	30	26	87.1%	1.8	0.7	A
	Through	1,320	1,283	97.2%	1.7	0.3	A
	Right Turn	5	4	81.0%	0.7	1.1	A
	Subtotal	1,355	1,313	96.9%	1.7	0.3	A
Total		1,380	1,335	96.7%	1.9	0.3	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	80	62	77.3%	15.1	5.2	B
	Through	10	9	92.0%	8.9	9.4	A
	Right Turn						
	Subtotal	90	71	78.9%	14.4	5.1	B
SB	Left Turn						
	Through	40	40	99.4%	20.9	12.0	C
	Right Turn	10	7	69.9%	8.6	12.7	A
	Subtotal	50	47	93.5%	19.1	10.7	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	315	302	95.8%	6.8	0.7	A
	Through	1,280	1,262	98.6%	4.8	0.5	A
	Right Turn	30	36	121.4%	4.6	1.1	A
	Subtotal	1,625	1,600	98.5%	5.1	0.4	A
Total		1,765	1,718	97.3%	5.9	0.7	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	160	1515	55	30	195	0	0	280	160
Future Volume (veh/h)	0	0	0	160	1515	55	30	195	0	0	280	160
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.92	1.00		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1620	1573	1620	1620	1573	0	0	1510	1555
Adj Flow Rate, veh/h				174	1647	56	33	212	0	0	304	164
Adj No. of Lanes				0	3	0	0	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				218	2205	77	54	219	0	0	257	139
Arrive On Green				0.18	0.18	0.18	0.11	0.11	0.00	0.00	0.11	0.11
Sat Flow, veh/h				394	3985	139	0	669	0	0	786	424
Grp Volume(v), veh/h				686	574	617	245	0	0	0	0	468
Grp Sat Flow(s),veh/h/ln				1553	1431	1534	669	0	0	0	0	1210
Q Serve(g_s), s				31.7	28.4	28.4	0.0	0.0	0.0	0.0	0.0	24.5
Cycle Q Clear(g_c), s				31.7	28.4	28.4	24.5	0.0	0.0	0.0	0.0	24.5
Prop In Lane				0.25		0.09	0.13		0.00	0.00		0.35
Lane Grp Cap(c), veh/h				859	792	849	273	0	0	0	0	395
V/C Ratio(X)				0.80	0.73	0.73	0.90	0.00	0.00	0.00	0.00	1.18
Avail Cap(c_a), veh/h				859	792	849	273	0	0	0	0	395
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				26.6	25.3	25.3	28.5	0.0	0.0	0.0	0.0	33.5
Incr Delay (d2), s/veh				7.6	5.7	5.4	33.5	0.0	0.0	0.0	0.0	105.7
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				15.5	12.5	13.3	7.6	0.0	0.0	0.0	0.0	19.8
LnGrp Delay(d),s/veh				34.3	31.0	30.7	62.0	0.0	0.0	0.0	0.0	139.1
LnGrp LOS				C	C	C	E					F
Approach Vol, veh/h					1877			245			468	
Approach Delay, s/veh					32.1			62.0			139.1	
Approach LOS					C			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.0		46.0		29.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				24.5		41.5		24.5
Max Q Clear Time (g_c+I1), s				26.5		33.7		26.5
Green Ext Time (p_c), s				0.0		5.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	235	1655	20	50	50	0	0	50	10
Future Volume (vph)	0	0	0	235	1655	20	50	50	0	0	50	10
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6			7.6	
Lane Util. Factor					0.91		1.00	1.00			1.00	
Frpb, ped/bikes					1.00		1.00	1.00			0.99	
Flpb, ped/bikes					0.98		0.93	1.00			1.00	
Frt					1.00		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3707		1060	1237			1191	
Flt Permitted					0.99		0.71	1.00			1.00	
Satd. Flow (perm)					3707		797	1237			1191	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	255	1799	22	54	54	0	0	54	11
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	2075	0	54	54	0	0	57	0
Confl. Peds. (#/hr)			73	73		38	49		63			49
Confl. Bikes (#/hr)						2			2			2
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			4			8	
Permitted Phases				6			4					
Actuated Green, G (s)					51.5		19.3	19.3			19.3	
Effective Green, g (s)					51.5		19.3	19.3			19.3	
Actuated g/C Ratio					0.57		0.21	0.21			0.21	
Clearance Time (s)					11.6		7.6	7.6			7.6	
Lane Grp Cap (vph)					2121		170	265			255	
v/s Ratio Prot								0.04			0.05	
v/s Ratio Perm					0.56		c0.07					
v/c Ratio					0.98		0.32	0.20			0.22	
Uniform Delay, d1					18.7		29.8	29.0			29.2	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					15.0		4.9	1.7			2.0	
Delay (s)					33.7		34.7	30.8			31.2	
Level of Service					C		C	C			C	
Approach Delay (s)		0.0			33.7			32.7			31.2	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	141.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	420	1465	0	0	0	0	0	750	390
Future Volume (veh/h)	0	0	0	420	1465	0	0	0	0	0	750	390
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.83
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1545	1573	0				0	1573	1485
Adj Flow Rate, veh/h				457	1592	0				0	815	414
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				763	2139	0				0	1832	446
Arrive On Green				0.15	0.15	0.00				0.00	0.14	0.14
Sat Flow, veh/h				1471	4718	0				0	4435	1045
Grp Volume(v), veh/h				457	1592	0				0	815	414
Grp Sat Flow(s),veh/h/ln				1471	1573	0				0	1431	1045
Q Serve(g_s), s				22.1	24.2	0.0				0.0	13.0	29.4
Cycle Q Clear(g_c), s				22.1	24.2	0.0				0.0	13.0	29.4
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				763	2139	0				0	1832	446
V/C Ratio(X)				0.60	0.74	0.00				0.00	0.44	0.93
Avail Cap(c_a), veh/h				763	2139	0				0	1832	446
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				26.8	27.7	0.0				0.0	24.1	31.1
Incr Delay (d2), s/veh				3.5	2.4	0.0				0.0	0.8	28.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.7	11.0	0.0				0.0	5.3	12.0
LnGrp Delay(d),s/veh				30.3	30.1	0.0				0.0	24.9	59.1
LnGrp LOS				C	C						C	E
Approach Vol, veh/h					2049						1229	
Approach Delay, s/veh					30.2						36.4	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						38.0		37.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						34.0		32.0
Max Q Clear Time (g_c+I1), s						26.2		31.4
Green Ext Time (p_c), s						5.8		0.4

Intersection Summary		
HCM 2010 Ctrl Delay		32.5
HCM 2010 LOS		C

Notes
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1020	120	875	1145	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1020	120	875	1145	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1485	1485	1398	1398	0			
Adj Flow Rate, veh/h				0	1109	98	960	1232	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	1379	403	1438	1510	0			
Arrive On Green				0.00	0.34	0.34	0.18	0.18	0.00			
Sat Flow, veh/h				0	4189	1186	2663	2796	0			
Grp Volume(v), veh/h				0	1109	98	960	1232	0			
Grp Sat Flow(s),veh/h/ln				0	1352	1186	1331	1398	0			
Q Serve(g_s), s				0.0	18.6	4.5	25.2	31.8	0.0			
Cycle Q Clear(g_c), s				0.0	18.6	4.5	25.2	31.8	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1379	403	1438	1510	0			
V/C Ratio(X)				0.00	0.80	0.24	0.67	0.82	0.00			
Avail Cap(c_a), veh/h				0	1379	403	1438	1510	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.5	17.8	24.5	27.2	0.0			
Incr Delay (d2), s/veh				0.0	5.1	1.4	2.5	5.0	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				0.0	7.5	1.6	9.8	13.4	0.0			
LnGrp Delay(d),s/veh				0.0	27.6	19.2	27.0	32.2	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1207			2192				
Approach Delay, s/veh					26.9			29.9				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				45.0		30.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				40.5		25.5		
Max Q Clear Time (g_c+I1), s				33.8		20.6		
Green Ext Time (p_c), s				5.3		2.7		

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1920	80	0	0	0	0	0	255	70	450	0
Future Volume (veh/h)	0	1920	80	0	0	0	0	0	255	70	450	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	0.99		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	0	1660	1710				0	1573	1620	1748	1748	0
Adj Flow Rate, veh/h	0	2087	80				0	0	261	76	489	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1126	1125	1488	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1323	1095	1748	0
Grp Volume(v), veh/h		0.0					0	0	261	76	489	0
Grp Sat Flow(s),veh/h/ln							0	0	1323	1095	1748	0
Q Serve(g_s), s							0.0	0.0	1.1	1.6	6.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	1.1	2.7	6.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1126	1125	1488	0
V/C Ratio(X)							0.00	0.00	0.23	0.07	0.33	0.00
Avail Cap(c_a), veh/h							0	0	1126	1125	1488	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	3.1	4.1	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.5	0.1	0.6	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.5	0.5	3.6	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.9	3.2	4.7	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								261			565	
Approach Delay, s/veh								0.9			4.5	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				26.4				26.4
Max Q Clear Time (g_c+I1), s				8.9				3.1
Green Ext Time (p_c), s				1.4				0.7

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2135	0	0	0	0	0	200	90	0	0	0
Future Volume (veh/h)	110	2135	0	0	0	0	0	200	90	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1485	0				0	1485	1440			
Adj Flow Rate, veh/h	120	2321	0				0	217	94			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	159	2405	0				0	549	228			
Arrive On Green	0.20	0.20	0.00				0.00	0.28	0.28			
Sat Flow, veh/h	172	3974	0				0	1978	823			
Grp Volume(v), veh/h	861	1580	0				0	161	150			
Grp Sat Flow(s),veh/h/ln	1442	1352	0				0	1485	1315			
Q Serve(g_s), s	38.3	43.4	0.0				0.0	6.6	7.0			
Cycle Q Clear(g_c), s	44.6	43.4	0.0				0.0	6.6	7.0			
Prop In Lane	0.14		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	928	1637	0				0	412	365			
V/C Ratio(X)	0.93	0.97	0.00				0.00	0.39	0.41			
Avail Cap(c_a), veh/h	928	1637	0				0	412	365			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	29.6	29.2	0.0				0.0	22.0	22.1			
Incr Delay (d2), s/veh	16.6	15.4	0.0				0.0	2.8	3.4			
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	19.7	0.0				0.0	3.0	2.9			
LnGrp Delay(d),s/veh	46.2	44.6	0.0				0.0	24.7	25.5			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2441						311				
Approach Delay, s/veh		45.2						25.1				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				25.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		45.4		
Max Q Clear Time (g_c+I1), s				9.0		46.6		
Green Ext Time (p_c), s				1.9		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	42.9
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2150	70	0	0	0	0	0	160	70	220	0
Future Volume (veh/h)	0	2150	70	0	0	0	0	0	160	70	220	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97	0.99		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	0	1485	1382				0	1573	1591	1545	1485	0
Adj Flow Rate, veh/h	0	2337	71				0	0	157	76	239	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1077	1127	1238	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.83	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1292	1061	1485	0
Grp Volume(v), veh/h		0.0					0	0	157	76	239	0
Grp Sat Flow(s),veh/h/ln							0	0	1292	1061	1485	0
Q Serve(g_s), s							0.0	0.0	0.6	1.5	3.3	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.6	2.1	3.3	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1077	1127	1238	0
V/C Ratio(X)							0.00	0.00	0.15	0.07	0.19	0.00
Avail Cap(c_a), veh/h							0	0	1077	1127	1238	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	2.6	2.8	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.3	0.1	0.3	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.3	0.5	1.5	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.7	2.7	3.2	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								157			315	
Approach Delay, s/veh								0.7			3.1	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				27.0				27.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				22.5				22.5
Max Q Clear Time (g_c+I1), s				5.3				2.6
Green Ext Time (p_c), s				0.7				0.4

Intersection Summary	
HCM 2010 Ctrl Delay	2.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	2085	195	0	0	0	0	240	20	50	115	0
Future Volume (veh/h)	90	2085	195	0	0	0	0	240	20	50	115	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	98	2266	197				0	261	12	54	125	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	102	2492	220				0	685	31	285	530	0
Arrive On Green	0.19	0.19	0.19				0.00	0.22	0.22	0.01	0.11	0.00
Sat Flow, veh/h	181	4419	390				0	3149	140	1581	1660	0
Grp Volume(v), veh/h	941	781	839				0	134	139	54	125	0
Grp Sat Flow(s),veh/h/ln	1739	1590	1662				0	1577	1629	1581	1660	0
Q Serve(g_s), s	40.3	35.9	37.1				0.0	5.4	5.5	0.0	5.2	0.0
Cycle Q Clear(g_c), s	40.3	35.9	37.1				0.0	5.4	5.5	0.0	5.2	0.0
Prop In Lane	0.10		0.23				0.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	980	897	937				0	352	364	285	530	0
V/C Ratio(X)	0.96	0.87	0.90				0.00	0.38	0.38	0.19	0.24	0.00
Avail Cap(c_a), veh/h	980	897	937				0	352	364	285	530	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.8	27.9	28.4				0.0	24.8	24.8	28.6	25.2	0.0
Incr Delay (d2), s/veh	20.5	11.3	13.0				0.0	3.1	3.0	1.5	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.0	18.6	20.4				0.0	2.6	2.7	1.1	2.5	0.0
LnGrp Delay(d),s/veh	50.3	39.3	41.4				0.0	27.9	27.8	30.0	26.3	0.0
LnGrp LOS	D	D	D					C	C	C	C	
Approach Vol, veh/h		2561						273			179	
Approach Delay, s/veh		44.0						27.8			27.4	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		47.0		28.2			7.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		42.4		* 24			* 3	* 17
Max Q Clear Time (g_c+I1), s		42.3		7.2			2.0	7.5
Green Ext Time (p_c), s		0.1		0.7			0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	41.6
HCM 2010 LOS	D

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	30	27	89.5%	12.9	4.5	B
	Through						
	Right Turn						
	Subtotal	30	27	89.5%	12.9	4.5	B
EB	Left Turn	20	17	82.8%	3.3	0.5	A
	Through	2,140	2,071	96.8%	2.6	0.2	A
	Right Turn						
	Subtotal	2,160	2,088	96.7%	2.6	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,190	2,115	96.6%	2.8	0.2	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	50	43	86.1%	15.2	3.4	B
	Right Turn	250	239	95.5%	16.4	3.6	B
	Subtotal	300	282	94.0%	16.2	3.4	B
SB	Left Turn	60	66	110.4%	30.1	2.9	C
	Through	295	277	94.1%	24.9	2.4	C
	Right Turn						
	Subtotal	355	344	96.8%	26.0	1.9	C
EB	Left Turn	40	28	69.9%	9.7	3.9	A
	Through	2,120	2,055	96.9%	11.6	0.9	B
	Right Turn	50	53	105.2%	10.4	2.6	B
	Subtotal	2,210	2,136	96.6%	11.6	0.9	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,865	2,761	96.4%	13.9	0.8	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	2255	40	0	0	0	0	105	50	130	255	0
Future Volume (veh/h)	135	2255	40	0	0	0	0	105	50	130	255	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1398	1382	1342	0
Adj Flow Rate, veh/h	147	2451	22				0	114	42	141	277	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	140	2509	598				0	500	411	284	541	0
Arrive On Green	0.18	0.18	0.18				0.00	0.36	0.36	0.12	0.12	0.00
Sat Flow, veh/h	264	4728	1126				0	1398	1151	573	1576	0
Grp Volume(v), veh/h	771	1827	22				0	114	42	215	203	0
Grp Sat Flow(s),veh/h/ln	1385	1202	1126				0	1398	1151	927	1160	0
Q Serve(g_s), s	39.8	37.6	1.2				0.0	4.3	1.8	13.5	12.3	0.0
Cycle Q Clear(g_c), s	39.8	37.6	1.2				0.0	4.3	1.8	17.8	12.3	0.0
Prop In Lane	0.19		1.00				0.00		1.00	0.65		0.00
Lane Grp Cap(c), veh/h	735	1914	598				0	500	411	411	415	0
V/C Ratio(X)	1.05	0.95	0.04				0.00	0.23	0.10	0.52	0.49	0.00
Avail Cap(c_a), veh/h	735	1914	598				0	500	411	411	415	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.9	30.0	15.0				0.0	16.9	16.1	30.3	26.7	0.0
Incr Delay (d2), s/veh	47.0	12.3	0.1				0.0	1.1	0.5	4.7	4.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.8	14.7	0.4				0.0	1.8	0.6	4.8	4.4	0.0
LnGrp Delay(d),s/veh	78.0	42.3	15.1				0.0	17.9	16.6	35.0	30.7	0.0
LnGrp LOS	F	D	B					B	B	C	C	
Approach Vol, veh/h		2620						156			418	
Approach Delay, s/veh		52.6						17.6			32.9	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		44.0		31.0				31.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 40		* 27				* 27
Max Q Clear Time (g_c+I1), s		41.8		6.3				19.8
Green Ext Time (p_c), s		0.0		0.5				1.1

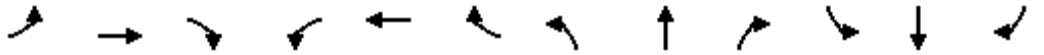
Intersection Summary	
HCM 2010 Ctrl Delay	48.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2310	60	0	0	0	0	50	250	110	180	0
Future Volume (veh/h)	50	2310	60	0	0	0	0	50	250	110	180	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1454	1398	1398	0
Adj Flow Rate, veh/h	54	2511	39				0	54	233	120	196	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	59	2939	651				0	317	273	265	317	0
Arrive On Green	0.20	0.20	0.20				0.00	0.23	0.23	0.07	0.07	0.00
Sat Flow, veh/h	98	4902	1086				0	1398	1203	862	1398	0
Grp Volume(v), veh/h	764	1801	39				0	54	233	120	196	0
Grp Sat Flow(s),veh/h/ln	1393	1202	1086				0	1398	1203	862	1398	0
Q Serve(g_s), s	40.3	36.0	2.2				0.0	2.3	13.9	10.2	10.2	0.0
Cycle Q Clear(g_c), s	40.3	36.0	2.2				0.0	2.3	13.9	12.6	10.2	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	835	2163	651				0	317	273	265	317	0
V/C Ratio(X)	0.92	0.83	0.06				0.00	0.17	0.85	0.45	0.62	0.00
Avail Cap(c_a), veh/h	835	2163	651				0	569	489	420	569	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.97	0.97	0.00
Uniform Delay (d), s/veh	28.2	26.5	12.9				0.0	23.3	27.8	33.8	31.5	0.0
Incr Delay (d2), s/veh	2.0	0.4	0.0				0.0	0.3	7.4	1.2	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.1	12.0	0.7				0.0	0.9	5.2	2.5	4.1	0.0
LnGrp Delay(d),s/veh	30.2	26.8	12.9				0.0	23.6	35.2	34.9	33.4	0.0
LnGrp LOS	C	C	B					C	D	C	C	
Approach Vol, veh/h		2604						287			316	
Approach Delay, s/veh		27.6						33.0			34.0	
Approach LOS		C						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.5		23.5				23.5
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		31.5		30.5				30.5
Max Q Clear Time (g_c+I1), s		42.3		15.9				14.6
Green Ext Time (p_c), s		0.0		1.1				1.4

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1165	1345	0	0	0	0	0	0	195	975	0
Future Volume (veh/h)	0	1165	1345	0	0	0	0	0	0	195	975	0
Number	5	2	12							7	4	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	0	1485	1485							1485	1485	0
Adj Flow Rate, veh/h	0	1266	1437							212	1060	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.92	0.92	0.92							0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3							3	3	0
Cap, veh/h	0	2050	1162							519	1089	0
Arrive On Green	0.00	0.15	0.15							0.12	0.12	0.00
Sat Flow, veh/h	0	4456	2525							1415	2971	0
Grp Volume(v), veh/h	0	1266	1437							212	1060	0
Grp Sat Flow(s),veh/h/ln	0	1485	1263							1415	1485	0
Q Serve(g_s), s	0.0	19.9	34.5							10.4	26.7	0.0
Cycle Q Clear(g_c), s	0.0	19.9	34.5							10.4	26.7	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2050	1162							519	1089	0
V/C Ratio(X)	0.00	0.62	1.24							0.41	0.97	0.00
Avail Cap(c_a), veh/h	0	2050	1162							519	1089	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.14	0.14							0.79	0.79	0.00
Uniform Delay (d), s/veh	0.0	25.6	31.8							25.4	32.6	0.0
Incr Delay (d2), s/veh	0.0	0.2	107.8							0.4	18.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.2	29.4							4.1	13.7	0.0
LnGrp Delay(d),s/veh	0.0	25.8	139.6							25.9	50.7	0.0
LnGrp LOS		C	F							C	D	
Approach Vol, veh/h		2703									1272	
Approach Delay, s/veh		86.3									46.6	
Approach LOS		F									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		43.0		32.0				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		34.5		27.5				
Max Q Clear Time (g_c+I1), s		36.5		28.7				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	73.6
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	715	815	0	0	0	0	0	1315	460	0	0	0
Future Volume (veh/h)	715	815	0	0	0	0	0	1315	460	0	0	0
Number	5	2	12				7	4	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	1454	1485	0				0	1398	1398			
Adj Flow Rate, veh/h	777	886	0				0	1429	461			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	1329	1220	0				0	1946	551			
Arrive On Green	0.14	0.14	0.00				0.00	0.46	0.46			
Sat Flow, veh/h	2769	2971	0				0	4194	1188			
Grp Volume(v), veh/h	777	886	0				0	1429	461			
Grp Sat Flow(s),veh/h/ln	1385	1485	0				0	1398	1188			
Q Serve(g_s), s	20.0	21.4	0.0				0.0	20.8	25.5			
Cycle Q Clear(g_c), s	20.0	21.4	0.0				0.0	20.8	25.5			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1329	1220	0				0	1946	551			
V/C Ratio(X)	0.58	0.73	0.00				0.00	0.73	0.84			
Avail Cap(c_a), veh/h	1329	1220	0				0	1946	551			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	27.8	28.4	0.0				0.0	16.3	17.6			
Incr Delay (d2), s/veh	1.9	3.8	0.0				0.0	2.5	14.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.1	9.5	0.0				0.0	8.4	10.5			
LnGrp Delay(d),s/veh	29.7	32.2	0.0				0.0	18.8	31.6			
LnGrp LOS	C	C						B	C			
Approach Vol, veh/h		1663						1890				
Approach Delay, s/veh		31.0						22.0				
Approach LOS		C						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		35.0		40.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 31		* 35				
Max Q Clear Time (g_c+I1), s		23.4		27.5				
Green Ext Time (p_c), s		6.3		6.6				

Intersection Summary	
HCM 2010 Ctrl Delay	26.2
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.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	310	50	5	80	210	50	50	270	150	60	200
Future Volume (veh/h)	20	310	50	5	80	210	50	50	270	150	60	200
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94		1.00		0.97	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2019	2019	2000		1942	1942	2000	1845	1845	1900	1845	1845
Adj Flow Rate, veh/h	22	337	46		87	228	44	54	293	138	65	217
Adj No. of Lanes	1	1	0		1	1	0	1	1	0	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
Percent Heavy Veh, %	3	3	3		3	3	3	3	3	3	3	3
Cap, veh/h	58	421	57		159	471	91	152	361	170	169	529
Arrive On Green	0.03	0.24	0.24		0.09	0.30	0.30	0.09	0.31	0.31	0.10	0.32
Sat Flow, veh/h	1923	1726	236		1849	1574	304	1757	1173	553	1757	1667
Grp Volume(v), veh/h	22	0	383		87	0	272	54	0	431	65	0
Grp Sat Flow(s),veh/h/ln	1923	0	1961		1849	0	1878	1757	0	1726	1757	0
Q Serve(g_s), s	0.7	0.0	11.8		2.9	0.0	7.6	1.9	0.0	14.8	2.2	0.0
Cycle Q Clear(g_c), s	0.7	0.0	11.8		2.9	0.0	7.6	1.9	0.0	14.8	2.2	0.0
Prop In Lane	1.00		0.12		1.00		0.16	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	58	0	478		159	0	562	152	0	531	169	0
V/C Ratio(X)	0.38	0.00	0.80		0.55	0.00	0.48	0.35	0.00	0.81	0.38	0.00
Avail Cap(c_a), veh/h	240	0	675		288	0	704	246	0	720	246	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
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.6	0.0	22.8		28.2	0.0	18.4	27.6	0.0	20.5	27.2	0.0
Incr Delay (d2), s/veh	1.5	0.0	4.6		1.1	0.0	0.6	0.5	0.0	5.1	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
%ile BackOfQ(50%),veh/ln	0.4	0.0	7.0		1.5	0.0	4.0	0.9	0.0	7.7	1.1	0.0
LnGrp Delay(d),s/veh	32.0	0.0	27.5		29.3	0.0	19.1	28.2	0.0	25.6	27.8	0.0
LnGrp LOS	C		C		C		B	C		C	C	
Approach Vol, veh/h		405				359			485			300
Approach Delay, s/veh		27.7				21.6			25.9			19.9
Approach LOS		C				C			C			B

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	9.5	20.6	9.6	24.6	5.9	24.1	10.2	24.0
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	22.1	9.0	* 27	8.0	24.1	9.0	* 27
Max Q Clear Time (g_c+I1), s	4.9	13.8	3.9	8.6	2.7	9.6	4.2	16.8
Green Ext Time (p_c), s	0.1	1.1	0.0	0.8	0.0	0.9	0.0	1.4

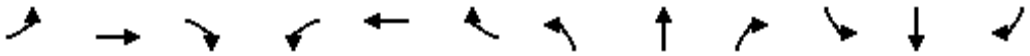
Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	20
Future Volume (veh/h)	20
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.91
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	18
Adj No. of Lanes	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	3
Cap, veh/h	44
Arrive On Green	0.32
Sat Flow, veh/h	138
Grp Volume(v), veh/h	235
Grp Sat Flow(s),veh/h/ln	1805
Q Serve(g_s), s	6.6
Cycle Q Clear(g_c), s	6.6
Prop In Lane	0.08
Lane Grp Cap(c), veh/h	573
V/C Ratio(X)	0.41
Avail Cap(c_a), veh/h	753
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	17.2
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.3
LnGrp Delay(d),s/veh	17.7
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	545	25	0	690	25	5
Future Volume (vph)	545	25	0	690	25	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			3.0	5.2	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	0.98	
Frt	0.99			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1560			1573	1441	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	1560			1573	1441	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	592	27	0	750	27	5
RTOR Reduction (vph)	2	0	0	0	4	0
Lane Group Flow (vph)	617	0	0	750	28	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA	Perm	
Protected Phases	2			3 4 6		
Permitted Phases					8	
Actuated Green, G (s)	30.1			51.2	13.4	
Effective Green, g (s)	30.1			45.6	13.4	
Actuated g/C Ratio	0.40			0.61	0.18	
Clearance Time (s)	5.6				5.2	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	626			956	257	
v/s Ratio Prot	c0.40			c0.48		
v/s Ratio Perm					c0.02	
v/c Ratio	0.98			0.78	0.11	
Uniform Delay, d1	22.2			11.0	25.8	
Progression Factor	0.78			0.68	1.05	
Incremental Delay, d2	28.6			0.4	0.2	
Delay (s)	46.0			7.9	27.3	
Level of Service	D			A	C	
Approach Delay (s)	46.0			7.9	27.3	
Approach LOS	D			A	C	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

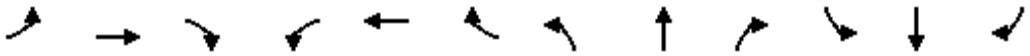


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	365	20	0	330	50	10	10	10	5	25	20
Future Volume (vph)	0	365	20	0	330	50	10	10	10	5	25	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6			5.6	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.98			0.95			0.94	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1558			1536			1466			1452	
Flt Permitted		1.00			1.00			0.87			0.97	
Satd. Flow (perm)		1558			1536			1293			1409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	397	22	0	359	54	11	11	11	5	27	22
RTOR Reduction (vph)	0	2	0	0	5	0	0	10	0	0	20	0
Lane Group Flow (vph)	0	417	0	0	408	0	0	23	0	0	34	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			4 6			8			8	
Permitted Phases							8			8		
Actuated Green, G (s)		39.8			56.0			7.8			7.8	
Effective Green, g (s)		39.8			56.0			7.8			7.8	
Actuated g/C Ratio		0.53			0.75			0.10			0.10	
Clearance Time (s)		5.6						5.6			5.6	
Vehicle Extension (s)		3.0						1.5			1.5	
Lane Grp Cap (vph)		826			1146			134			146	
v/s Ratio Prot		c0.27			c0.27							
v/s Ratio Perm								0.02			c0.02	
v/c Ratio		0.50			0.36			0.17			0.23	
Uniform Delay, d1		11.3			3.3			30.7			30.9	
Progression Factor		0.72			0.06			0.63			0.83	
Incremental Delay, d2		1.7			0.1			0.2			0.3	
Delay (s)		9.8			0.3			19.5			25.8	
Level of Service		A			A			B			C	
Approach Delay (s)		9.8			0.3			19.5			25.8	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

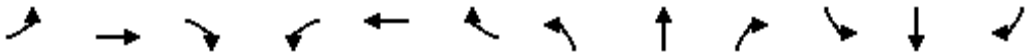
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	550	0	0	685	5	20
Future Volume (vph)	550	0	0	685	5	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			5.6	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.89	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1573			1573	1387	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1573			1573	1387	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	598	0	0	745	5	22
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	598	0	0	745	10	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	48.7			30.1	15.5	
Effective Green, g (s)	43.5			30.1	15.5	
Actuated g/C Ratio	0.58			0.40	0.21	
Clearance Time (s)				5.6		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	912			631	286	
v/s Ratio Prot	c0.38			c0.47	c0.01	
v/s Ratio Perm						
v/c Ratio	0.66			1.18	0.03	
Uniform Delay, d1	10.7			22.4	23.8	
Progression Factor	0.61			1.15	0.82	
Incremental Delay, d2	0.5			88.9	0.0	
Delay (s)	7.0			114.6	19.4	
Level of Service	A			F	B	
Approach Delay (s)	7.0			114.6	19.4	
Approach LOS	A			F	B	

Intersection Summary			
HCM 2000 Control Delay	65.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	380	0	0	340	20	40	5	25	0	0	0
Future Volume (vph)	0	380	0	0	340	20	40	5	25	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.98				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.97				
Satd. Flow (prot)		1573			1557			1431				
Flt Permitted		1.00			1.00			0.97				
Satd. Flow (perm)		1573			1557			1431				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	413	0	0	370	22	43	5	27	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	23	0	0	0	0
Lane Group Flow (vph)	0	413	0	0	390	0	0	52	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		53.2			39.8			10.6				
Effective Green, g (s)		53.2			39.8			10.6				
Actuated g/C Ratio		0.71			0.53			0.14				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1115			826			202				
v/s Ratio Prot		c0.26			c0.25			c0.04				
v/s Ratio Perm												
v/c Ratio		0.37			0.47			0.26				
Uniform Delay, d1		4.3			11.0			28.7				
Progression Factor		0.01			0.51			1.27				
Incremental Delay, d2		0.1			1.8			0.2				
Delay (s)		0.1			7.4			36.5				
Level of Service		A			A			D				
Approach Delay (s)		0.1			7.4			36.5			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	410	0	0	405	75	10	5	10	0	0	0
Future Volume (vph)	0	410	0	0	405	75	10	5	10	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1512			1441				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1512			1441				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	0	0	440	82	11	5	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	446	0	0	514	0	0	18	0	0	0	0
Confl. Peds. (#/hr)	39		22			39			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		50.7			32.7			13.5				
Effective Green, g (s)		50.7			32.7			13.5				
Actuated g/C Ratio		0.68			0.44			0.18				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1063			659			259				
v/s Ratio Prot		c0.28			c0.34			c0.01				
v/s Ratio Perm												
v/c Ratio		0.42			0.78			0.07				
Uniform Delay, d1		5.5			18.1			25.5				
Progression Factor		0.06			0.94			1.00				
Incremental Delay, d2		0.3			7.9			0.1				
Delay (s)		0.6			25.0			25.7				
Level of Service		A			C			C				
Approach Delay (s)		0.6			25.0			25.7			0.0	
Approach LOS		A			C			C			A	

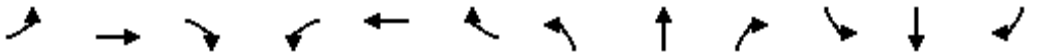
Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	465	20	50	530	70	10	485	50	0	360	300
Future Volume (veh/h)	260	465	20	50	530	70	10	485	50	0	360	300
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	0.99		0.93	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1800	1694	1728	0	1765	1728
Adj Flow Rate, veh/h	271	484	19	52	552	67	10	505	42	0	375	116
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	180	941	37	435	640	78	53	1124	92	0	968	294
Arrive On Green	0.11	0.59	0.59	0.87	0.87	0.87	0.77	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1597	1601	63	844	1463	178	18	2901	238	0	2586	759
Grp Volume(v), veh/h	271	0	503	52	0	619	295	0	262	0	250	241
Grp Sat Flow(s),veh/h/ln	1597	0	1664	844	0	1640	1677	0	1480	0	1676	1580
Q Serve(g_s), s	9.0	0.0	14.3	1.0	0.0	15.4	0.0	0.0	4.9	0.0	8.6	8.8
Cycle Q Clear(g_c), s	9.0	0.0	14.3	3.3	0.0	15.4	4.8	0.0	4.9	0.0	8.6	8.8
Prop In Lane	1.00		0.04	1.00		0.11	0.03		0.16	0.00		0.48
Lane Grp Cap(c), veh/h	180	0	978	435	0	718	696	0	573	0	650	612
V/C Ratio(X)	1.51	0.00	0.51	0.12	0.00	0.86	0.42	0.00	0.46	0.00	0.38	0.39
Avail Cap(c_a), veh/h	180	0	978	435	0	718	696	0	573	0	650	612
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.81	0.00	0.81	0.82	0.00	0.82	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	9.8	3.3	0.0	3.8	6.1	0.0	6.1	0.0	17.6	17.7
Incr Delay (d2), s/veh	255.5	0.0	1.9	0.5	0.0	10.9	1.6	0.0	2.1	0.0	1.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.7	0.0	7.1	0.3	0.0	8.0	2.4	0.0	2.2	0.0	4.3	4.1
LnGrp Delay(d),s/veh	291.0	0.0	11.7	3.7	0.0	14.6	7.6	0.0	8.2	0.0	19.3	19.6
LnGrp LOS	F		B	A		B	A		A		B	B
Approach Vol, veh/h		774			671			557			491	
Approach Delay, s/veh		109.5			13.8			7.9			19.5	
Approach LOS		F			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.2		35.8	12.0	39.2		35.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 47		24.4	9.0	* 35		24.4
Max Q Clear Time (g_c+I1), s		16.3		6.9	11.0	17.4		10.8
Green Ext Time (p_c), s		5.4		4.6	0.0	6.3		3.5

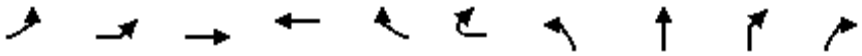
Intersection Summary	
HCM 2010 Ctrl Delay	43.3
HCM 2010 LOS	D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	50	40	175	0	0	0	0	230	1160	450
Future Volume (vph)	0	490	50	40	175	0	0	0	0	230	1160	450
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		1.00			1.00						1.00	0.98
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.99			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2769			1781						2993	1321
Flt Permitted		1.00			0.85						0.99	1.00
Satd. Flow (perm)		2769			1520						2993	1321
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	510	52	42	182	0	0	0	0	240	1208	469
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	224	0	0	0	0	0	1448	469
Confl. Peds. (#/hr)			15	15		4			11			
Confl. Bikes (#/hr)			3			3			3			2
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		30.8			30.8						40.4	33.4
Effective Green, g (s)		30.8			30.8						40.4	33.4
Actuated g/C Ratio		0.39			0.39						0.50	0.42
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1066			585						1511	551
v/s Ratio Prot		c0.20									c0.48	
v/s Ratio Perm					0.15							0.36
v/c Ratio		0.52			0.38						0.96	0.85
Uniform Delay, d1		18.9			17.7						19.0	21.1
Progression Factor		0.34			0.36						1.00	1.00
Incremental Delay, d2		1.6			1.6						15.1	15.2
Delay (s)		8.1			8.1						34.1	36.3
Level of Service		A			A						C	D
Approach Delay (s)		8.1			8.1			0.0			34.7	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	395	20	305	135	300	20	75	1465	190	50
Future Volume (vph)	395	20	305	135	300	20	75	1465	190	50
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1509	1812	1812	1485			3677	1316	
Flt Permitted		0.63	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		1000	1812	1812	1485			3677	1316	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	411	21	318	141	312	21	78	1526	198	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	432	318	141	334	0	0	1604	212	0
Confl. Peds. (#/hr)							8			3
Confl. Bikes (#/hr)					4	4				
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Effective Green, g (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Actuated g/C Ratio		0.41	0.41	0.21	0.21			0.48	0.48	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		485	742	380	311			1783	638	
v/s Ratio Prot		c0.13	0.18	0.08	c0.22					
v/s Ratio Perm		0.23						0.44	0.16	
v/c Ratio		0.89	0.43	0.37	1.07			0.90	0.33	
Uniform Delay, d1		21.7	16.9	27.1	31.6			18.8	12.6	
Progression Factor		0.73	0.75	1.00	1.00			0.46	0.24	
Incremental Delay, d2		16.8	1.3	2.8	72.1			5.0	0.9	
Delay (s)		32.5	14.0	29.8	103.7			13.7	3.9	
Level of Service		C	B	C	F			B	A	
Approach Delay (s)			24.7	81.8				12.4		
Approach LOS			C	F				B		

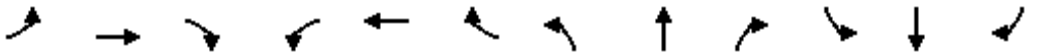
Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	370	40	30	250	50	40	415	50	60	330	40
Future Volume (veh/h)	80	370	40	30	250	50	40	415	50	60	330	40
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)	0.99		0.98	1.00		0.98	0.98		0.92	0.98		0.92
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	1412	1560	1530	1412	1500	1530	1440	1500	1469	1440	1500	1469
Adj Flow Rate, veh/h	83	385	37	31	260	43	42	432	41	62	344	32
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	520	706	68	333	632	104	105	887	82	160	780	73
Arrive On Green	0.50	0.50	0.50	1.00	1.00	1.00	0.76	0.76	0.76	0.76	0.76	0.76
Sat Flow, veh/h	852	1398	134	768	1251	207	140	2335	217	269	2052	192
Grp Volume(v), veh/h	83	0	422	31	0	303	268	0	247	219	0	219
Grp Sat Flow(s),veh/h/ln	852	0	1532	768	0	1457	1387	0	1305	1201	0	1312
Q Serve(g_s), s	4.3	0.0	15.1	1.3	0.0	0.0	0.0	0.0	5.8	0.5	0.0	4.8
Cycle Q Clear(g_c), s	4.3	0.0	15.1	16.4	0.0	0.0	5.3	0.0	5.8	6.3	0.0	4.8
Prop In Lane	1.00		0.09	1.00		0.14	0.16		0.17	0.28		0.15
Lane Grp Cap(c), veh/h	520	0	774	333	0	736	579	0	496	514	0	499
V/C Ratio(X)	0.16	0.00	0.55	0.09	0.00	0.41	0.46	0.00	0.50	0.43	0.00	0.44
Avail Cap(c_a), veh/h	520	0	774	333	0	736	579	0	496	514	0	499
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.85	0.00	0.85	0.75	0.00	0.75
Uniform Delay (d), s/veh	10.9	0.0	13.5	3.0	0.0	0.0	6.6	0.0	6.7	6.4	0.0	6.5
Incr Delay (d2), s/veh	0.7	0.0	2.8	0.5	0.0	1.7	2.3	0.0	3.0	1.9	0.0	2.1
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	1.1	0.0	6.9	0.3	0.0	0.3	2.4	0.0	2.3	1.9	0.0	1.9
LnGrp Delay(d),s/veh	11.5	0.0	16.3	3.6	0.0	1.7	8.8	0.0	9.7	8.4	0.0	8.6
LnGrp LOS	B		B	A		A	A		A	A		A
Approach Vol, veh/h		505			334			515			438	
Approach Delay, s/veh		15.5			1.8			9.2			8.5	
Approach LOS		B			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		40.4		30.4		40.4		30.4
Max Q Clear Time (g_c+I1), s		17.1		7.8		18.4		8.3
Green Ext Time (p_c), s		2.5		2.2		1.5		2.0

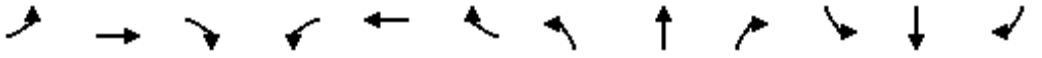
Intersection Summary	
HCM 2010 Ctrl Delay	9.4
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	325	180	60	170	0	0	0	0	50	1070	130
Future Volume (vph)	0	325	180	60	170	0	0	0	0	50	1070	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.96
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1697			1775						4163	1148
Flt Permitted		1.00			0.67						1.00	1.00
Satd. Flow (perm)		1697			1213						4163	1148
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	339	188	62	177	0	0	0	0	52	1115	135
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	508	0	0	240	0	0	0	0	0	1167	135
Confl. Peds. (#/hr)	12		12	12		12			12	12		7
Confl. Bikes (#/hr)			6			4			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		35.8			35.8						35.4	28.4
Effective Green, g (s)		35.8			35.8						35.4	28.4
Actuated g/C Ratio		0.45			0.45						0.44	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		759			542						1842	407
v/s Ratio Prot		c0.30										
v/s Ratio Perm					0.20						0.28	0.12
v/c Ratio		0.67			0.44						0.63	0.33
Uniform Delay, d1		17.4			15.2						17.3	18.9
Progression Factor		0.32			1.02						0.35	0.43
Incremental Delay, d2		4.4			2.1						0.6	0.8
Delay (s)		10.0			17.6						6.7	8.9
Level of Service		B			B						A	A
Approach Delay (s)		10.0			17.6			0.0			6.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	150	0	0	130	110	90	1410	20	0	0	0
Future Volume (veh/h)	245	150	0	0	130	110	90	1410	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1620	1588	1620			
Adj Flow Rate, veh/h	255	156	0	0	135	105	94	1469	19			
Adj No. of Lanes	1	1	0	0	1	0	0	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	360	643	0	0	287	224	123	2056	27			
Arrive On Green	0.68	0.68	0.00	0.00	0.41	0.41	0.16	0.16	0.16			
Sat Flow, veh/h	1017	1588	0	0	710	552	257	4282	57			
Grp Volume(v), veh/h	255	156	0	0	0	240	576	481	525			
Grp Sat Flow(s),veh/h/ln	1017	1588	0	0	0	1262	1575	1445	1576			
Q Serve(g_s), s	19.2	3.0	0.0	0.0	0.0	11.2	28.0	25.2	25.2			
Cycle Q Clear(g_c), s	30.4	3.0	0.0	0.0	0.0	11.2	28.0	25.2	25.2			
Prop In Lane	1.00		0.00	0.00		0.44	0.16		0.04			
Lane Grp Cap(c), veh/h	360	643	0	0	0	511	756	694	756			
V/C Ratio(X)	0.71	0.24	0.00	0.00	0.00	0.47	0.76	0.69	0.69			
Avail Cap(c_a), veh/h	360	643	0	0	0	511	756	694	756			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	18.0	8.2	0.0	0.0	0.0	17.5	29.3	28.1	28.1			
Incr Delay (d2), s/veh	11.2	0.9	0.0	0.0	0.0	3.1	7.1	5.6	5.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.4	1.5	0.0	0.0	0.0	4.3	13.7	11.2	12.1			
LnGrp Delay(d),s/veh	29.2	9.1	0.0	0.0	0.0	20.6	36.4	33.7	33.3			
LnGrp LOS	C	A				C	D	C	C			
Approach Vol, veh/h		411			240			1582				
Approach Delay, s/veh		21.6			20.6			34.6				
Approach LOS		C			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		37.0		43.0		37.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		32.4		38.4		32.4		
Max Q Clear Time (g_c+I1), s		32.4		30.0		13.2		
Green Ext Time (p_c), s		0.0		4.7		0.9		

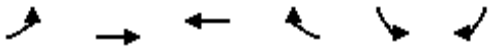
Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	230	40	105	250	70	30	395	85	45	290	65
Future Volume (veh/h)	55	230	40	105	250	70	30	395	85	45	290	65
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)	0.99		0.91	0.97		0.91	0.92		0.83	0.96		0.83
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	1588	1525	1620	1588	1588	1620	1620	1588	1555	1620	1588	1555
Adj Flow Rate, veh/h	57	240	34	109	260	59	31	411	67	47	302	47
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	390	657	93	472	626	142	86	899	141	122	721	119
Arrive On Green	0.51	0.51	0.51	0.17	0.17	0.17	0.13	0.13	0.13	0.77	0.77	0.77
Sat Flow, veh/h	937	1288	182	960	1227	278	94	2335	367	171	1873	310
Grp Volume(v), veh/h	57	0	274	109	0	319	274	0	235	196	0	200
Grp Sat Flow(s),veh/h/ln	937	0	1471	960	0	1505	1507	0	1289	1038	0	1316
Q Serve(g_s), s	3.5	0.0	9.0	8.2	0.0	15.2	0.0	0.0	13.6	3.2	0.0	4.0
Cycle Q Clear(g_c), s	18.7	0.0	9.0	17.2	0.0	15.2	12.8	0.0	13.6	16.8	0.0	4.0
Prop In Lane	1.00		0.12	1.00		0.18	0.11		0.28	0.24		0.24
Lane Grp Cap(c), veh/h	390	0	750	472	0	768	630	0	496	456	0	507
V/C Ratio(X)	0.15	0.00	0.37	0.23	0.00	0.42	0.43	0.00	0.47	0.43	0.00	0.39
Avail Cap(c_a), veh/h	390	0	750	472	0	768	630	0	496	456	0	507
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.88	0.00	0.88	0.85	0.00	0.85
Uniform Delay (d), s/veh	19.7	0.0	11.8	27.5	0.0	22.6	27.0	0.0	27.4	7.0	0.0	6.1
Incr Delay (d2), s/veh	0.8	0.0	1.4	1.1	0.0	1.5	1.9	0.0	2.8	2.5	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	3.9	2.3	0.0	6.7	5.9	0.0	5.2	1.5	0.0	1.6
LnGrp Delay(d),s/veh	20.5	0.0	13.2	28.5	0.0	24.1	29.0	0.0	30.2	9.5	0.0	8.1
LnGrp LOS	C		B	C		C	C		C	A		A
Approach Vol, veh/h		331			428			509			396	
Approach Delay, s/veh		14.4			25.3			29.5			8.8	
Approach LOS		B			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 41		* 31		* 41		* 31
Max Q Clear Time (g_c+I1), s		20.7		15.6		19.2		18.8
Green Ext Time (p_c), s		2.9		4.0		4.1		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

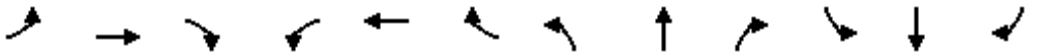
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	370	380	65	0	55
Future Volume (vph)	0	370	380	65	0	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0			5.6
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.97			0.78
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.98			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1588	1516			1074
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1588	1516			1074
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	385	396	68	0	57
RTOR Reduction (vph)	0	0	7	0	0	48
Lane Group Flow (vph)	0	385	457	0	0	9
Confl. Peds. (#/hr)				59		78
Confl. Bikes (#/hr)				14		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		55.1	56.1			12.3
Effective Green, g (s)		55.1	56.1			12.3
Actuated g/C Ratio		0.69	0.70			0.15
Clearance Time (s)						5.6
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1093	1063			165
v/s Ratio Prot		c0.24	c0.30			
v/s Ratio Perm						0.01
v/c Ratio		0.35	0.43			0.05
Uniform Delay, d1		5.1	5.1			28.9
Progression Factor		0.95	0.17			1.00
Incremental Delay, d2		0.2	0.2			0.1
Delay (s)		5.0	1.1			29.0
Level of Service		A	A			C
Approach Delay (s)		5.0	1.1		29.0	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	4.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	270	110	80	240	0	0	0	0	125	955	230
Future Volume (vph)	0	270	110	80	240	0	0	0	0	125	955	230
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.93	1.00	1.00						1.00	0.92
Flpb, ped/bikes		1.00	1.00	0.97	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1641	1173	1605	1535						4142	1102
Flt Permitted		1.00	1.00	0.52	1.00						0.99	1.00
Satd. Flow (perm)		1641	1173	874	1535						4142	1102
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	281	115	83	250	0	0	0	0	130	995	240
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	281	86	83	250	0	0	0	0	0	1125	240
Confl. Peds. (#/hr)			51	51		28			11	11		19
Confl. Bikes (#/hr)			10			16			1			1
Parking (#/hr)											2	2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		34.8	34.8	34.8	34.8						36.4	29.4
Effective Green, g (s)		34.8	34.8	34.8	34.8						36.4	29.4
Actuated g/C Ratio		0.43	0.43	0.43	0.43						0.45	0.37
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		713	510	380	667						1884	404
v/s Ratio Prot		c0.17			0.16							
v/s Ratio Perm			0.07	0.10							0.27	0.22
v/c Ratio		0.39	0.17	0.22	0.37						0.60	0.59
Uniform Delay, d1		15.4	13.8	14.1	15.3						16.3	20.5
Progression Factor		0.52	0.38	0.88	0.92						0.38	0.49
Incremental Delay, d2		1.6	0.7	1.2	1.5						1.1	4.9
Delay (s)		9.6	5.9	13.7	15.5						7.4	14.9
Level of Service		A	A	B	B						A	B
Approach Delay (s)		8.5			15.0			0.0			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	210	0	0	195	90	125	1260	160	0	0	0
Future Volume (veh/h)	175	210	0	0	195	90	125	1260	160	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1525	1588	1620			
Adj Flow Rate, veh/h	182	219	0	0	203	72	130	1312	146			
Adj No. of Lanes	1	1	0	0	1	0	1	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	234	552	0	0	333	118	795	2166	241			
Arrive On Green	0.11	0.11	0.00	0.00	0.11	0.11	0.18	0.18	0.18			
Sat Flow, veh/h	985	1588	0	0	959	340	1452	3955	440			
Grp Volume(v), veh/h	182	219	0	0	0	275	130	959	499			
Grp Sat Flow(s),veh/h/ln	985	1588	0	0	0	1299	1452	1445	1505			
Q Serve(g_s), s	11.7	10.2	0.0	0.0	0.0	16.1	6.0	24.4	24.4			
Cycle Q Clear(g_c), s	27.8	10.2	0.0	0.0	0.0	16.1	6.0	24.4	24.4			
Prop In Lane	1.00		0.00	0.00		0.26	1.00		0.29			
Lane Grp Cap(c), veh/h	234	552	0	0	0	451	795	1583	824			
V/C Ratio(X)	0.78	0.40	0.00	0.00	0.00	0.61	0.16	0.61	0.61			
Avail Cap(c_a), veh/h	234	552	0	0	0	451	795	1583	824			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.92	0.92	0.00	0.00	0.00	1.00	0.35	0.35	0.35			
Uniform Delay (d), s/veh	44.7	27.6	0.0	0.0	0.0	30.2	17.3	24.8	24.8			
Incr Delay (d2), s/veh	20.7	2.0	0.0	0.0	0.0	6.0	0.2	0.6	1.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.4	4.8	0.0	0.0	0.0	6.6	2.5	9.9	10.4			
LnGrp Delay(d),s/veh	65.4	29.6	0.0	0.0	0.0	36.3	17.5	25.4	26.0			
LnGrp LOS	E	C				D	B	C	C			
Approach Vol, veh/h		401			275			1588				
Approach Delay, s/veh		45.9			36.3			25.0				
Approach LOS		D			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		32.0		48.0		32.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 28		* 44		* 28		
Max Q Clear Time (g_c+I1), s		29.8		26.4		18.1		
Green Ext Time (p_c), s		0.0		7.8		0.8		

Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	1485	0	0	0	0	0	280	50
Future Volume (veh/h)	0	0	0	300	1485	0	0	0	0	0	280	50
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.95
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.82
Adj Sat Flow, veh/h/ln				1530	1500	0				0	1500	1530
Adj Flow Rate, veh/h				312	1547	0				0	292	33
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				455	1994	0				0	626	70
Arrive On Green				0.21	0.21	0.00				0.00	0.27	0.27
Sat Flow, veh/h				625	3326	0				0	2415	261
Grp Volume(v), veh/h				671	1188	0				0	176	149
Grp Sat Flow(s),veh/h/ln				1344	1242	0				0	1425	1176
Q Serve(g_s), s				38.0	36.1	0.0				0.0	8.3	8.5
Cycle Q Clear(g_c), s				38.0	36.1	0.0				0.0	8.3	8.5
Prop In Lane				0.46		0.00				0.00		0.22
Lane Grp Cap(c), veh/h				902	1546	0				0	381	315
V/C Ratio(X)				0.74	0.77	0.00				0.00	0.46	0.47
Avail Cap(c_a), veh/h				902	1546	0				0	381	315
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				27.1	26.3	0.0				0.0	24.5	24.6
Incr Delay (d2), s/veh				5.5	3.7	0.0				0.0	4.0	5.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.6	13.2	0.0				0.0	3.7	3.2
LnGrp Delay(d),s/veh				32.6	30.1	0.0				0.0	28.5	29.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1859						325	
Approach Delay, s/veh					31.0						29.0	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.0		26.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 50		21.4				
Max Q Clear Time (g_c+I1), s		40.0		10.5				
Green Ext Time (p_c), s		6.4		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

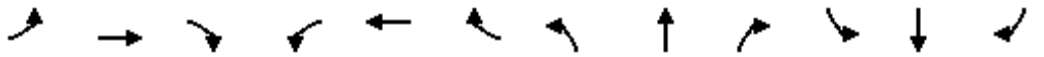
Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1655	150	140	310	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1655	150	140	310	0	0	0	0
Number				5	2	12	7	4	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				0	1412	1412	1440	1412	0			
Adj Flow Rate, veh/h				0	1724	120	146	323	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2351	717	266	507	0			
Arrive On Green				0.00	0.20	0.20	0.09	0.09	0.00			
Sat Flow, veh/h				0	3981	1175	683	1842	0			
Grp Volume(v), veh/h				0	1724	120	253	216	0			
Grp Sat Flow(s),veh/h/ln				0	1285	1175	1241	1220	0			
Q Serve(g_s), s				0.0	33.5	6.8	14.8	13.6	0.0			
Cycle Q Clear(g_c), s				0.0	33.5	6.8	15.8	13.6	0.0			
Prop In Lane				0.00		1.00	0.58		0.00			
Lane Grp Cap(c), veh/h				0	2351	717	425	348	0			
V/C Ratio(X)				0.00	0.73	0.17	0.60	0.62	0.00			
Avail Cap(c_a), veh/h				0	2351	717	425	348	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	25.9	15.2	33.0	32.1	0.0			
Incr Delay (d2), s/veh				0.0	2.1	0.5	6.0	8.1	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	12.4	2.3	6.1	5.4	0.0			
LnGrp Delay(d),s/veh				0.0	27.9	15.7	39.0	40.2	0.0			
LnGrp LOS					C	B	D	D				
Approach Vol, veh/h					1844			469				
Approach Delay, s/veh					27.1			39.6				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		53.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 49		* 23				
Max Q Clear Time (g_c+I1), s		35.5		17.8				
Green Ext Time (p_c), s		8.2		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	29.6
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	180	1720	0	0	0	0	0	275	90
Future Volume (veh/h)	0	0	0	180	1720	0	0	0	0	0	275	90
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1412	0				0	1412	1440
Adj Flow Rate, veh/h				188	1792	0				0	286	77
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				264	2122	0				0	499	129
Arrive On Green				0.21	0.21	0.00				0.00	0.26	0.26
Sat Flow, veh/h				326	3458	0				0	1988	496
Grp Volume(v), veh/h				729	1251	0				0	196	167
Grp Sat Flow(s),veh/h/ln				1330	1169	0				0	1341	1072
Q Serve(g_s), s				39.9	41.1	0.0				0.0	10.2	10.9
Cycle Q Clear(g_c), s				42.3	41.1	0.0				0.0	10.2	10.9
Prop In Lane				0.26		0.00				0.00		0.46
Lane Grp Cap(c), veh/h				901	1485	0				0	349	279
V/C Ratio(X)				0.81	0.84	0.00				0.00	0.56	0.60
Avail Cap(c_a), veh/h				901	1485	0				0	349	279
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				28.2	27.8	0.0				0.0	25.7	25.9
Incr Delay (d2), s/veh				7.8	6.0	0.0				0.0	6.4	9.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.5	14.6	0.0				0.0	4.4	3.9
LnGrp Delay(d),s/veh				35.9	33.8	0.0				0.0	32.1	35.1
LnGrp LOS				D	C						C	D
Approach Vol, veh/h					1980						363	
Approach Delay, s/veh					34.6						33.5	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		55.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 51		* 21				
Max Q Clear Time (g_c+I1), s		44.3		12.9				
Green Ext Time (p_c), s		4.9		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	34.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	70	1570	90	240	155	0	0	170	50
Future Volume (veh/h)	0	0	0	70	1570	90	240	155	0	0	170	50
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				73	1635	87	250	161	0	0	177	38
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				105	2505	138	299	649	0	0	299	64
Arrive On Green				0.18	0.18	0.18	0.10	0.58	0.00	0.00	0.23	0.23
Sat Flow, veh/h				194	4606	253	1765	1853	0	0	1294	278
Grp Volume(v), veh/h				662	551	582	250	161	0	0	0	215
Grp Sat Flow(s),veh/h/ln				1755	1606	1692	1765	1853	0	0	0	1571
Q Serve(g_s), s				28.3	25.4	25.5	2.1	3.4	0.0	0.0	0.0	9.7
Cycle Q Clear(g_c), s				28.3	25.4	25.5	2.1	3.4	0.0	0.0	0.0	9.7
Prop In Lane				0.11		0.15	1.00		0.00	0.00		0.18
Lane Grp Cap(c), veh/h				954	873	920	299	649	0	0	0	363
V/C Ratio(X)				0.69	0.63	0.63	0.84	0.25	0.00	0.00	0.00	0.59
Avail Cap(c_a), veh/h				954	873	920	299	649	0	0	0	363
HCM Platoon Ratio				0.33	0.33	0.33	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				26.6	25.4	25.4	32.4	11.5	0.0	0.0	0.0	27.4
Incr Delay (d2), s/veh				4.1	3.5	3.3	23.3	0.9	0.0	0.0	0.0	6.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.8	12.1	12.8	7.0	1.9	0.0	0.0	0.0	4.9
LnGrp Delay(d),s/veh				30.7	28.9	28.7	55.7	12.4	0.0	0.0	0.0	34.3
LnGrp LOS				C	C	C	E	B				C
Approach Vol, veh/h					1795			411			215	
Approach Delay, s/veh					29.5			38.7			34.3	
Approach LOS					C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.0	23.0		48.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			5.0	18.5		43.5		28.0
Max Q Clear Time (g_c+I1), s			4.1	11.7		30.3		5.4
Green Ext Time (p_c), s			0.2	0.8		11.0		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	31.5
HCM 2010 LOS	C

SimTraffic Post-Processor **BioMarin**
Average Results from 10 Runs **Baseline Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	40	39	97.5%	11.5	4.2	B
	Through	5	4	73.6%	7.4	8.0	A
	Right Turn						
	Subtotal	45	43	94.9%	11.4	3.8	B
SB	Left Turn						
	Through	10	10	99.4%	21.4	11.4	C
	Right Turn	5	6	117.8%	10.1	10.9	B
	Subtotal	15	16	105.5%	21.6	6.8	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	65	65	99.6%	2.4	0.4	A
	Through	1,690	1,619	95.8%	1.6	0.4	A
	Right Turn	5	2	44.2%	0.5	0.9	A
	Subtotal	1,760	1,686	95.8%	1.6	0.4	A
Total		1,820	1,745	95.9%	2.0	0.5	A

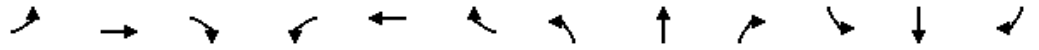
Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	110	109	99.0%	25.8	2.7	C
	Through	20	28	138.0%	23.5	6.2	C
	Right Turn						
	Subtotal	130	137	105.0%	25.2	2.5	C
SB	Left Turn						
	Through	50	43	86.1%	18.6	4.5	B
	Right Turn	10	10	95.7%	10.8	12.1	B
	Subtotal	60	53	87.7%	16.5	3.4	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	220	210	95.3%	11.7	2.7	B
	Through	1,725	1,614	93.5%	9.1	1.7	A
	Right Turn	40	37	92.9%	6.6	1.6	A
	Subtotal	1,985	1,861	93.7%	9.3	1.7	A
Total		2,175	2,050	94.2%	10.6	1.7	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	100	1685	130	40	325	0	0	265	150
Future Volume (veh/h)	0	0	0	100	1685	130	40	325	0	0	265	150
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.97		1.00	1.00		0.83
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				1620	1588	1620	1620	1588	0	0	1525	1555
Adj Flow Rate, veh/h				104	1755	125	42	339	0	0	276	149
Adj No. of Lanes				0	3	0	0	2	0	0	2	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				127	2282	167	101	734	0	0	552	279
Arrive On Green				0.19	0.19	0.19	0.64	0.64	0.00	0.00	0.11	0.11
Sat Flow, veh/h				224	4013	294	144	2376	0	0	1807	874
Grp Volume(v), veh/h				733	610	641	190	191	0	0	228	197
Grp Sat Flow(s),veh/h/ln				1577	1445	1508	1075	1373	0	0	1448	1157
Q Serve(g_s), s				35.6	31.9	32.1	2.5	5.6	0.0	0.0	11.9	12.9
Cycle Q Clear(g_c), s				35.6	31.9	32.1	15.4	5.6	0.0	0.0	11.9	12.9
Prop In Lane				0.14		0.19	0.22		0.00	0.00		0.76
Lane Grp Cap(c), veh/h				897	822	858	398	438	0	0	462	369
V/C Ratio(X)				0.82	0.74	0.75	0.48	0.44	0.00	0.00	0.49	0.53
Avail Cap(c_a), veh/h				897	822	858	398	438	0	0	462	369
HCM Platoon Ratio				0.33	0.33	0.33	2.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				28.5	27.0	27.1	11.4	10.9	0.0	0.0	29.7	30.2
Incr Delay (d2), s/veh				8.1	6.0	5.9	4.1	3.1	0.0	0.0	3.7	5.5
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				17.6	14.2	14.8	2.4	2.4	0.0	0.0	5.3	4.7
LnGrp Delay(d),s/veh				36.6	33.0	33.0	15.5	14.0	0.0	0.0	33.4	35.6
LnGrp LOS				D	C	C	B	B			C	D
Approach Vol, veh/h					1984			381			425	
Approach Delay, s/veh					34.3			14.7			34.5	
Approach LOS					C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				30.0		50.0		30.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				25.5		45.5		25.5
Max Q Clear Time (g_c+I1), s				17.4		37.6		14.9
Green Ext Time (p_c), s				1.0		5.5		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	1760	30	110	50	0	0	30	30
Future Volume (vph)	0	0	0	300	1760	30	110	50	0	0	30	30
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6			7.6	
Lane Util. Factor					0.91		1.00	1.00			1.00	
Frpb, ped/bikes					1.00		1.00	1.00			0.97	
Flpb, ped/bikes					0.97		0.96	1.00			1.00	
Frt					1.00		1.00	1.00			0.93	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3681		1100	1249			1128	
Flt Permitted					0.99		0.72	1.00			1.00	
Satd. Flow (perm)					3681		830	1249			1128	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	312	1833	31	115	52	0	0	31	31
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	2175	0	115	52	0	0	53	0
Confl. Peds. (#/hr)			106	106		44	30		69			30
Confl. Bikes (#/hr)						2			3			8
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			4			8	
Permitted Phases				6			4					
Actuated Green, G (s)					51.4		19.4	19.4			19.4	
Effective Green, g (s)					51.4		19.4	19.4			19.4	
Actuated g/C Ratio					0.57		0.22	0.22			0.22	
Clearance Time (s)					11.6		7.6	7.6			7.6	
Lane Grp Cap (vph)					2102		178	269			243	
v/s Ratio Prot								0.04			0.05	
v/s Ratio Perm					0.59		c0.14					
v/c Ratio					1.03		0.65	0.19			0.22	
Uniform Delay, d1					19.3		32.2	28.9			29.1	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					29.3		16.7	1.6			2.1	
Delay (s)					48.6		48.9	30.5			31.1	
Level of Service					D		D	C			C	
Approach Delay (s)		0.0			48.6			43.2			31.1	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	154.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	480	1585	0	0	0	0	0	665	480
Future Volume (veh/h)	0	0	0	480	1585	0	0	0	0	0	665	480
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.85
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1560	1588	0				0	1588	1500
Adj Flow Rate, veh/h				500	1651	0				0	693	492
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				740	2085	0				0	1951	489
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1486	4765	0				0	4479	1088
Grp Volume(v), veh/h				500	1651	0				0	693	492
Grp Sat Flow(s),veh/h/ln				1486	1588	0				0	1445	1088
Q Serve(g_s), s				25.9	26.8	0.0				0.0	11.5	36.0
Cycle Q Clear(g_c), s				25.9	26.8	0.0				0.0	11.5	36.0
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				740	2085	0				0	1951	489
V/C Ratio(X)				0.68	0.79	0.00				0.00	0.36	1.01
Avail Cap(c_a), veh/h				740	2085	0				0	1951	489
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				30.3	30.7	0.0				0.0	23.6	34.1
Incr Delay (d2), s/veh				4.9	3.2	0.0				0.0	0.5	42.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.7	12.4	0.0				0.0	4.7	16.5
LnGrp Delay(d),s/veh				35.2	33.9	0.0				0.0	24.1	76.1
LnGrp LOS				D	C						C	F
Approach Vol, veh/h					2151						1185	
Approach Delay, s/veh					34.2						45.7	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						39.0		41.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						35.0		36.0
Max Q Clear Time (g_c+I1), s						28.8		38.0
Green Ext Time (p_c), s						4.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	38.3
HCM 2010 LOS	D

Notes
User approved volume balancing among the lanes for turning movement.

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1150	195	910	1350	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1150	195	910	1350	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1500	1500	1398	1398	0			
Adj Flow Rate, veh/h				0	1198	187	1026	1297	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	3	3	0			
Cap, veh/h				0	1510	441	1381	1450	0			
Arrive On Green				0.00	0.37	0.37	0.17	0.17	0.00			
Sat Flow, veh/h				0	4230	1195	2663	2796	0			
Grp Volume(v), veh/h				0	1198	187	1026	1297	0			
Grp Sat Flow(s),veh/h/ln				0	1365	1195	1331	1398	0			
Q Serve(g_s), s				0.0	20.9	9.4	29.3	36.3	0.0			
Cycle Q Clear(g_c), s				0.0	20.9	9.4	29.3	36.3	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1510	441	1381	1450	0			
V/C Ratio(X)				0.00	0.79	0.42	0.74	0.89	0.00			
Avail Cap(c_a), veh/h				0	1510	441	1381	1450	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.5	18.9	28.1	31.0	0.0			
Incr Delay (d2), s/veh				0.0	4.4	3.0	3.6	8.8	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	8.4	3.4	11.5	15.8	0.0			
LnGrp Delay(d),s/veh				0.0	26.9	21.9	31.7	39.8	0.0			
LnGrp LOS					C	C	C	D				
Approach Vol, veh/h					1385			2323				
Approach Delay, s/veh					26.2			36.3				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				46.0		34.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				41.5		29.5		
Max Q Clear Time (g_c+I1), s				38.3		22.9		
Green Ext Time (p_c), s				2.8		3.8		

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1525	100	0	0	0	0	0	400	170	430	0
Future Volume (veh/h)	0	1525	100	0	0	0	0	0	400	170	430	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		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	0	1676	1710				0	1588	1620	1765	1765	0
Adj Flow Rate, veh/h	0	1589	95				0	0	402	177	448	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1145	992	1526	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.86	0.29	0.29	0.00
Sat Flow, veh/h		0					0	0	1324	969	1765	0
Grp Volume(v), veh/h		0.0					0	0	402	177	448	0
Grp Sat Flow(s),veh/h/ln							0	0	1324	969	1765	0
Q Serve(g_s), s							0.0	0.0	2.0	4.9	6.7	0.0
Cycle Q Clear(g_c), s							0.0	0.0	2.0	6.9	6.7	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1145	992	1526	0
V/C Ratio(X)							0.00	0.00	0.35	0.18	0.29	0.00
Avail Cap(c_a), veh/h							0	0	1145	992	1526	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.9	4.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.8	0.4	0.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.9	1.4	3.6	0.0
LnGrp Delay(d),s/veh							0.0	0.0	1.3	5.3	4.5	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								402			625	
Approach Delay, s/veh								1.3			4.7	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				34.0				34.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				29.4				29.4
Max Q Clear Time (g_c+I1), s				8.9				4.0
Green Ext Time (p_c), s				1.8				1.2

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	1915	0	0	0	0	0	245	120	0	0	0
Future Volume (veh/h)	185	1915	0	0	0	0	0	245	120	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1500	0				0	1500	1440			
Adj Flow Rate, veh/h	193	1995	0				0	255	120			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	251	2157	0				0	626	284			
Arrive On Green	0.19	0.19	0.00				0.00	0.32	0.32			
Sat Flow, veh/h	344	3800	0				0	1940	881			
Grp Volume(v), veh/h	762	1426	0				0	195	180			
Grp Sat Flow(s),veh/h/ln	1414	1365	0				0	1500	1322			
Q Serve(g_s), s	40.9	41.0	0.0				0.0	8.1	8.5			
Cycle Q Clear(g_c), s	42.6	41.0	0.0				0.0	8.1	8.5			
Prop In Lane	0.25		0.00				0.00		0.67			
Lane Grp Cap(c), veh/h	859	1549	0				0	484	426			
V/C Ratio(X)	0.89	0.92	0.00				0.00	0.40	0.42			
Avail Cap(c_a), veh/h	859	1549	0				0	484	426			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	31.3	30.7	0.0				0.0	21.1	21.3			
Incr Delay (d2), s/veh	13.1	10.4	0.0				0.0	2.5	3.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	19.9	17.8	0.0				0.0	3.7	3.5			
LnGrp Delay(d),s/veh	44.5	41.1	0.0				0.0	23.6	24.3			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2188						375				
Approach Delay, s/veh		42.3						23.9				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				30.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 26		45.4		
Max Q Clear Time (g_c+I1), s				10.5		44.6		
Green Ext Time (p_c), s				2.8		0.8		

Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1960	80	0	0	0	0	0	230	200	270	0
Future Volume (veh/h)	0	1960	80	0	0	0	0	0	230	200	270	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1500	1382				0	1588	1591	1560	1500	0
Adj Flow Rate, veh/h	0	2042	78				0	0	224	208	281	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1101	1057	1282	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1288	1001	1500	0
Grp Volume(v), veh/h		0.0					0	0	224	208	281	0
Grp Sat Flow(s),veh/h/ln							0	0	1288	1001	1500	0
Q Serve(g_s), s							0.0	0.0	0.9	5.0	4.4	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.9	6.0	4.4	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1101	1057	1282	0
V/C Ratio(X)							0.00	0.00	0.20	0.20	0.22	0.00
Avail Cap(c_a), veh/h							0	0	1101	1057	1282	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.1	3.2	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.4	0.4	0.4	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.4	1.5	2.0	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.8	4.5	3.6	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								224			489	
Approach Delay, s/veh								0.8			4.0	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				26.5				26.5
Max Q Clear Time (g_c+I1), s				8.0				2.9
Green Ext Time (p_c), s				1.4				0.6

Intersection Summary	
HCM 2010 Ctrl Delay	3.0
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	2115	175	0	0	0	0	305	30	110	130	0
Future Volume (veh/h)	100	2115	175	0	0	0	0	305	30	110	130	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.92	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	104	2203	171				0	318	22	115	135	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	116	2596	205				0	629	43	255	543	0
Arrive On Green	0.19	0.19	0.19				0.00	0.21	0.21	0.03	0.21	0.00
Sat Flow, veh/h	200	4488	355				0	3088	206	1597	1744	0
Grp Volume(v), veh/h	911	756	811				0	167	173	115	135	0
Grp Sat Flow(s),veh/h/ln	1755	1606	1682				0	1593	1618	1597	1744	0
Q Serve(g_s), s	40.6	36.2	37.2				0.0	7.4	7.6	0.0	5.2	0.0
Cycle Q Clear(g_c), s	40.6	36.2	37.2				0.0	7.4	7.6	0.0	5.2	0.0
Prop In Lane	0.11		0.21				0.00		0.13	1.00		0.00
Lane Grp Cap(c), veh/h	1015	929	973				0	334	339	255	543	0
V/C Ratio(X)	0.90	0.81	0.83				0.00	0.50	0.51	0.45	0.25	0.00
Avail Cap(c_a), veh/h	1015	929	973				0	334	339	255	543	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.1	28.3	28.7				0.0	28.0	28.1	34.1	23.9	0.0
Incr Delay (d2), s/veh	12.2	7.8	8.3				0.0	5.3	5.4	5.7	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.2	18.1	19.6				0.0	3.7	3.9	2.9	2.7	0.0
LnGrp Delay(d),s/veh	42.3	36.1	37.0				0.0	33.3	33.4	39.8	25.0	0.0
LnGrp LOS	D	D	D					C	C	D	C	
Approach Vol, veh/h		2478						340			250	
Approach Delay, s/veh		38.7						33.4			31.8	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		51.0		29.2			8.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		46.4		* 25			* 4	* 17
Max Q Clear Time (g_c+I1), s		42.6		7.2			2.0	9.6
Green Ext Time (p_c), s		3.7		0.9			0.1	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	37.5
HCM 2010 LOS	D

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	75	70	93.2%	26.0	4.8	D
	Through						
	Right Turn						
	Subtotal	75	70	93.2%	26.0	4.8	D
EB	Left Turn	45	43	96.5%	3.1	0.4	A
	Through	2,245	2,176	96.9%	2.6	0.2	A
	Right Turn						
	Subtotal	2,290	2,219	96.9%	2.6	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,365	2,289	96.8%	3.4	0.4	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	80	85	105.8%	18.2	2.3	B
	Right Turn	290	278	95.9%	18.1	3.6	B
	Subtotal	370	363	98.1%	18.2	2.6	B
SB	Left Turn	100	95	94.6%	22.4	4.9	C
	Through	170	153	90.1%	16.0	3.3	B
	Right Turn						
	Subtotal	270	248	91.7%	18.5	1.9	B
EB	Left Turn	50	49	97.2%	17.4	2.9	B
	Through	2,200	2,120	96.3%	15.1	0.9	B
	Right Turn	40	37	92.0%	7.8	4.2	A
	Subtotal	2,290	2,205	96.3%	15.0	0.9	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,930	2,816	96.1%	15.7	1.0	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	2265	50	0	0	0	0	200	130	130	180	0
Future Volume (veh/h)	215	2265	50	0	0	0	0	200	130	130	180	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1412	1382	1355	0
Adj Flow Rate, veh/h	224	2359	29				0	208	125	135	188	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	223	2533	642				0	491	404	257	439	0
Arrive On Green	0.18	0.18	0.18				0.00	0.35	0.35	0.69	0.69	0.00
Sat Flow, veh/h	408	4626	1172				0	1412	1162	496	1324	0
Grp Volume(v), veh/h	765	1818	29				0	208	125	156	167	0
Grp Sat Flow(s),veh/h/ln	1391	1214	1172				0	1412	1162	587	1172	0
Q Serve(g_s), s	43.8	39.2	1.6				0.0	9.0	6.3	11.6	4.9	0.0
Cycle Q Clear(g_c), s	43.8	39.2	1.6				0.0	9.0	6.3	20.6	4.9	0.0
Prop In Lane	0.29		1.00				0.00		1.00	0.87		0.00
Lane Grp Cap(c), veh/h	762	1994	642				0	491	404	288	407	0
V/C Ratio(X)	1.00	0.91	0.05				0.00	0.42	0.31	0.54	0.41	0.00
Avail Cap(c_a), veh/h	762	1994	642				0	491	404	288	407	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.8	30.9	15.5				0.0	20.0	19.1	14.3	8.7	0.0
Incr Delay (d2), s/veh	33.5	7.8	0.1				0.0	2.7	2.0	7.1	3.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.0	14.6	0.6				0.0	3.9	2.2	3.3	1.8	0.0
LnGrp Delay(d),s/veh	66.3	38.7	15.6				0.0	22.6	21.1	21.4	11.8	0.0
LnGrp LOS	F	D	B					C	C	C	B	
Approach Vol, veh/h		2612						333			323	
Approach Delay, s/veh		46.5						22.1			16.4	
Approach LOS		D						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.0		32.0				32.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 44		* 28				* 28
Max Q Clear Time (g_c+I1), s		45.8		11.0				22.6
Green Ext Time (p_c), s		0.0		1.3				0.7

Intersection Summary	
HCM 2010 Ctrl Delay	41.0
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	2375	120	0	0	0	0	140	340	85	235	0
Future Volume (veh/h)	30	2375	120	0	0	0	0	140	340	85	235	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1468	1412	1412	0
Adj Flow Rate, veh/h	31	2474	76				0	146	319	89	245	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	32	2738	614				0	408	351	243	408	0
Arrive On Green	0.18	0.18	0.18				0.00	0.29	0.29	0.58	0.58	0.00
Sat Flow, veh/h	58	4993	1119				0	1412	1216	738	1412	0
Grp Volume(v), veh/h	747	1758	76				0	146	319	89	245	0
Grp Sat Flow(s),veh/h/ln	1409	1214	1119				0	1412	1216	738	1412	0
Q Serve(g_s), s	42.1	37.6	4.6				0.0	6.6	20.2	7.4	9.0	0.0
Cycle Q Clear(g_c), s	42.1	37.6	4.6				0.0	6.6	20.2	14.0	9.0	0.0
Prop In Lane	0.04		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	773	1998	614				0	408	351	243	408	0
V/C Ratio(X)	0.97	0.88	0.12				0.00	0.36	0.91	0.37	0.60	0.00
Avail Cap(c_a), veh/h	773	1998	614				0	468	403	274	468	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.97	0.97	0.00
Uniform Delay (d), s/veh	32.0	30.2	16.7				0.0	22.6	27.4	17.5	13.9	0.0
Incr Delay (d2), s/veh	4.7	0.6	0.0				0.0	0.5	22.1	0.9	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.5	12.8	1.4				0.0	2.6	8.9	1.5	3.6	0.0
LnGrp Delay(d),s/veh	36.7	30.8	16.7				0.0	23.1	49.5	18.4	15.5	0.0
LnGrp LOS	D	C	B					C	D	B	B	
Approach Vol, veh/h		2581						465			334	
Approach Delay, s/veh		32.1						41.2			16.3	
Approach LOS		C						D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.4		29.6				29.6
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		40.5		26.5				26.5
Max Q Clear Time (g_c+I1), s		44.1		22.2				16.0
Green Ext Time (p_c), s		0.0		0.9				1.2

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1790	1005	0	0	0	0	0	0	365	780	0
Future Volume (veh/h)	0	1790	1005	0	0	0	0	0	0	365	780	0
Number	5	2	12							7	4	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	0	1500	1500							1500	1500	0
Adj Flow Rate, veh/h	0	1808	1016							380	812	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.96	0.96	0.96							0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2							2	2	0
Cap, veh/h	0	2268	1285							476	1000	0
Arrive On Green	0.00	0.17	0.17							0.11	0.11	0.00
Sat Flow, veh/h	0	4500	2550							1429	3000	0
Grp Volume(v), veh/h	0	1808	1016							380	812	0
Grp Sat Flow(s),veh/h/ln	0	1500	1275							1429	1500	0
Q Serve(g_s), s	0.0	30.9	30.6							20.8	21.2	0.0
Cycle Q Clear(g_c), s	0.0	30.9	30.6							20.8	21.2	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2268	1285							476	1000	0
V/C Ratio(X)	0.00	0.80	0.79							0.80	0.81	0.00
Avail Cap(c_a), veh/h	0	2268	1285							545	1144	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.18	0.18							0.88	0.88	0.00
Uniform Delay (d), s/veh	0.0	29.4	29.3							33.0	33.1	0.0
Incr Delay (d2), s/veh	0.0	0.6	1.0							6.5	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.0	11.0							9.1	9.3	0.0
LnGrp Delay(d),s/veh	0.0	30.0	30.2							39.4	36.7	0.0
LnGrp LOS		C	C							D	D	
Approach Vol, veh/h		2824									1192	
Approach Delay, s/veh		30.1									37.6	
Approach LOS		C									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.8		31.2				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		36.5		30.5				
Max Q Clear Time (g_c+I1), s		32.9		23.2				
Green Ext Time (p_c), s		3.4		3.5				

Intersection Summary	
HCM 2010 Ctrl Delay	32.3
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	900	1305	0	0	0	0	0	1380	560	0	0	0
Future Volume (veh/h)	900	1305	0	0	0	0	0	1380	560	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1468	1500	0				0	1412	1412			
Adj Flow Rate, veh/h	1002	1270	0				0	1534	501			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	1466	1380	0				0	1789	495			
Arrive On Green	0.15	0.15	0.00				0.00	0.42	0.42			
Sat Flow, veh/h	2797	3000	0				0	4235	1172			
Grp Volume(v), veh/h	1002	1270	0				0	1534	501			
Grp Sat Flow(s),veh/h/ln	1398	1500	0				0	1412	1172			
Q Serve(g_s), s	27.6	33.4	0.0				0.0	26.2	33.8			
Cycle Q Clear(g_c), s	27.6	33.4	0.0				0.0	26.2	33.8			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1466	1380	0				0	1789	495			
V/C Ratio(X)	0.68	0.92	0.00				0.00	0.86	1.01			
Avail Cap(c_a), veh/h	1466	1380	0				0	1789	495			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	30.0	32.5	0.0				0.0	20.9	23.1			
Incr Delay (d2), s/veh	2.6	11.4	0.0				0.0	5.6	43.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	11.2	16.1	0.0				0.0	11.0	16.8			
LnGrp Delay(d),s/veh	32.6	43.9	0.0				0.0	26.5	66.6			
LnGrp LOS	C	D						C	F			
Approach Vol, veh/h		2272						2035				
Approach Delay, s/veh		38.9						36.4				
Approach LOS		D						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		41.0		39.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 37		* 34				
Max Q Clear Time (g_c+I1), s		35.4		35.8				
Green Ext Time (p_c), s		1.4		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	37.7
HCM 2010 LOS	D

Notes
User approved volume balancing among the lanes for turning movement.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	280	40	70	280	50	60	220	170	90	130	30
Future Volume (veh/h)	20	280	40	70	280	50	60	220	170	90	130	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		0.96	1.00		0.96	1.00		0.96	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2039	2039	2000	1961	1961	2000	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	21	292	35	73	292	45	62	229	145	94	135	22
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	389	47	155	449	69	271	302	191	213	395	64
Arrive On Green	0.03	0.22	0.22	0.08	0.27	0.27	0.15	0.29	0.29	0.12	0.26	0.26
Sat Flow, veh/h	1942	1778	213	1867	1650	254	1774	1047	663	1774	1543	251
Grp Volume(v), veh/h	21	0	327	73	0	337	62	0	374	94	0	157
Grp Sat Flow(s),veh/h/ln	1942	0	1991	1867	0	1904	1774	0	1711	1774	0	1795
Q Serve(g_s), s	0.6	0.0	9.1	2.2	0.0	9.2	1.8	0.0	11.7	2.9	0.0	4.2
Cycle Q Clear(g_c), s	0.6	0.0	9.1	2.2	0.0	9.2	1.8	0.0	11.7	2.9	0.0	4.2
Prop In Lane	1.00		0.11	1.00		0.13	1.00		0.39	1.00		0.14
Lane Grp Cap(c), veh/h	58	0	436	155	0	518	271	0	493	213	0	459
V/C Ratio(X)	0.37	0.00	0.75	0.47	0.00	0.65	0.23	0.00	0.76	0.44	0.00	0.34
Avail Cap(c_a), veh/h	263	0	841	317	0	868	301	0	667	301	0	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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	21.5	25.8	0.0	19.0	21.9	0.0	19.1	24.1	0.0	17.9
Incr Delay (d2), s/veh	1.4	0.0	2.6	0.8	0.0	1.4	0.2	0.0	3.4	0.5	0.0	0.4
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	0.4	0.0	5.2	1.2	0.0	5.1	0.9	0.0	6.0	1.4	0.0	2.1
LnGrp Delay(d),s/veh	29.5	0.0	24.1	26.6	0.0	20.4	22.1	0.0	22.5	24.7	0.0	18.3
LnGrp LOS	C		C	C		C	C		C	C		B
Approach Vol, veh/h		348			410			436			251	
Approach Delay, s/veh		24.5			21.5			22.5			20.7	
Approach LOS		C			C			C			C	

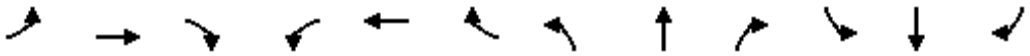
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	17.8	13.0	19.3	5.7	20.9	11.1	21.2
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	24.9	10.0	* 23	8.0	26.9	10.0	* 23
Max Q Clear Time (g_c+I1), s	4.2	11.1	3.8	6.2	2.6	11.2	4.9	13.7
Green Ext Time (p_c), s	0.0	1.1	0.0	0.5	0.0	1.2	0.1	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.4
HCM 2010 LOS	C

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	490	50	0	635	10	25
Future Volume (vph)	490	50	0	635	10	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			3.0	5.6	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	0.99	
Frt	0.99			1.00	0.90	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1561			1588	1401	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1561			1588	1401	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	510	52	0	661	10	26
RTOR Reduction (vph)	5	0	0	0	21	0
Lane Group Flow (vph)	557	0	0	661	15	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA	Perm	
Protected Phases	2			3 4 6		
Permitted Phases					8	
Actuated Green, G (s)	34.1			54.9	13.9	
Effective Green, g (s)	34.1			48.9	13.9	
Actuated g/C Ratio	0.43			0.61	0.17	
Clearance Time (s)	6.0				5.6	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	665			970	243	
v/s Ratio Prot	c0.36			c0.42		
v/s Ratio Perm					c0.01	
v/c Ratio	0.84			0.68	0.06	
Uniform Delay, d1	20.5			10.4	27.6	
Progression Factor	0.64			0.35	0.72	
Incremental Delay, d2	10.7			0.5	0.1	
Delay (s)	23.9			4.2	20.0	
Level of Service	C			A	C	
Approach Delay (s)	23.9			4.2	20.0	
Approach LOS	C			A	C	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

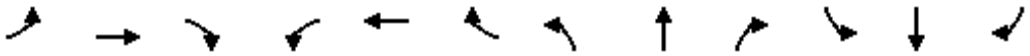


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	455	5	0	290	15	30	25	20	10	20	20
Future Volume (vph)	0	455	5	0	290	15	30	25	20	10	20	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1585			1574			1487			1461	
Flt Permitted		1.00			1.00			0.85			0.92	
Satd. Flow (perm)		1585			1574			1285			1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	474	5	0	302	16	31	26	21	10	21	21
RTOR Reduction (vph)	0	0	0	0	2	0	0	19	0	0	19	0
Lane Group Flow (vph)	0	479	0	0	316	0	0	59	0	0	33	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			4 6			8			8	
Permitted Phases							8			8		
Actuated Green, G (s)		43.0			58.8			9.2			9.2	
Effective Green, g (s)		43.0			58.8			9.2			9.2	
Actuated g/C Ratio		0.54			0.73			0.11			0.11	
Clearance Time (s)		6.0						6.0			6.0	
Vehicle Extension (s)		3.0						1.5			1.5	
Lane Grp Cap (vph)		851			1156			147			155	
v/s Ratio Prot		c0.30			c0.20							
v/s Ratio Perm								c0.05			0.02	
v/c Ratio		0.56			0.27			0.40			0.22	
Uniform Delay, d1		12.3			3.5			32.9			32.1	
Progression Factor		0.58			0.05			0.38			0.84	
Incremental Delay, d2		2.3			0.0			0.6			0.1	
Delay (s)		9.4			0.2			13.0			27.1	
Level of Service		A			A			B			C	
Approach Delay (s)		9.4			0.2			13.0			27.1	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

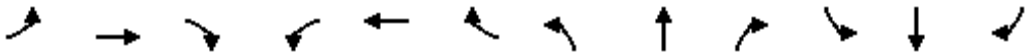
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	515	0	0	625	10	25
Future Volume (vph)	515	0	0	625	10	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			6.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.90	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1588			1588	1414	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1588			1588	1414	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	536	0	0	651	10	26
RTOR Reduction (vph)	0	0	0	0	21	0
Lane Group Flow (vph)	536	0	0	651	15	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	53.6			34.1	14.8	
Effective Green, g (s)	48.0			34.1	14.8	
Actuated g/C Ratio	0.60			0.43	0.19	
Clearance Time (s)				6.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	952			676	261	
v/s Ratio Prot	c0.34			c0.41	c0.01	
v/s Ratio Perm						
v/c Ratio	0.56			0.96	0.06	
Uniform Delay, d1	9.7			22.3	26.9	
Progression Factor	0.29			1.04	1.82	
Incremental Delay, d2	0.4			20.9	0.0	
Delay (s)	3.3			44.0	48.9	
Level of Service	A			D	D	
Approach Delay (s)	3.3			44.0	48.9	
Approach LOS	A			D	D	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	485	0	0	285	15	20	20	20	0	0	0
Future Volume (vph)	0	485	0	0	285	15	20	20	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1573			1470				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1573			1470				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	505	0	0	297	16	21	21	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	505	0	0	311	0	0	45	0	0	0	0
Confl. Peds. (#/hr)	10		10			10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		58.2			43.0			9.8				
Effective Green, g (s)		58.2			43.0			9.8				
Actuated g/C Ratio		0.73			0.54			0.12				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1155			845			180				
v/s Ratio Prot		c0.32			0.20			c0.03				
v/s Ratio Perm												
v/c Ratio		0.44			0.37			0.25				
Uniform Delay, d1		4.4			10.7			31.8				
Progression Factor		0.09			0.52			1.01				
Incremental Delay, d2		0.1			1.2			0.2				
Delay (s)		0.5			6.7			32.3				
Level of Service		A			A			C				
Approach Delay (s)		0.5			6.7			32.3			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	370	0	0	425	50	20	5	20	0	0	0
Future Volume (vph)	0	370	0	0	425	50	20	5	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1537			1442				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1537			1442				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	385	0	0	443	52	21	5	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	5	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	385	0	0	490	0	0	29	0	0	0	0
Confl. Peds. (#/hr)	59		21			59			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		55.1			36.8			13.3				
Effective Green, g (s)		55.1			36.8			13.3				
Actuated g/C Ratio		0.69			0.46			0.17				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1093			707			239				
v/s Ratio Prot		c0.24			c0.32			c0.02				
v/s Ratio Perm												
v/c Ratio		0.35			0.69			0.12				
Uniform Delay, d1		5.1			17.1			28.4				
Progression Factor		0.21			0.78			1.01				
Incremental Delay, d2		0.2			5.0			0.2				
Delay (s)		1.3			18.4			28.9				
Level of Service		A			B			C				
Approach Delay (s)		1.3			18.4			28.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	28.1	46.2	0.07	5.3	F
C	IV	25	18.9	11.5	30.4	0.07	8.5	E
B	IV	25	17.9	43.2	61.1	0.07	4.0	F
A	IV	25	18.5	12.3	30.8	0.07	8.1	E
Lindaro	IV	25	25.3	18.1	43.4	0.14	11.6	D
Lincoln	IV	25	21.4	57.0	78.4	0.10	4.5	F
Francisco W.	IV	25	12.2	30.8	43.0	0.05	3.9	F
101 SBOn 2nd	IV	25	14.2	22.1	36.3	0.05	5.3	F
Total	IV		146.5	223.1	369.6	0.61	6.0	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	24.0	43.0	0.07	6.0	F
Tamalpais	IV	25	14.4	34.9	49.3	0.05	4.0	F
Lincoln	IV	25	13.2	17.0	30.2	0.05	6.0	F
Lindaro	IV	25	21.4	3.2	24.6	0.10	14.2	C
A	IV	25	25.3	15.5	40.8	0.14	12.4	D
B	IV	25	17.9	8.8	26.7	0.07	9.1	D
C	IV	25	19.0	4.5	23.5	0.07	11.0	D
D	IV	25	18.7	2.6	21.3	0.07	11.9	D
Total	IV		148.9	110.5	259.4	0.62	8.7	E

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	29	24.0	42.9	66.9	0.16	8.6	E
5th	IV	25	16.3	3.3	19.6	0.06	11.3	D
4th	IV	25	14.6	6.3	20.9	0.05	9.5	D
3rd	IV	25	17.7	10.2	27.9	0.07	8.6	E
2nd	IV	25	15.6	75.4	91.0	0.06	2.3	F
Total	IV		88.2	138.1	226.3	0.40	6.4	F

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	30	25.2	27.4	52.6	0.17	11.5	D
3rd St	IV	25	14.8	18.1	32.9	0.06	6.1	F
4th	IV	25	18.3	17.1	35.4	0.07	7.0	E
5th	IV	25	14.6	9.7	24.3	0.06	8.2	E
Mission	IV	25	15.7	5.9	21.6	0.06	9.9	D
Total	IV		88.6	78.2	166.8	0.41	8.8	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	14.6	43.1	0.16	13.2	C
Tamalpais	IV	25	16.0	49.8	65.8	0.06	3.3	F
Tamalpais	IV	25	3.1	5.7	8.8	0.01	4.8	F
Hetherton	IV	25	8.7	10.2	18.9	0.03	6.3	F
Irwin	IV	25	18.9	14.7	33.6	0.07	7.6	E
Total	IV		75.2	95.0	170.2	0.33	7.1	E

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	27.6	49.2	0.10	7.2	E
Hetherton	IV	25	18.9	23.4	42.3	0.07	6.1	F
Tamalpais	IV	25	8.7	115.6	124.3	0.03	1.0	F
Tamalpais	IV	25	3.1	4.7	7.8	0.01	5.4	F
Lincoln	IV	25	16.0	80.8	96.8	0.06	2.2	F
Total	IV		68.3	252.1	320.4	0.27	3.1	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	17.6	35.7	0.07	6.9	F
C	IV	25	18.9	13.8	32.7	0.07	7.9	E
B	IV	25	17.9	14.9	32.8	0.07	7.4	E
A	IV	25	18.5	12.1	30.6	0.07	8.2	E
Lindaro	IV	25	25.3	12.3	37.6	0.14	13.4	C
Lincoln	IV	25	21.4	36.4	57.8	0.10	6.1	F
Francisco W.	IV	25	12.2	19.0	31.2	0.05	5.3	F
101 SBOn Hetherton	IV	25	14.2	61.0	75.2	0.05	2.6	F
Total	IV		146.5	187.1	333.6	0.61	6.6	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	40.6	59.6	0.07	4.3	F
Tamalpais	IV	25	14.4	49.9	64.3	0.05	3.0	F
Lincoln	IV	25	13.2	17.8	31.0	0.05	5.8	F
Lindaro	IV	25	21.4	4.6	26.0	0.10	13.5	C
A	IV	25	25.3	6.1	31.4	0.14	16.1	C
B	IV	25	17.9	7.1	25.0	0.07	9.7	D
C	IV	25	19.0	4.3	23.3	0.07	11.1	D
D	IV	25	18.7	2.9	21.6	0.07	11.7	D
Total	IV		148.9	133.3	282.2	0.62	8.0	E

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	35	22.2	35.6	57.8	0.16	9.9	D
5th	IV	25	16.3	6.7	23.0	0.06	9.6	D
4th	IV	25	14.6	7.4	22.0	0.05	9.0	E
3rd	IV	25	17.7	22.8	40.5	0.07	5.9	F
2nd	IV	25	15.6	25.7	41.3	0.06	5.1	F
Total	IV		86.4	98.2	184.6	0.40	7.8	E

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	38	19.3	55.5	74.8	0.17	8.1	E
3rd St	IV	25	14.8	18.6	33.4	0.06	6.0	F
4th	IV	25	18.9	3.7	22.6	0.07	11.4	D
5th	IV	25	14.0	12.2	26.2	0.05	7.3	E
Mission	IV	25	15.7	3.2	18.9	0.06	11.3	D
Total	IV		82.7	93.2	175.9	0.41	8.3	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	12.1	40.6	0.16	14.0	C
Tamalpais	IV	25	16.1	25.9	42.0	0.06	5.2	F
Tamalpais	IV	25	4.3	3.1	7.4	0.02	7.9	E
Hetherton	IV	25	7.5	8.0	15.5	0.03	6.6	F
Irwin	IV	25	18.9	14.4	33.3	0.07	7.7	E
Total	IV		75.3	63.5	138.8	0.33	8.7	E

Arterial Level of Service: WB Mission

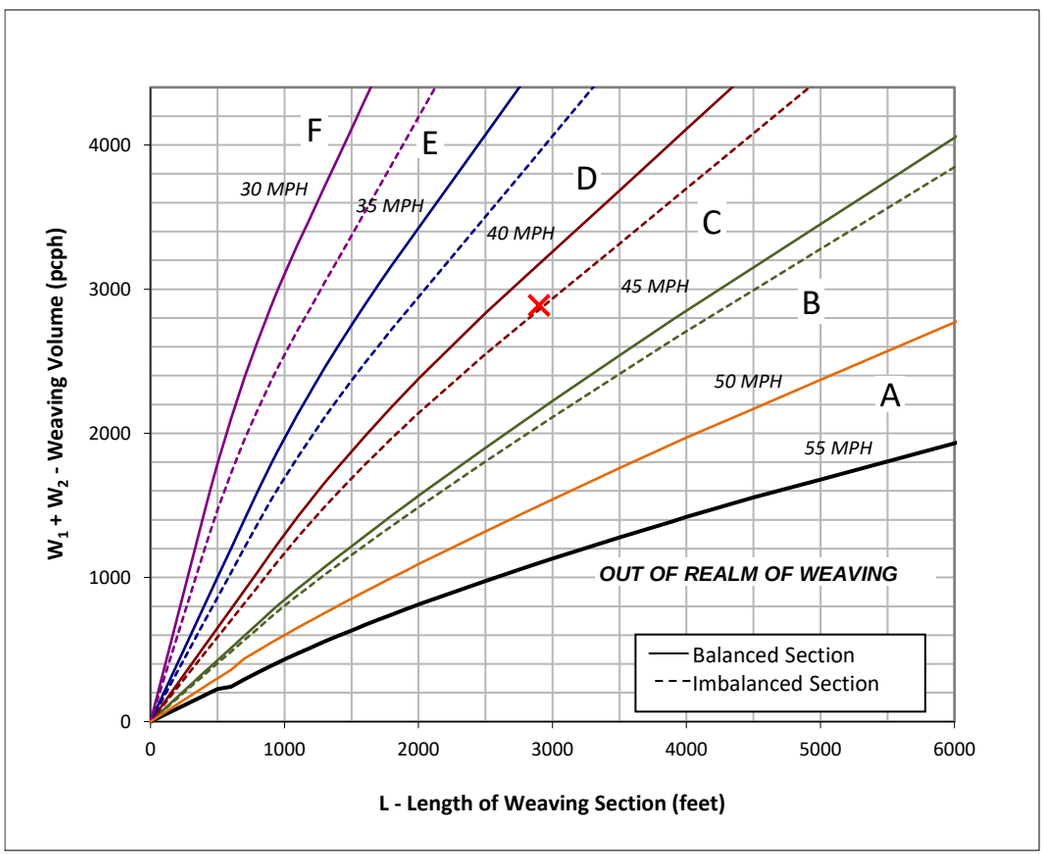
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	30.4	52.0	0.10	6.8	F
Hetherton	IV	25	18.9	8.3	27.2	0.07	9.4	D
Tamalpais	IV	25	7.5	46.6	54.1	0.03	1.9	F
Tamalpais	IV	25	4.3	2.7	7.0	0.02	8.4	E
Lincoln	IV	25	16.1	31.9	48.0	0.06	4.6	F
Total	IV		68.4	119.9	188.3	0.27	5.3	F

Leisch Method for Weaving Analysis

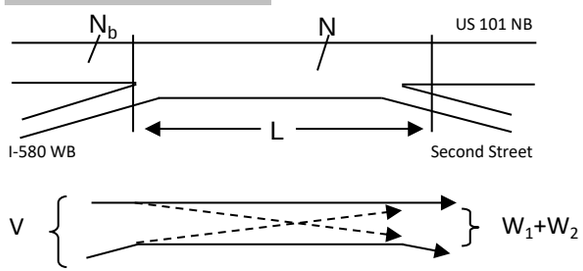
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Baseline AM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,707	Volume (vph)*	1,754	Volume (vph)*	1,016
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	4%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	5,958	Volume (pcph)	1,831	Volume (pcph)	1,058



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	N
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.8
4. Weaving Intensity Factor (k)	2.54
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,517
6. Level of Service (LOS)	D

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3833	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1404
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.61
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	23.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	820
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.50
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.8
Speed 2 (S_2), mi/h	0.2	Density (D_{ML}), pc/mi/ln	13.7
Speed 2 (S_3), mi/h	1.4	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5612	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1594
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.69
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	26.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5803	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	2097
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.91
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	55.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	37.8
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	3/17/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5803	1448
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	4.40	3.72
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.958
Flow Rate (v_i), pc/h	6291	1643
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.91	0.78

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	62470.8	Density in Ramp Influence Area (D_R), pc/mi/ln	37.9
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.381
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2199
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	53.1
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.527	Outer Lanes Freeway Speed (S_O), mi/h	61.1
Flow in Lanes 1 and 2 (v_{12}), pc/h	4092	Ramp Junction Speed (S), mi/h	55.6
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	37.7
Level of Service (LOS)	E		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0

Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4355	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1628
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.71
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	27.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

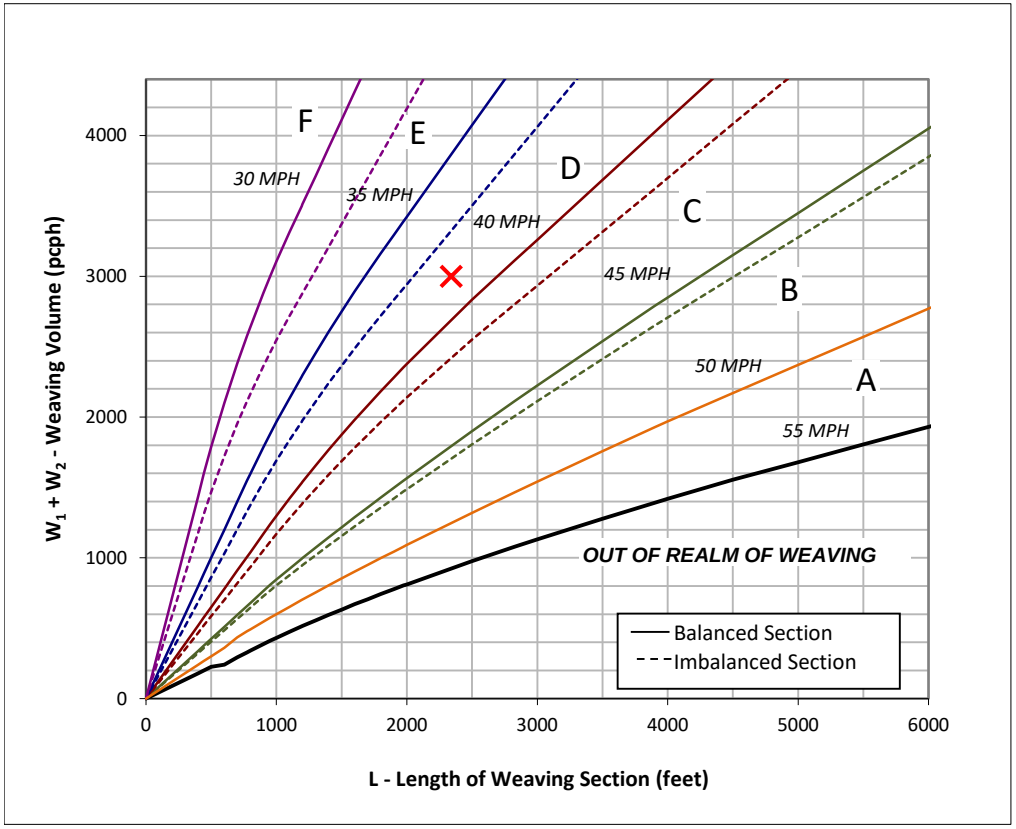
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	998	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1104
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.0
Speed 2 (S_2), mi/h	1.0	Density (D_{ML}), pc/mi/ln	18.7
Speed 2 (S_3), mi/h	5.0	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

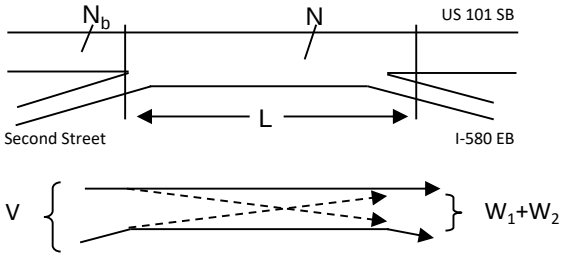
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Baseline AM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,697	Volume (vph)*	1,709	Volume (vph)*	1,177
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	6,992	Volume (pcph)	1,754	Volume (pcph)	1,247



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.7
4. Weaving Intensity Factor (k)	2.60
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	2,248
6. Level of Service (LOS)	F

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

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

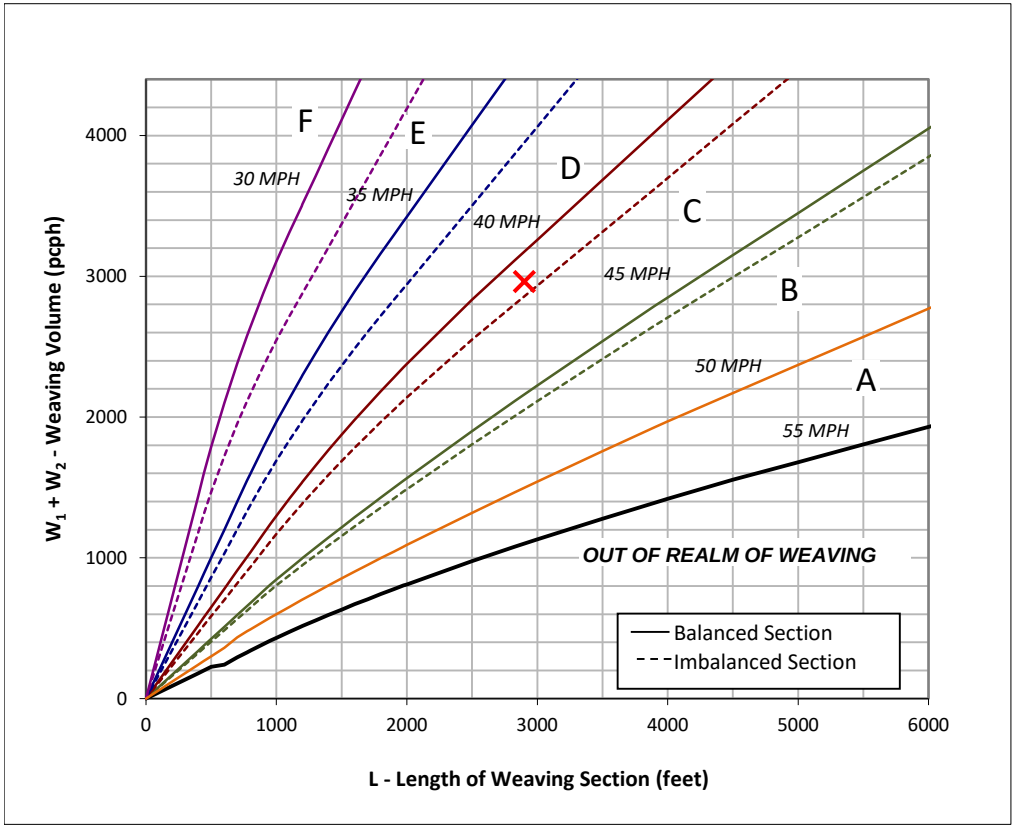
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Leisch Method for Weaving Analysis

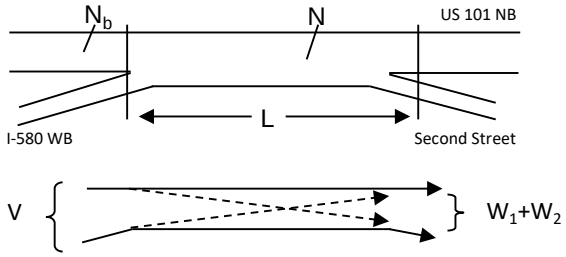
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Baseline PM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,739	Volume (vph)*	1,546	Volume (vph)*	1,315
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	7,036	Volume (pcph)	1,614	Volume (pcph)	1,350



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.5
4. Weaving Intensity Factor (k)	2.55
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,827
6. Level of Service (LOS)	E

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4799	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1776
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.77
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	29.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	848	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	890
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.7
Speed 2 (S_2), mi/h	0.3	Density (D_{ML}), pc/mi/ln	14.9
Speed 2 (S_3), mi/h	2.1	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6959	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1997
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	57.1
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	35.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1217	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	1342
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.81
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	57.7
Speed 2 (S_2), mi/h	2.3	Density (D_{ML}), pc/mi/ln	23.3
Speed 2 (S_3), mi/h	9.8	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5072	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1833
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.80
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	31.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1377	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1555
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	56.0
Speed 2 (S_2), mi/h	4.0	Density (D_{ML}), pc/mi/ln	27.8
Speed 2 (S_3), mi/h	15.4	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5072	1737
Peak Hour Factor (PHF)	0.97	0.96
Total Trucks, %	4.40	2.00
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.973
Flow Rate (v_i), pc/h	5498	1860
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.80	0.89

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	101150.1	Density in Ramp Influence Area (D_R), pc/mi/ln	35.5
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.400
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1684
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	52.8
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.537	Outer Lanes Freeway Speed (S_O), mi/h	63.2
Flow in Lanes 1 and 2 (v_{12}), pc/h	3814	Ramp Junction Speed (S), mi/h	55.6
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	33.0
Level of Service (LOS)	E		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1380	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1559
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	55.9
Speed 2 (S_2), mi/h	4.1	Density (D_{ML}), pc/mi/ln	27.9
Speed 2 (S_3), mi/h	15.5	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3335	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1247
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	20.8
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

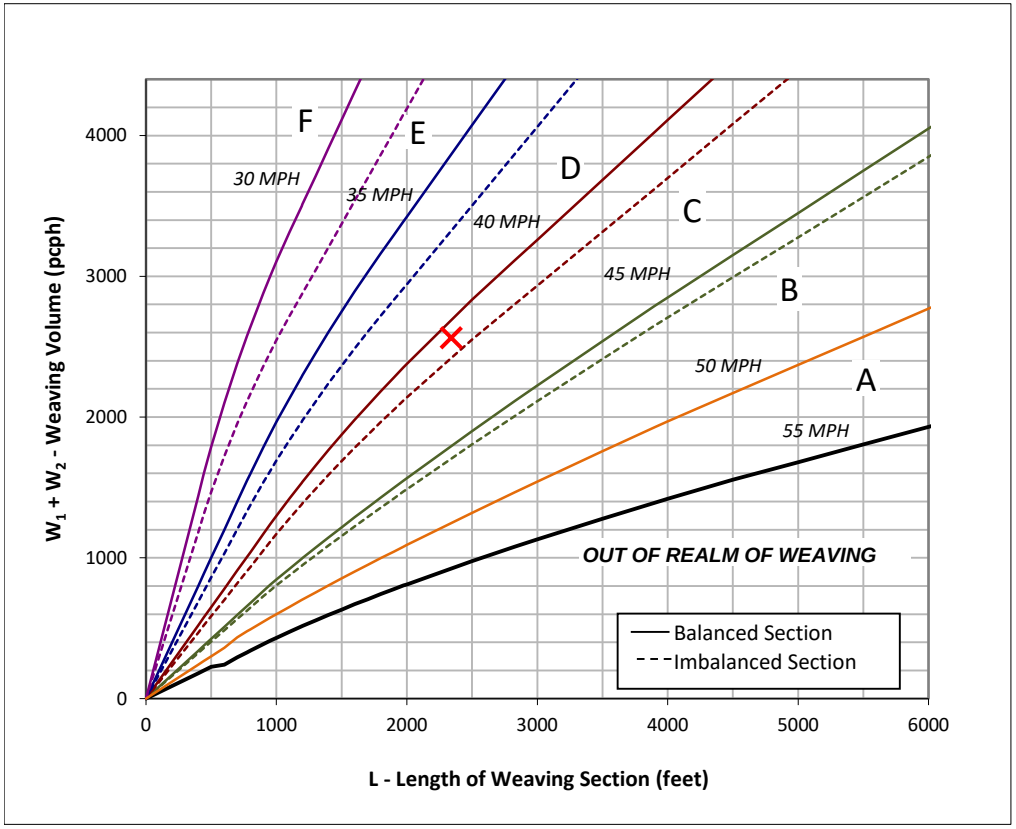
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	918	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1049
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.64
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.2
Speed 2 (S_2), mi/h	0.8	Density (D_{ML}), pc/mi/ln	17.7
Speed 2 (S_3), mi/h	4.2	Level of Service (LOS)	B

Leisch Method for Weaving Analysis

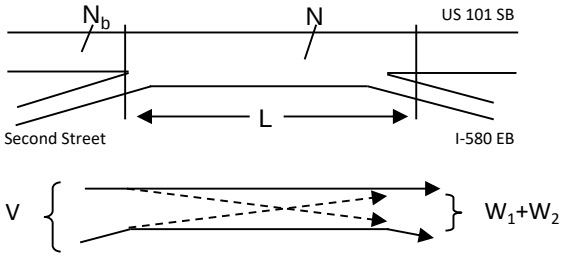
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Baseline PM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	5,056	994	1,409
Truck Percentage	4%	3%	3%
PCE for Trucks	2.0	2.0	4.1
Volume (pcph)	5,278	1,019	1,545



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	40.7
4. Weaving Intensity Factor (k)	2.47
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,693
6. Level of Service (LOS)	E

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

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

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

Appendix C:
Baseline Plus Project Conditions (R&D Only) –
Technical Calculations

Transportation Impact Study

for BioMarin 999 3rd Street

San Rafael Campus Expansion

April 5, 2019

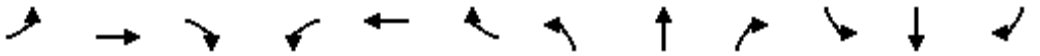
FEHR PEERS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	460	20	70	570	50	20	210	40	60	390	360
Future Volume (veh/h)	110	460	20	70	570	50	20	210	40	60	390	360
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1660	1660	1710	1660	1660	1710	1800	1678	1728	1800	1748	1728
Adj Flow Rate, veh/h	120	500	20	76	620	50	22	228	34	65	424	180
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	148	865	35	372	625	50	73	509	72	144	848	347
Arrive On Green	0.09	0.55	0.55	0.55	0.55	0.55	0.85	0.85	0.85	0.43	0.43	0.43
Sat Flow, veh/h	1581	1582	63	817	1512	122	49	1192	169	206	1988	813
Grp Volume(v), veh/h	120	0	520	76	0	670	284	0	0	362	0	307
Grp Sat Flow(s),veh/h/ln	1581	0	1646	817	0	1634	1410	0	0	1621	0	1385
Q Serve(g_s), s	5.6	0.0	15.7	4.4	0.0	30.5	0.0	0.0	0.0	2.9	0.0	12.2
Cycle Q Clear(g_c), s	5.6	0.0	15.7	10.1	0.0	30.5	3.5	0.0	0.0	11.6	0.0	12.2
Prop In Lane	1.00		0.04	1.00		0.07	0.08		0.12	0.18		0.59
Lane Grp Cap(c), veh/h	148	0	900	372	0	675	653	0	0	748	0	591
V/C Ratio(X)	0.81	0.00	0.58	0.20	0.00	0.99	0.43	0.00	0.00	0.48	0.00	0.52
Avail Cap(c_a), veh/h	148	0	900	372	0	675	653	0	0	748	0	591
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.72	0.00	0.72	0.87	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.4	0.0	11.3	14.0	0.0	16.8	3.4	0.0	0.0	15.6	0.0	15.8
Incr Delay (d2), s/veh	36.9	0.0	2.7	0.9	0.0	27.5	1.8	0.0	0.0	2.2	0.0	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	7.8	1.1	0.0	18.6	1.5	0.0	0.0	5.9	0.0	5.2
LnGrp Delay(d),s/veh	70.3	0.0	14.0	14.9	0.0	44.2	5.2	0.0	0.0	17.8	0.0	19.1
LnGrp LOS	E		B	B		D	A			B		B
Approach Vol, veh/h		640			746			284			669	
Approach Delay, s/veh		24.5			41.2			5.2			18.4	
Approach LOS		C			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.2		36.8	10.0	35.2		36.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 41		25.4	7.0	* 31		25.4
Max Q Clear Time (g_c+I1), s		17.7		5.5	7.6	32.5		14.2
Green Ext Time (p_c), s		5.1		2.4	0.0	0.0		4.5

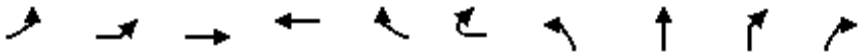
Intersection Summary	
HCM 2010 Ctrl Delay	25.8
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	80	40	220	0	0	0	0	220	1026	465
Future Volume (vph)	0	490	80	40	220	0	0	0	0	220	1026	465
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.97
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.98			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2715			1766						2962	1302
Flt Permitted		1.00			0.86						0.99	1.00
Satd. Flow (perm)		2715			1534						2962	1302
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	533	87	43	239	0	0	0	0	239	1115	505
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	603	0	0	282	0	0	0	0	0	1354	505
Confl. Peds. (#/hr)	15		22	22		15			16			1
Confl. Bikes (#/hr)			3			2			1			3
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1187			670						1319	458
v/s Ratio Prot		c0.22									c0.46	
v/s Ratio Perm					0.18							0.39
v/c Ratio		0.51			0.42						1.03	1.10
Uniform Delay, d1		15.3			14.6						20.8	24.3
Progression Factor		0.61			1.45						1.00	1.00
Incremental Delay, d2		1.3			1.6						31.8	72.9
Delay (s)		10.5			22.6						52.6	97.2
Level of Service		B			C						D	F
Approach Delay (s)		10.5			22.6			0.0			64.7	
Approach LOS		B			C			A			E	

Intersection Summary			
HCM 2000 Control Delay	48.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



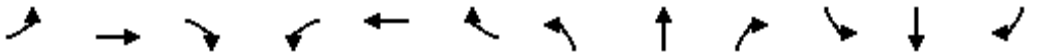
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	380	20	310	160	320	5	110	1071	130	40
Future Volume (vph)	380	20	310	160	320	5	110	1071	130	40
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1494	1794	1615	1471			3428	1295	
Flt Permitted		0.60	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		938	1794	1615	1471			3428	1295	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	22	337	174	348	5	120	1164	141	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0
Lane Group Flow (vph)	0	435	337	174	353	0	0	1284	140	0
Confl. Peds. (#/hr)							13			6
Confl. Bikes (#/hr)					2	2				2
Parking (#/hr)				0				2		
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Effective Green, g (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Actuated g/C Ratio		0.45	0.45	0.25	0.25			0.44	0.44	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		502	808	404	368			1499	566	
v/s Ratio Prot		c0.12	0.19	0.11	c0.24					
v/s Ratio Perm		0.27						0.37	0.11	
v/c Ratio		0.87	0.42	0.43	0.96			0.86	0.25	
Uniform Delay, d1		19.1	13.9	23.6	27.7			19.0	13.3	
Progression Factor		0.99	0.95	1.00	1.00			0.74	0.66	
Incremental Delay, d2		13.8	1.2	3.3	37.7			3.1	0.5	
Delay (s)		32.8	14.3	26.9	65.4			17.2	9.3	
Level of Service		C	B	C	E			B	A	
Approach Delay (s)			24.8	52.7				16.2		
Approach LOS			C	D				B		

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	300	40	70	280	30	10	220	45	40	400	40
Future Volume (veh/h)	30	300	40	70	280	30	10	220	45	40	400	40
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1398	1545	1530	1398	1485	1530	1440	1485	1469	1440	1485	1469
Adj Flow Rate, veh/h	33	326	36	76	304	28	11	239	39	43	435	39
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	243	534	59	257	524	48	58	523	83	82	534	46
Arrive On Green	0.39	0.39	0.39	0.13	0.13	0.13	0.97	0.97	0.97	0.97	0.97	0.97
Sat Flow, veh/h	825	1361	150	802	1336	123	16	1077	171	62	1101	95
Grp Volume(v), veh/h	33	0	362	76	0	332	289	0	0	517	0	0
Grp Sat Flow(s),veh/h/ln	825	0	1511	802	0	1459	1264	0	0	1258	0	0
Q Serve(g_s), s	2.6	0.0	14.4	6.9	0.0	16.1	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.6	0.0	14.4	21.2	0.0	16.1	0.9	0.0	0.0	4.3	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.08	0.04		0.13	0.08		0.08
Lane Grp Cap(c), veh/h	243	0	592	257	0	572	663	0	0	662	0	0
V/C Ratio(X)	0.14	0.00	0.61	0.30	0.00	0.58	0.44	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	243	0	592	257	0	572	663	0	0	662	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	0.85	0.00	0.00	0.51	0.00	0.00
Uniform Delay (d), s/veh	26.4	0.0	18.2	36.0	0.0	26.8	0.6	0.0	0.0	0.6	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	4.6	2.8	0.0	4.0	1.8	0.0	0.0	4.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	6.7	1.7	0.0	7.1	0.6	0.0	0.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	27.6	0.0	22.9	38.8	0.0	30.9	2.3	0.0	0.0	5.3	0.0	0.0
LnGrp LOS	C		C	D		C	A			A		
Approach Vol, veh/h		395			408			289			517	
Approach Delay, s/veh		23.3			32.3			2.3			5.3	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		34.0		41.0		34.0		41.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		29.4		36.4		29.4		36.4
Max Q Clear Time (g_c+I1), s		20.6		2.9		23.2		6.3
Green Ext Time (p_c), s		1.2		1.3		1.0		2.6

Intersection Summary	
HCM 2010 Ctrl Delay	16.0
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	240	165	40	245	0	0	0	0	50	981	115
Future Volume (vph)	0	240	165	40	245	0	0	0	0	50	981	115
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1665			1769						4118	1127
Flt Permitted		1.00			0.91						1.00	1.00
Satd. Flow (perm)		1665			1612						4118	1127
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	261	179	43	266	0	0	0	0	54	1066	125
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	417	0	0	309	0	0	0	0	0	1120	125
Confl. Peds. (#/hr)			15	15		14			22	22		10
Confl. Bikes (#/hr)			4			2			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		728			704						1833	396
v/s Ratio Prot		c0.25										
v/s Ratio Perm					0.19						0.27	0.11
v/c Ratio		0.57			0.44						0.61	0.32
Uniform Delay, d1		15.8			14.7						15.8	17.7
Progression Factor		0.44			1.25						0.17	0.25
Incremental Delay, d2		3.1			1.2						0.4	0.6
Delay (s)		10.1			19.5						3.1	5.0
Level of Service		B			B						A	A
Approach Delay (s)		10.1			19.5			0.0			3.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	100	0	0	155	120	155	1121	10	0	0	0
Future Volume (veh/h)	140	100	0	0	155	120	155	1121	10	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1620	1573	1620			
Adj Flow Rate, veh/h	152	109	0	0	168	90	168	1218	10			
Adj No. of Lanes	1	1	0	0	1	0	0	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0			
Cap, veh/h	237	491	0	0	265	142	180	1379	12			
Arrive On Green	0.10	0.10	0.00	0.00	0.31	0.31	0.19	0.19	0.19			
Sat Flow, veh/h	993	1573	0	0	849	455	319	2440	21			
Grp Volume(v), veh/h	152	109	0	0	0	258	728	0	668			
Grp Sat Flow(s),veh/h/ln	993	1573	0	0	0	1304	1384	0	1396			
Q Serve(g_s), s	10.7	4.8	0.0	0.0	0.0	12.7	38.9	0.0	34.6			
Cycle Q Clear(g_c), s	23.4	4.8	0.0	0.0	0.0	12.7	38.9	0.0	34.6			
Prop In Lane	1.00		0.00	0.00		0.35	0.23		0.01			
Lane Grp Cap(c), veh/h	237	491	0	0	0	407	782	0	789			
V/C Ratio(X)	0.64	0.22	0.00	0.00	0.00	0.63	0.93	0.00	0.85			
Avail Cap(c_a), veh/h	237	491	0	0	0	407	782	0	789			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	40.4	25.3	0.0	0.0	0.0	22.1	29.1	0.0	27.3			
Incr Delay (d2), s/veh	12.5	1.0	0.0	0.0	0.0	7.3	19.2	0.0	10.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	2.2	0.0	0.0	0.0	5.4	19.1	0.0	15.8			
LnGrp Delay(d),s/veh	52.9	26.3	0.0	0.0	0.0	29.5	48.3	0.0	38.2			
LnGrp LOS	D	C				C	D		D			
Approach Vol, veh/h		261			258			1396				
Approach Delay, s/veh		41.8			29.5			43.4				
Approach LOS		D			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		23.4		42.4		23.4		
Max Q Clear Time (g_c+I1), s		25.4		40.9		14.7		
Green Ext Time (p_c), s		0.0		1.1		0.7		

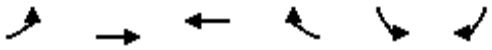
Intersection Summary	
HCM 2010 Ctrl Delay	41.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	260	20	70	310	30	20	225	65	65	370	80
Future Volume (veh/h)	30	260	20	70	310	30	20	225	65	65	370	80
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)	0.99		0.92	0.98		0.92	0.97		0.91	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1573	1510	1620	1573	1573	1620	1620	1573	1555	1620	1573	1555
Adj Flow Rate, veh/h	33	283	18	76	337	28	22	245	57	71	402	77
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	238	536	34	309	546	45	71	517	115	113	496	90
Arrive On Green	0.38	0.38	0.38	0.13	0.13	0.13	0.17	0.17	0.17	1.00	1.00	1.00
Sat Flow, veh/h	894	1396	89	937	1422	118	40	1027	228	116	983	179
Grp Volume(v), veh/h	33	0	301	76	0	365	324	0	0	550	0	0
Grp Sat Flow(s),veh/h/ln	894	0	1485	937	0	1540	1294	0	0	1279	0	0
Q Serve(g_s), s	2.4	0.0	11.7	5.8	0.0	16.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	19.3	0.0	11.7	17.5	0.0	16.8	16.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.08	0.07		0.18	0.13		0.14
Lane Grp Cap(c), veh/h	238	0	570	309	0	591	703	0	0	699	0	0
V/C Ratio(X)	0.14	0.00	0.53	0.25	0.00	0.62	0.46	0.00	0.00	0.79	0.00	0.00
Avail Cap(c_a), veh/h	238	0	570	309	0	591	703	0	0	699	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.46	0.00	0.00	0.46	0.00	0.00
Uniform Delay (d), s/veh	27.5	0.0	17.8	33.4	0.0	27.5	22.4	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	3.5	1.7	0.0	4.4	1.0	0.0	0.0	4.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	5.3	1.6	0.0	7.9	6.3	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	28.7	0.0	21.3	35.2	0.0	31.9	23.4	0.0	0.0	4.2	0.0	0.0
LnGrp LOS	C		C	D		C	C			A		
Approach Vol, veh/h		334			441			324			550	
Approach Delay, s/veh		22.1			32.5			23.4			4.2	
Approach LOS		C			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		42.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 29		* 38		* 29		* 38
Max Q Clear Time (g_c+I1), s		21.3		18.5		19.5		2.0
Green Ext Time (p_c), s		1.6		2.8		2.6		6.7

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

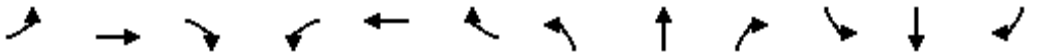
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	410	380	35	0	35
Future Volume (vph)	0	410	380	35	0	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6	5.6			5.2
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.99			0.87
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.99			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1573	1540			1188
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1573	1540			1188
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	413	38	0	38
RTOR Reduction (vph)	0	0	4	0	0	32
Lane Group Flow (vph)	0	446	447	0	0	6
Confl. Peds. (#/hr)				39		46
Confl. Bikes (#/hr)				4		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		50.7	51.8			12.4
Effective Green, g (s)		50.7	51.8			12.4
Actuated g/C Ratio		0.68	0.69			0.17
Clearance Time (s)						5.2
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1063	1063			196
v/s Ratio Prot		c0.28	c0.29			
v/s Ratio Perm						0.01
v/c Ratio		0.42	0.42			0.03
Uniform Delay, d1		5.5	5.1			26.3
Progression Factor		1.63	0.49			1.00
Incremental Delay, d2		0.2	0.2			0.1
Delay (s)		9.2	2.6			26.3
Level of Service		A	A			C
Approach Delay (s)		9.2	2.6		26.3	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	285	130	185	285	0	0	0	0	105	881	200
Future Volume (vph)	0	285	130	185	285	0	0	0	0	105	881	200
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	0.89
Flpb, ped/bikes		1.00	1.00	0.98	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1625	1180	1606	1520						4263	1185
Flt Permitted		1.00	1.00	0.49	1.00						0.99	1.00
Satd. Flow (perm)		1625	1180	832	1520						4263	1185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	310	141	201	310	0	0	0	0	114	958	217
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	310	112	201	310	0	0	0	0	0	1072	217
Confl. Peds. (#/hr)			40	40		22			9	9		30
Confl. Bikes (#/hr)			8			4						2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		32.8	32.8	32.8	32.8						33.4	26.4
Effective Green, g (s)		32.8	32.8	32.8	32.8						33.4	26.4
Actuated g/C Ratio		0.44	0.44	0.44	0.44						0.45	0.35
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		710	516	363	664						1898	417
v/s Ratio Prot		0.19			0.20							
v/s Ratio Perm			0.09	c0.24							0.25	0.18
v/c Ratio		0.44	0.22	0.55	0.47						0.56	0.52
Uniform Delay, d1		14.7	13.1	15.7	14.9						15.4	19.3
Progression Factor		0.39	0.26	1.02	1.03						0.33	0.43
Incremental Delay, d2		1.8	0.9	4.4	1.7						1.0	3.7
Delay (s)		7.6	4.3	20.3	17.2						6.1	11.9
Level of Service		A	A	C	B						A	B
Approach Delay (s)		6.5			18.4			0.0			7.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	230	0	0	345	70	130	1086	50	0	0	0
Future Volume (veh/h)	160	230	0	0	345	70	130	1086	50	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1510	1573	1620			
Adj Flow Rate, veh/h	174	250	0	0	375	65	141	1180	50			
Adj No. of Lanes	1	1	0	0	1	0	1	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	152	604	0	0	443	77	725	1389	59			
Arrive On Green	0.77	0.77	0.00	0.00	0.13	0.13	0.17	0.17	0.17			
Sat Flow, veh/h	842	1573	0	0	1153	200	1438	2756	117			
Grp Volume(v), veh/h	174	250	0	0	0	440	141	639	591			
Grp Sat Flow(s),veh/h/ln	842	1573	0	0	0	1353	1438	1494	1378			
Q Serve(g_s), s	4.9	4.1	0.0	0.0	0.0	23.9	6.3	31.2	31.2			
Cycle Q Clear(g_c), s	28.8	4.1	0.0	0.0	0.0	23.9	6.3	31.2	31.2			
Prop In Lane	1.00		0.00	0.00		0.15	1.00		0.08			
Lane Grp Cap(c), veh/h	152	604	0	0	0	520	725	753	695			
V/C Ratio(X)	1.15	0.41	0.00	0.00	0.00	0.85	0.19	0.85	0.85			
Avail Cap(c_a), veh/h	152	604	0	0	0	520	725	753	695			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.00	1.00	0.30	0.30	0.30			
Uniform Delay (d), s/veh	22.2	5.8	0.0	0.0	0.0	30.6	18.1	28.5	28.5			
Incr Delay (d2), s/veh	114.7	1.9	0.0	0.0	0.0	15.6	0.2	3.9	4.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	7.9	1.9	0.0	0.0	0.0	11.2	2.6	13.7	12.7			
LnGrp Delay(d),s/veh	136.9	7.7	0.0	0.0	0.0	46.2	18.3	32.3	32.7			
LnGrp LOS	F	A				D	B	C	C			
Approach Vol, veh/h		424			440			1371				
Approach Delay, s/veh		60.7			46.2			31.1				
Approach LOS		E			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 29		* 38		* 29		
Max Q Clear Time (g_c+I1), s		30.8		33.2		25.9		
Green Ext Time (p_c), s		0.0		2.7		0.6		

Intersection Summary	
HCM 2010 Ctrl Delay	39.7
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	295	1136	0	0	0	0	0	230	30
Future Volume (veh/h)	0	0	0	295	1136	0	0	0	0	0	230	30
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.99
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1530	1485	0				0	1485	1530
Adj Flow Rate, veh/h				321	1235	0				0	250	18
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				502	1719	0				0	786	56
Arrive On Green				0.19	0.19	0.00				0.00	0.31	0.31
Sat Flow, veh/h				747	3133	0				0	2593	180
Grp Volume(v), veh/h				558	998	0				0	139	129
Grp Sat Flow(s),veh/h/ln				1299	1230	0				0	1411	1288
Q Serve(g_s), s				30.5	28.5	0.0				0.0	5.6	5.7
Cycle Q Clear(g_c), s				30.5	28.5	0.0				0.0	5.6	5.7
Prop In Lane				0.58		0.00				0.00		0.14
Lane Grp Cap(c), veh/h				817	1404	0				0	440	402
V/C Ratio(X)				0.68	0.71	0.00				0.00	0.32	0.32
Avail Cap(c_a), veh/h				817	1404	0				0	440	402
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				25.4	24.6	0.0				0.0	19.7	19.7
Incr Delay (d2), s/veh				4.6	3.1	0.0				0.0	1.9	2.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.0	10.3	0.0				0.0	2.4	2.3
LnGrp Delay(d),s/veh				30.0	27.7	0.0				0.0	21.6	21.8
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1556						268	
Approach Delay, s/veh					28.6						21.7	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		47.0		28.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 43		23.4				
Max Q Clear Time (g_c+I1), s		32.5		7.7				
Green Ext Time (p_c), s		5.7		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1316	110	100	235	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1316	110	100	235	0	0	0	0
Number				5	2	12	7	4	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				0	1398	1398	1440	1398	0			
Adj Flow Rate, veh/h				0	1430	82	109	255	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	2229	679	266	553	0			
Arrive On Green				0.00	0.19	0.19	0.10	0.10	0.00			
Sat Flow, veh/h				0	3943	1163	630	1883	0			
Grp Volume(v), veh/h				0	1430	82	197	167	0			
Grp Sat Flow(s),veh/h/ln				0	1272	1163	1241	1209	0			
Q Serve(g_s), s				0.0	25.9	4.4	9.6	9.7	0.0			
Cycle Q Clear(g_c), s				0.0	25.9	4.4	11.2	9.7	0.0			
Prop In Lane				0.00		1.00	0.55		0.00			
Lane Grp Cap(c), veh/h				0	2229	679	452	367	0			
V/C Ratio(X)				0.00	0.64	0.12	0.44	0.45	0.00			
Avail Cap(c_a), veh/h				0	2229	679	452	367	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	23.0	14.4	28.4	27.9	0.0			
Incr Delay (d2), s/veh				0.0	1.4	0.4	3.1	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				0.0	9.4	1.5	4.3	3.7	0.0			
LnGrp Delay(d),s/veh				0.0	24.5	14.7	31.5	31.9	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1512			364				
Approach Delay, s/veh					23.9			31.7				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 44		* 23				
Max Q Clear Time (g_c+I1), s		27.9		13.2				
Green Ext Time (p_c), s		7.6		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	1371	0	0	0	0	0	190	50
Future Volume (veh/h)	0	0	0	90	1371	0	0	0	0	0	190	50
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.87
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1398	0				0	1398	1440
Adj Flow Rate, veh/h				98	1490	0				0	207	25
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				167	2129	0				0	616	72
Arrive On Green				0.20	0.20	0.00				0.00	0.28	0.28
Sat Flow, veh/h				182	3601	0				0	2290	261
Grp Volume(v), veh/h				590	998	0				0	122	110
Grp Sat Flow(s),veh/h/ln				1353	1158	0				0	1328	1153
Q Serve(g_s), s				21.8	30.1	0.0				0.0	5.5	5.7
Cycle Q Clear(g_c), s				30.4	30.1	0.0				0.0	5.5	5.7
Prop In Lane				0.17		0.00				0.00		0.23
Lane Grp Cap(c), veh/h				882	1414	0				0	368	320
V/C Ratio(X)				0.67	0.71	0.00				0.00	0.33	0.34
Avail Cap(c_a), veh/h				882	1414	0				0	368	320
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.7	23.7	0.0				0.0	21.6	21.7
Incr Delay (d2), s/veh				4.0	3.0	0.0				0.0	2.4	2.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.4	10.3	0.0				0.0	2.2	2.1
LnGrp Delay(d),s/veh				27.7	26.7	0.0				0.0	24.0	24.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1588						232	
Approach Delay, s/veh					27.0						24.3	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		50.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 46		* 21				
Max Q Clear Time (g_c+I1), s		32.4		7.7				
Green Ext Time (p_c), s		6.8		0.7				

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	40	1226	80	195	120	0	0	130	30
Future Volume (veh/h)	0	0	0	40	1226	80	195	120	0	0	130	30
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.97		1.00	1.00		0.93
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				43	1333	77	212	130	0	0	141	21
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				72	2357	141	371	685	0	0	358	53
Arrive On Green				0.17	0.17	0.17	0.02	0.12	0.00	0.00	0.26	0.26
Sat Flow, veh/h				139	4591	274	1748	1835	0	0	1375	205
Grp Volume(v), veh/h				537	446	470	212	130	0	0	0	162
Grp Sat Flow(s),veh/h/ln				1741	1590	1674	1748	1835	0	0	0	1580
Q Serve(g_s), s				21.4	19.3	19.3	0.0	4.8	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s				21.4	19.3	19.3	0.0	4.8	0.0	0.0	0.0	6.3
Prop In Lane				0.08		0.16	1.00		0.00	0.00		0.13
Lane Grp Cap(c), veh/h				894	816	859	371	685	0	0	0	411
V/C Ratio(X)				0.60	0.55	0.55	0.57	0.19	0.00	0.00	0.00	0.39
Avail Cap(c_a), veh/h				894	816	859	371	685	0	0	0	411
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				24.0	23.2	23.2	30.1	22.7	0.0	0.0	0.0	22.9
Incr Delay (d2), s/veh				3.0	2.6	2.5	6.2	0.6	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				11.0	9.1	9.5	5.0	2.5	0.0	0.0	0.0	3.1
LnGrp Delay(d),s/veh				27.0	25.8	25.7	36.3	23.3	0.0	0.0	0.0	25.7
LnGrp LOS				C	C	C	D	C				C
Approach Vol, veh/h					1453			342			162	
Approach Delay, s/veh					26.2			31.4			25.7	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.0	24.0		43.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			4.0	19.5		38.5		28.0
Max Q Clear Time (g_c+I1), s			2.0	8.3		23.4		6.8
Green Ext Time (p_c), s			0.3	0.8		10.6		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	27.1
HCM 2010 LOS	C

SimTraffic Post-Processor **BioMarin**
Average Results from 10 Runs **Baseline + BioMarin Only Conditions**
Volume and Delay by Movement **AM Peak Hour**

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	20	19	95.7%	10.5	4.3	B
	Through	5	6	125.1%	24.4	17.8	C
	Right Turn						
	Subtotal	25	25	101.6%	14.5	5.5	B
SB	Left Turn						
	Through	5	3	51.5%	6.7	12.7	A
	Right Turn	5	7	139.8%	15.4	12.5	C
	Subtotal	10	10	95.7%	17.0	11.6	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	30	27	89.5%	2.5	0.3	A
	Through	1,321	1,301	98.5%	2.4	0.4	A
	Right Turn	5	5	103.0%	1.8	1.1	A
	Subtotal	1,356	1,333	98.3%	2.4	0.4	A
Total		1,391	1,368	98.3%	2.7	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	83	78	93.6%	15.5	2.7	B
	Through	10	9	92.0%	14.5	11.7	B
	Right Turn						
	Subtotal	93	87	93.4%	15.8	2.7	B
SB	Left Turn						
	Through	40	37	92.9%	36.0	9.2	D
	Right Turn	10	8	81.0%	18.6	9.2	B
	Subtotal	50	45	90.5%	32.5	8.8	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	452	433	95.8%	25.5	12.6	C
	Through	1,293	1,275	98.6%	8.4	2.8	A
	Right Turn	30	32	105.5%	6.5	2.6	A
	Subtotal	1,775	1,740	98.0%	12.7	5.1	B
Total		1,918	1,872	97.6%	13.3	4.8	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	160	1659	55	31	195	0	0	280	165
Future Volume (veh/h)	0	0	0	160	1659	55	31	195	0	0	280	165
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.92	1.00		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1620	1573	1620	1620	1573	0	0	1510	1555
Adj Flow Rate, veh/h				174	1803	56	34	212	0	0	304	172
Adj No. of Lanes				0	3	0	0	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				202	2230	71	55	215	0	0	252	142
Arrive On Green				0.18	0.18	0.18	0.11	0.11	0.00	0.00	0.11	0.11
Sat Flow, veh/h				364	4030	129	0	659	0	0	771	436
Grp Volume(v), veh/h				743	621	669	246	0	0	0	0	476
Grp Sat Flow(s),veh/h/ln				1555	1431	1537	659	0	0	0	0	1207
Q Serve(g_s), s				34.8	31.0	31.2	0.0	0.0	0.0	0.0	0.0	24.5
Cycle Q Clear(g_c), s				34.8	31.0	31.2	24.5	0.0	0.0	0.0	0.0	24.5
Prop In Lane				0.23		0.08	0.14		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				860	792	850	270	0	0	0	0	394
V/C Ratio(X)				0.86	0.78	0.79	0.91	0.00	0.00	0.00	0.00	1.21
Avail Cap(c_a), veh/h				860	792	850	270	0	0	0	0	394
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				27.9	26.4	26.4	28.8	0.0	0.0	0.0	0.0	33.5
Incr Delay (d2), s/veh				11.2	7.7	7.3	36.1	0.0	0.0	0.0	0.0	115.0
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				17.7	14.0	15.0	7.8	0.0	0.0	0.0	0.0	20.8
LnGrp Delay(d),s/veh				39.1	34.0	33.7	64.9	0.0	0.0	0.0	0.0	148.5
LnGrp LOS				D	C	C	E					F
Approach Vol, veh/h					2033			246			476	
Approach Delay, s/veh					35.8			64.9			148.5	
Approach LOS					D			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.0		46.0		29.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				24.5		41.5		24.5
Max Q Clear Time (g_c+I1), s				26.5		36.8		26.5
Green Ext Time (p_c), s				0.0		3.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	57.8
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	235	1799	20	50	50	0	0	50	10
Future Volume (vph)	0	0	0	235	1799	20	50	50	0	0	50	10
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6			7.6	
Lane Util. Factor					0.91		1.00	1.00			1.00	
Frpb, ped/bikes					1.00		1.00	1.00			0.99	
Flpb, ped/bikes					0.98		0.93	1.00			1.00	
Frt					1.00		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3714		1060	1237			1191	
Flt Permitted					0.99		0.71	1.00			1.00	
Satd. Flow (perm)					3714		797	1237			1191	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	255	1955	22	54	54	0	0	54	11
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	0	0	0	2231	0	54	54	0	0	59	0
Confl. Peds. (#/hr)			73	73		38	49		63			49
Confl. Bikes (#/hr)						2			2			2
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			4			8	
Permitted Phases				6			4					
Actuated Green, G (s)					51.6		19.2	19.2			19.2	
Effective Green, g (s)					51.6		19.2	19.2			19.2	
Actuated g/C Ratio					0.57		0.21	0.21			0.21	
Clearance Time (s)					11.6		7.6	7.6			7.6	
Lane Grp Cap (vph)					2129		170	263			254	
v/s Ratio Prot								0.04			0.05	
v/s Ratio Perm					0.60		c0.07					
v/c Ratio					1.05		0.32	0.21			0.23	
Uniform Delay, d1					19.2		29.9	29.1			29.3	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					33.4		4.9	1.8			2.1	
Delay (s)					52.6		34.7	30.9			31.4	
Level of Service					D		C	C			C	
Approach Delay (s)		0.0			52.6			32.8			31.4	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	51.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	145.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	420	1553	0	0	0	0	0	750	446
Future Volume (veh/h)	0	0	0	420	1553	0	0	0	0	0	750	446
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.83
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1545	1573	0				0	1573	1485
Adj Flow Rate, veh/h				457	1688	0				0	815	475
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				763	2139	0				0	1832	446
Arrive On Green				0.15	0.15	0.00				0.00	0.14	0.14
Sat Flow, veh/h				1471	4718	0				0	4435	1045
Grp Volume(v), veh/h				457	1688	0				0	815	475
Grp Sat Flow(s),veh/h/ln				1471	1573	0				0	1431	1045
Q Serve(g_s), s				22.1	25.9	0.0				0.0	13.0	32.0
Cycle Q Clear(g_c), s				22.1	25.9	0.0				0.0	13.0	32.0
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				763	2139	0				0	1832	446
V/C Ratio(X)				0.60	0.79	0.00				0.00	0.44	1.07
Avail Cap(c_a), veh/h				763	2139	0				0	1832	446
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				26.8	28.4	0.0				0.0	24.1	32.2
Incr Delay (d2), s/veh				3.5	3.1	0.0				0.0	0.8	61.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.7	11.9	0.0				0.0	5.3	16.8
LnGrp Delay(d),s/veh				30.3	31.5	0.0				0.0	24.9	93.3
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2145						1290	
Approach Delay, s/veh					31.2						50.1	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						38.0		37.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						34.0		32.0
Max Q Clear Time (g_c+I1), s						27.9		34.0
Green Ext Time (p_c), s						4.8		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		38.3
HCM 2010 LOS		D

Notes
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1025	120	958	1151	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1025	120	958	1151	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1485	1485	1398	1398	0			
Adj Flow Rate, veh/h				0	1114	98	1041	1251	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	1379	403	1438	1510	0			
Arrive On Green				0.00	0.34	0.34	0.18	0.18	0.00			
Sat Flow, veh/h				0	4189	1186	2663	2796	0			
Grp Volume(v), veh/h				0	1114	98	1041	1251	0			
Grp Sat Flow(s),veh/h/ln				0	1352	1186	1331	1398	0			
Q Serve(g_s), s				0.0	18.7	4.5	27.7	32.4	0.0			
Cycle Q Clear(g_c), s				0.0	18.7	4.5	27.7	32.4	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1379	403	1438	1510	0			
V/C Ratio(X)				0.00	0.81	0.24	0.72	0.83	0.00			
Avail Cap(c_a), veh/h				0	1379	403	1438	1510	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.5	17.8	25.5	27.5	0.0			
Incr Delay (d2), s/veh				0.0	5.2	1.4	3.2	5.4	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				0.0	7.6	1.6	10.9	13.6	0.0			
LnGrp Delay(d),s/veh				0.0	27.7	19.2	28.7	32.9	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1212			2292				
Approach Delay, s/veh					27.0			31.0				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				45.0		30.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				40.5		25.5		
Max Q Clear Time (g_c+I1), s				34.4		20.7		
Green Ext Time (p_c), s				5.1		2.7		

Intersection Summary	
HCM 2010 Ctrl Delay	29.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1931	80	0	0	0	0	0	255	70	450	0
Future Volume (veh/h)	0	1931	80	0	0	0	0	0	255	70	450	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	0.99		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	0	1660	1710				0	1573	1620	1748	1748	0
Adj Flow Rate, veh/h	0	2099	80				0	0	261	76	489	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1126	1125	1488	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1323	1095	1748	0
Grp Volume(v), veh/h		0.0					0	0	261	76	489	0
Grp Sat Flow(s),veh/h/ln							0	0	1323	1095	1748	0
Q Serve(g_s), s							0.0	0.0	1.1	1.6	6.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	1.1	2.7	6.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1126	1125	1488	0
V/C Ratio(X)							0.00	0.00	0.23	0.07	0.33	0.00
Avail Cap(c_a), veh/h							0	0	1126	1125	1488	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	3.1	4.1	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.5	0.1	0.6	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.5	0.5	3.6	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.9	3.2	4.7	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								261			565	
Approach Delay, s/veh								0.9			4.5	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				26.4				26.4
Max Q Clear Time (g_c+I1), s				8.9				3.1
Green Ext Time (p_c), s				1.4				0.7

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2146	0	0	0	0	0	200	90	0	0	0
Future Volume (veh/h)	110	2146	0	0	0	0	0	200	90	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1485	0				0	1485	1440			
Adj Flow Rate, veh/h	120	2333	0				0	217	94			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	158	2406	0				0	549	228			
Arrive On Green	0.20	0.20	0.00				0.00	0.28	0.28			
Sat Flow, veh/h	171	3975	0				0	1978	823			
Grp Volume(v), veh/h	866	1587	0				0	161	150			
Grp Sat Flow(s),veh/h/ln	1443	1352	0				0	1485	1315			
Q Serve(g_s), s	38.6	43.7	0.0				0.0	6.6	7.0			
Cycle Q Clear(g_c), s	44.9	43.7	0.0				0.0	6.6	7.0			
Prop In Lane	0.14		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	928	1637	0				0	412	365			
V/C Ratio(X)	0.93	0.97	0.00				0.00	0.39	0.41			
Avail Cap(c_a), veh/h	928	1637	0				0	412	365			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	29.7	29.3	0.0				0.0	22.0	22.1			
Incr Delay (d2), s/veh	17.2	16.2	0.0				0.0	2.8	3.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	22.4	20.1	0.0				0.0	3.0	2.9			
LnGrp Delay(d),s/veh	46.9	45.5	0.0				0.0	24.7	25.5			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2453						311				
Approach Delay, s/veh		46.0						25.1				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				25.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		45.4		
Max Q Clear Time (g_c+I1), s				9.0		46.9		
Green Ext Time (p_c), s				1.9		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	43.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2161	70	0	0	0	0	0	160	70	220	0
Future Volume (veh/h)	0	2161	70	0	0	0	0	0	160	70	220	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97	0.99		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	0	1485	1382				0	1573	1591	1545	1485	0
Adj Flow Rate, veh/h	0	2349	71				0	0	157	76	239	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1077	1127	1238	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.83	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1292	1061	1485	0
Grp Volume(v), veh/h		0.0					0	0	157	76	239	0
Grp Sat Flow(s),veh/h/ln							0	0	1292	1061	1485	0
Q Serve(g_s), s							0.0	0.0	0.6	1.5	3.3	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.6	2.1	3.3	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1077	1127	1238	0
V/C Ratio(X)							0.00	0.00	0.15	0.07	0.19	0.00
Avail Cap(c_a), veh/h							0	0	1077	1127	1238	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	2.6	2.8	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.3	0.1	0.3	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.3	0.5	1.5	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.7	2.7	3.2	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								157			315	
Approach Delay, s/veh								0.7			3.1	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				27.0				27.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				22.5				22.5
Max Q Clear Time (g_c+I1), s				5.3				2.6
Green Ext Time (p_c), s				0.7				0.4

Intersection Summary	
HCM 2010 Ctrl Delay	2.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	2096	195	0	0	0	0	240	20	50	115	0
Future Volume (veh/h)	90	2096	195	0	0	0	0	240	20	50	115	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97				1.00		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	98	2278	197				0	261	12	54	125	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	102	2494	219				0	685	31	285	530	0
Arrive On Green	0.19	0.19	0.19				0.00	0.22	0.22	0.01	0.11	0.00
Sat Flow, veh/h	180	4423	388				0	3149	140	1581	1660	0
Grp Volume(v), veh/h	945	784	844				0	134	139	54	125	0
Grp Sat Flow(s),veh/h/ln	1739	1590	1663				0	1577	1629	1581	1660	0
Q Serve(g_s), s	40.5	36.1	37.3				0.0	5.4	5.5	0.0	5.2	0.0
Cycle Q Clear(g_c), s	40.5	36.1	37.3				0.0	5.4	5.5	0.0	5.2	0.0
Prop In Lane	0.10		0.23				0.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	980	897	937				0	352	364	285	530	0
V/C Ratio(X)	0.96	0.87	0.90				0.00	0.38	0.38	0.19	0.24	0.00
Avail Cap(c_a), veh/h	980	897	937				0	352	364	285	530	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.8	28.0	28.5				0.0	24.8	24.8	28.6	25.2	0.0
Incr Delay (d2), s/veh	21.3	11.6	13.3				0.0	3.1	3.0	1.5	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.3	18.8	20.6				0.0	2.6	2.7	1.1	2.5	0.0
LnGrp Delay(d),s/veh	51.1	39.6	41.9				0.0	27.9	27.8	30.0	26.3	0.0
LnGrp LOS	D	D	D					C	C	C	C	
Approach Vol, veh/h		2573						273			179	
Approach Delay, s/veh		44.6						27.8			27.4	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		47.0		28.2			7.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		42.4		* 24			* 3	* 17
Max Q Clear Time (g_c+I1), s		42.5		7.2			2.0	7.5
Green Ext Time (p_c), s		0.0		0.7			0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	42.1
HCM 2010 LOS	D

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	37	30	81.6%	15.6	6.6	C
	Through						
	Right Turn						
	Subtotal	37	30	81.6%	15.6	6.6	C
EB	Left Turn	25	25	98.6%	3.2	0.6	A
	Through	2,151	2,098	97.5%	2.6	0.1	A
	Right Turn						
	Subtotal	2,176	2,122	97.5%	2.6	0.1	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,213	2,152	97.3%	2.8	0.2	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	52	52	100.5%	16.3	3.1	B
	Right Turn	261	279	106.7%	18.0	4.2	B
	Subtotal	313	331	105.7%	17.8	3.4	B
SB	Left Turn	62	57	92.6%	38.0	5.4	D
	Through	427	407	95.3%	35.7	2.5	D
	Right Turn						
	Subtotal	489	464	95.0%	35.9	2.5	D
EB	Left Turn	41	35	85.3%	11.0	2.9	B
	Through	2,122	2,056	96.9%	12.0	1.2	B
	Right Turn	60	58	96.3%	9.9	3.0	A
	Subtotal	2,223	2,149	96.7%	11.9	1.1	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,025	2,944	97.3%	16.4	0.7	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	2270	40	0	0	0	0	106	50	130	255	0
Future Volume (veh/h)	135	2270	40	0	0	0	0	106	50	130	255	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1398	1382	1342	0
Adj Flow Rate, veh/h	147	2467	22				0	115	42	141	277	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	139	2510	598				0	500	411	284	541	0
Arrive On Green	0.18	0.18	0.18				0.00	0.36	0.36	0.12	0.12	0.00
Sat Flow, veh/h	262	4730	1126				0	1398	1151	571	1575	0
Grp Volume(v), veh/h	776	1838	22				0	115	42	215	203	0
Grp Sat Flow(s),veh/h/ln	1385	1202	1126				0	1398	1151	925	1160	0
Q Serve(g_s), s	39.8	37.9	1.2				0.0	4.3	1.8	13.6	12.3	0.0
Cycle Q Clear(g_c), s	39.8	37.9	1.2				0.0	4.3	1.8	17.9	12.3	0.0
Prop In Lane	0.19		1.00				0.00		1.00	0.66		0.00
Lane Grp Cap(c), veh/h	735	1914	598				0	500	411	410	415	0
V/C Ratio(X)	1.06	0.96	0.04				0.00	0.23	0.10	0.53	0.49	0.00
Avail Cap(c_a), veh/h	735	1914	598				0	500	411	410	415	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.9	30.1	15.0				0.0	16.9	16.1	30.3	26.7	0.0
Incr Delay (d2), s/veh	49.1	13.1	0.1				0.0	1.1	0.5	4.7	4.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.3	14.9	0.4				0.0	1.8	0.6	4.8	4.4	0.0
LnGrp Delay(d),s/veh	80.0	43.2	15.1				0.0	18.0	16.6	35.0	30.8	0.0
LnGrp LOS	F	D	B					B	B	D	C	
Approach Vol, veh/h		2636						157			418	
Approach Delay, s/veh		53.8						17.6			33.0	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		44.0		31.0				31.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 40		* 27				* 27
Max Q Clear Time (g_c+I1), s		41.8		6.3				19.9
Green Ext Time (p_c), s		0.0		0.5				1.0

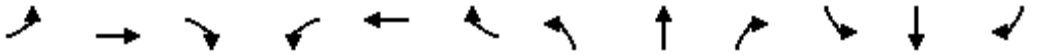
Intersection Summary	
HCM 2010 Ctrl Delay	49.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2325	60	0	0	0	0	50	250	110	180	0
Future Volume (veh/h)	50	2325	60	0	0	0	0	50	250	110	180	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1454	1398	1398	0
Adj Flow Rate, veh/h	54	2527	39				0	54	233	120	196	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	59	2940	651				0	317	273	265	317	0
Arrive On Green	0.20	0.20	0.20				0.00	0.23	0.23	0.07	0.07	0.00
Sat Flow, veh/h	98	4902	1086				0	1398	1203	862	1398	0
Grp Volume(v), veh/h	769	1812	39				0	54	233	120	196	0
Grp Sat Flow(s),veh/h/ln	1393	1202	1086				0	1398	1203	862	1398	0
Q Serve(g_s), s	40.6	36.2	2.2				0.0	2.3	13.9	10.2	10.2	0.0
Cycle Q Clear(g_c), s	40.6	36.2	2.2				0.0	2.3	13.9	12.6	10.2	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	835	2163	651				0	317	273	265	317	0
V/C Ratio(X)	0.92	0.84	0.06				0.00	0.17	0.85	0.45	0.62	0.00
Avail Cap(c_a), veh/h	835	2163	651				0	569	489	420	569	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.97	0.97	0.00
Uniform Delay (d), s/veh	28.3	26.6	12.9				0.0	23.3	27.8	33.8	31.5	0.0
Incr Delay (d2), s/veh	2.1	0.4	0.0				0.0	0.3	7.4	1.2	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.2	12.2	0.7				0.0	0.9	5.2	2.5	4.1	0.0
LnGrp Delay(d),s/veh	30.5	27.0	12.9				0.0	23.6	35.2	34.9	33.4	0.0
LnGrp LOS	C	C	B					C	D	C	C	
Approach Vol, veh/h		2620						287			316	
Approach Delay, s/veh		27.8						33.0			34.0	
Approach LOS		C						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.5		23.5				23.5
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		31.5		30.5				30.5
Max Q Clear Time (g_c+I1), s		42.6		15.9				14.6
Green Ext Time (p_c), s		0.0		1.1				1.4

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1171	1354	0	0	0	0	0	0	195	975	0
Future Volume (veh/h)	0	1171	1354	0	0	0	0	0	0	195	975	0
Number	5	2	12							7	4	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	0	1485	1485							1485	1485	0
Adj Flow Rate, veh/h	0	1273	1447							212	1060	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.92	0.92	0.92							0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3							3	3	0
Cap, veh/h	0	2050	1162							519	1089	0
Arrive On Green	0.00	0.15	0.15							0.12	0.12	0.00
Sat Flow, veh/h	0	4456	2525							1415	2971	0
Grp Volume(v), veh/h	0	1273	1447							212	1060	0
Grp Sat Flow(s),veh/h/ln	0	1485	1263							1415	1485	0
Q Serve(g_s), s	0.0	20.1	34.5							10.4	26.7	0.0
Cycle Q Clear(g_c), s	0.0	20.1	34.5							10.4	26.7	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2050	1162							519	1089	0
V/C Ratio(X)	0.00	0.62	1.25							0.41	0.97	0.00
Avail Cap(c_a), veh/h	0	2050	1162							519	1089	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.12	0.12							0.81	0.81	0.00
Uniform Delay (d), s/veh	0.0	25.7	31.8							25.4	32.6	0.0
Incr Delay (d2), s/veh	0.0	0.2	111.5							0.4	18.4	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	0.0	8.3	30.0							4.1	13.8	0.0
LnGrp Delay(d),s/veh	0.0	25.9	143.3							25.9	51.0	0.0
LnGrp LOS		C	F							C	D	
Approach Vol, veh/h		2720									1272	
Approach Delay, s/veh		88.4									46.8	
Approach LOS		F									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		43.0		32.0				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		34.5		27.5				
Max Q Clear Time (g_c+I1), s		36.5		28.7				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	75.1
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	721	815	0	0	0	0	0	1398	460	0	0	0
Future Volume (veh/h)	721	815	0	0	0	0	0	1398	460	0	0	0
Number	5	2	12				7	4	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	1454	1485	0				0	1398	1398			
Adj Flow Rate, veh/h	784	886	0				0	1520	463			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	1329	1220	0				0	1946	551			
Arrive On Green	0.14	0.14	0.00				0.00	0.46	0.46			
Sat Flow, veh/h	2769	2971	0				0	4194	1188			
Grp Volume(v), veh/h	784	886	0				0	1520	463			
Grp Sat Flow(s),veh/h/ln	1385	1485	0				0	1398	1188			
Q Serve(g_s), s	20.2	21.4	0.0				0.0	22.8	25.7			
Cycle Q Clear(g_c), s	20.2	21.4	0.0				0.0	22.8	25.7			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1329	1220	0				0	1946	551			
V/C Ratio(X)	0.59	0.73	0.00				0.00	0.78	0.84			
Avail Cap(c_a), veh/h	1329	1220	0				0	1946	551			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	27.9	28.4	0.0				0.0	16.9	17.7			
Incr Delay (d2), s/veh	1.9	3.8	0.0				0.0	3.2	14.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.1	9.5	0.0				0.0	9.3	10.5			
LnGrp Delay(d),s/veh	29.8	32.2	0.0				0.0	20.1	31.9			
LnGrp LOS	C	C						C	C			
Approach Vol, veh/h		1670						1983				
Approach Delay, s/veh		31.0						22.9				
Approach LOS		C						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		35.0		40.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 31		* 35				
Max Q Clear Time (g_c+I1), s		23.4		27.7				
Green Ext Time (p_c), s		6.3		6.5				

Intersection Summary	
HCM 2010 Ctrl Delay	26.6
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.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	310	50	5	80	210	63	50	279	150	61	201
Future Volume (veh/h)	20	310	50	5	80	210	63	50	279	150	61	201
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94		1.00		0.97	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2019	2019	2000		1942	1942	2000	1845	1845	1900	1845	1845
Adj Flow Rate, veh/h	22	337	46		87	228	55	54	303	139	66	218
Adj No. of Lanes	1	1	0		1	1	0	1	1	0	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
Percent Heavy Veh, %	3	3	3		3	3	3	3	3	3	3	3
Cap, veh/h	58	420	57		158	448	108	152	368	169	170	536
Arrive On Green	0.03	0.24	0.24		0.09	0.30	0.30	0.09	0.31	0.31	0.10	0.32
Sat Flow, veh/h	1923	1726	236		1849	1503	362	1757	1185	543	1757	1668
Grp Volume(v), veh/h	22	0	383		87	0	283	54	0	442	66	0
Grp Sat Flow(s),veh/h/ln	1923	0	1961		1849	0	1865	1757	0	1728	1757	0
Q Serve(g_s), s	0.7	0.0	11.9		2.9	0.0	8.1	1.9	0.0	15.4	2.3	0.0
Cycle Q Clear(g_c), s	0.7	0.0	11.9		2.9	0.0	8.1	1.9	0.0	15.4	2.3	0.0
Prop In Lane	1.00		0.12		1.00		0.19	1.00		0.31	1.00	
Lane Grp Cap(c), veh/h	58	0	477		158	0	557	152	0	538	170	0
V/C Ratio(X)	0.38	0.00	0.80		0.55	0.00	0.51	0.36	0.00	0.82	0.39	0.00
Avail Cap(c_a), veh/h	237	0	669		285	0	693	244	0	714	244	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
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.8	0.0	23.1		28.5	0.0	18.8	27.9	0.0	20.7	27.5	0.0
Incr Delay (d2), s/veh	1.5	0.0	4.8		1.1	0.0	0.7	0.5	0.0	5.8	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
%ile BackOfQ(50%),veh/ln	0.4	0.0	7.0		1.5	0.0	4.3	0.9	0.0	8.1	1.1	0.0
LnGrp Delay(d),s/veh	32.3	0.0	27.9		29.6	0.0	19.5	28.4	0.0	26.5	28.0	0.0
LnGrp LOS	C		C		C		B	C		C	C	
Approach Vol, veh/h		405				370			496			302
Approach Delay, s/veh		28.1				21.9			26.7			19.9
Approach LOS		C				C			C			B

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	9.5	20.7	9.6	25.0	6.0	24.2	10.3	24.4
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	22.1	9.0	* 27	8.0	24.1	9.0	* 27
Max Q Clear Time (g_c+I1), s	4.9	13.9	3.9	8.6	2.7	10.1	4.3	17.4
Green Ext Time (p_c), s	0.1	1.1	0.0	0.9	0.0	0.9	0.0	1.4

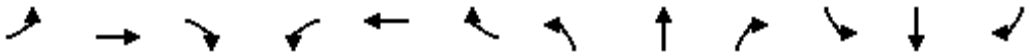
Intersection Summary	
HCM 2010 Ctrl Delay	24.6
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	20
Future Volume (veh/h)	20
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.91
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	18
Adj No. of Lanes	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	3
Cap, veh/h	44
Arrive On Green	0.32
Sat Flow, veh/h	138
Grp Volume(v), veh/h	236
Grp Sat Flow(s),veh/h/ln	1805
Q Serve(g_s), s	6.6
Cycle Q Clear(g_c), s	6.6
Prop In Lane	0.08
Lane Grp Cap(c), veh/h	580
V/C Ratio(X)	0.41
Avail Cap(c_a), veh/h	746
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	17.2
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.4
LnGrp Delay(d),s/veh	17.6
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	545	25	0	690	25	5
Future Volume (vph)	545	25	0	690	25	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			3.0	5.2	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	0.98	
Frt	0.99			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1560			1573	1441	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	1560			1573	1441	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	592	27	0	750	27	5
RTOR Reduction (vph)	2	0	0	0	4	0
Lane Group Flow (vph)	617	0	0	750	28	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA	Perm	
Protected Phases	2			3 4 6		
Permitted Phases					8	
Actuated Green, G (s)	30.1			51.2	13.4	
Effective Green, g (s)	30.1			45.6	13.4	
Actuated g/C Ratio	0.40			0.61	0.18	
Clearance Time (s)	5.6				5.2	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	626			956	257	
v/s Ratio Prot	c0.40			c0.48		
v/s Ratio Perm					c0.02	
v/c Ratio	0.98			0.78	0.11	
Uniform Delay, d1	22.2			11.0	25.8	
Progression Factor	0.78			0.69	1.05	
Incremental Delay, d2	28.6			0.4	0.2	
Delay (s)	46.0			7.9	27.3	
Level of Service	D			A	C	
Approach Delay (s)	46.0			7.9	27.3	
Approach LOS	D			A	C	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

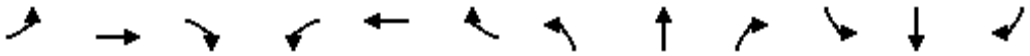


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	365	20	0	330	50	10	10	10	5	25	20
Future Volume (vph)	0	365	20	0	330	50	10	10	10	5	25	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6			5.6	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.98			0.95			0.94	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1558			1536			1466			1452	
Flt Permitted		1.00			1.00			0.87			0.97	
Satd. Flow (perm)		1558			1536			1293			1409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	397	22	0	359	54	11	11	11	5	27	22
RTOR Reduction (vph)	0	2	0	0	5	0	0	10	0	0	20	0
Lane Group Flow (vph)	0	417	0	0	408	0	0	23	0	0	34	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			4 6			8			8	
Permitted Phases							8			8		
Actuated Green, G (s)		39.8			56.0			7.8			7.8	
Effective Green, g (s)		39.8			56.0			7.8			7.8	
Actuated g/C Ratio		0.53			0.75			0.10			0.10	
Clearance Time (s)		5.6						5.6			5.6	
Vehicle Extension (s)		3.0						1.5			1.5	
Lane Grp Cap (vph)		826			1146			134			146	
v/s Ratio Prot		c0.27			c0.27							
v/s Ratio Perm								0.02			c0.02	
v/c Ratio		0.50			0.36			0.17			0.23	
Uniform Delay, d1		11.3			3.3			30.7			30.9	
Progression Factor		0.72			0.06			0.63			0.83	
Incremental Delay, d2		1.7			0.1			0.2			0.3	
Delay (s)		9.8			0.3			19.4			25.8	
Level of Service		A			A			B			C	
Approach Delay (s)		9.8			0.3			19.4			25.8	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

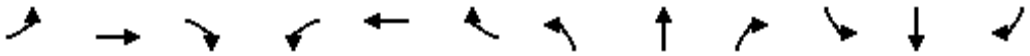
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	550	0	0	685	5	20
Future Volume (vph)	550	0	0	685	5	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			5.6	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.89	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1573			1573	1387	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1573			1573	1387	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	598	0	0	745	5	22
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	598	0	0	745	10	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	48.7			30.1	15.5	
Effective Green, g (s)	43.5			30.1	15.5	
Actuated g/C Ratio	0.58			0.40	0.21	
Clearance Time (s)				5.6		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	912			631	286	
v/s Ratio Prot	c0.38			c0.47	c0.01	
v/s Ratio Perm						
v/c Ratio	0.66			1.18	0.03	
Uniform Delay, d1	10.7			22.4	23.8	
Progression Factor	0.61			1.15	0.81	
Incremental Delay, d2	0.5			88.9	0.0	
Delay (s)	7.0			114.6	19.3	
Level of Service	A			F	B	
Approach Delay (s)	7.0			114.6	19.3	
Approach LOS	A			F	B	

Intersection Summary			
HCM 2000 Control Delay	65.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	380	0	0	340	20	40	5	25	0	0	0
Future Volume (vph)	0	380	0	0	340	20	40	5	25	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.98				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.97				
Satd. Flow (prot)		1573			1557			1431				
Flt Permitted		1.00			1.00			0.97				
Satd. Flow (perm)		1573			1557			1431				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	413	0	0	370	22	43	5	27	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	23	0	0	0	0
Lane Group Flow (vph)	0	413	0	0	390	0	0	52	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		53.2			39.8			10.6				
Effective Green, g (s)		53.2			39.8			10.6				
Actuated g/C Ratio		0.71			0.53			0.14				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1115			826			202				
v/s Ratio Prot		c0.26			c0.25			c0.04				
v/s Ratio Perm												
v/c Ratio		0.37			0.47			0.26				
Uniform Delay, d1		4.3			11.0			28.7				
Progression Factor		0.01			0.51			1.27				
Incremental Delay, d2		0.1			1.8			0.2				
Delay (s)		0.1			7.4			36.5				
Level of Service		A			A			D				
Approach Delay (s)		0.1			7.4			36.5			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	410	0	0	405	75	10	5	10	0	0	0
Future Volume (vph)	0	410	0	0	405	75	10	5	10	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1512			1441				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1512			1441				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	0	0	440	82	11	5	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	446	0	0	514	0	0	18	0	0	0	0
Confl. Peds. (#/hr)	39		22			39			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		50.7			32.7			13.5				
Effective Green, g (s)		50.7			32.7			13.5				
Actuated g/C Ratio		0.68			0.44			0.18				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1063			659			259				
v/s Ratio Prot		c0.28			c0.34			c0.01				
v/s Ratio Perm												
v/c Ratio		0.42			0.78			0.07				
Uniform Delay, d1		5.5			18.1			25.5				
Progression Factor		0.06			0.94			1.01				
Incremental Delay, d2		0.3			7.9			0.1				
Delay (s)		0.6			24.9			25.8				
Level of Service		A			C			C				
Approach Delay (s)		0.6			24.9			25.8			0.0	
Approach LOS		A			C			C			A	

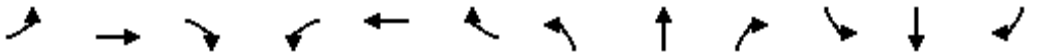
Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	465	20	50	530	70	10	490	50	0	360	300
Future Volume (veh/h)	260	465	20	50	530	70	10	490	50	0	360	300
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	0.99		0.93	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1800	1694	1728	0	1765	1728
Adj Flow Rate, veh/h	271	484	19	52	552	67	10	510	42	0	375	116
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	180	941	37	435	640	78	53	1125	91	0	968	294
Arrive On Green	0.11	0.59	0.59	0.87	0.87	0.87	0.77	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1597	1601	63	844	1463	178	18	2904	236	0	2586	759
Grp Volume(v), veh/h	271	0	503	52	0	619	298	0	264	0	250	241
Grp Sat Flow(s),veh/h/ln	1597	0	1664	844	0	1640	1677	0	1480	0	1676	1580
Q Serve(g_s), s	9.0	0.0	14.3	1.0	0.0	15.4	0.0	0.0	5.0	0.0	8.6	8.8
Cycle Q Clear(g_c), s	9.0	0.0	14.3	3.3	0.0	15.4	4.9	0.0	5.0	0.0	8.6	8.8
Prop In Lane	1.00		0.04	1.00		0.11	0.03		0.16	0.00		0.48
Lane Grp Cap(c), veh/h	180	0	978	435	0	718	696	0	574	0	650	612
V/C Ratio(X)	1.51	0.00	0.51	0.12	0.00	0.86	0.43	0.00	0.46	0.00	0.38	0.39
Avail Cap(c_a), veh/h	180	0	978	435	0	718	696	0	574	0	650	612
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.81	0.00	0.81	0.81	0.00	0.81	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	9.8	3.3	0.0	3.8	6.1	0.0	6.1	0.0	17.6	17.7
Incr Delay (d2), s/veh	255.5	0.0	1.9	0.5	0.0	10.9	1.6	0.0	2.2	0.0	1.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.7	0.0	7.1	0.3	0.0	8.0	2.4	0.0	2.2	0.0	4.3	4.1
LnGrp Delay(d),s/veh	291.0	0.0	11.7	3.7	0.0	14.6	7.6	0.0	8.2	0.0	19.3	19.6
LnGrp LOS	F		B	A		B	A		A		B	B
Approach Vol, veh/h		774			671			562			491	
Approach Delay, s/veh		109.5			13.8			7.9			19.5	
Approach LOS		F			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.2		35.8	12.0	39.2		35.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 47		24.4	9.0	* 35		24.4
Max Q Clear Time (g_c+I1), s		16.3		7.0	11.0	17.4		10.8
Green Ext Time (p_c), s		5.4		4.6	0.0	6.3		3.5

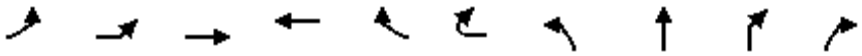
Intersection Summary	
HCM 2010 Ctrl Delay	43.2
HCM 2010 LOS	D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	50	40	175	0	0	0	0	230	1166	450
Future Volume (vph)	0	490	50	40	175	0	0	0	0	230	1166	450
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		1.00			1.00						1.00	0.98
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.99			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2769			1781						2993	1321
Flt Permitted		1.00			0.85						0.99	1.00
Satd. Flow (perm)		2769			1520						2993	1321
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	510	52	42	182	0	0	0	0	240	1215	469
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	224	0	0	0	0	0	1455	469
Confl. Peds. (#/hr)			15	15		4			11			
Confl. Bikes (#/hr)			3			3			3			2
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		30.8			30.8						40.4	33.4
Effective Green, g (s)		30.8			30.8						40.4	33.4
Actuated g/C Ratio		0.39			0.39						0.50	0.42
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1066			585						1511	551
v/s Ratio Prot		c0.20									c0.49	
v/s Ratio Perm					0.15							0.36
v/c Ratio		0.52			0.38						0.96	0.85
Uniform Delay, d1		18.9			17.7						19.1	21.1
Progression Factor		0.34			0.36						1.00	1.00
Incremental Delay, d2		1.6			1.6						15.9	15.2
Delay (s)		8.1			7.9						34.9	36.3
Level of Service		A			A						C	D
Approach Delay (s)		8.1			7.9			0.0			35.3	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	395	20	305	135	300	20	75	1518	190	50
Future Volume (vph)	395	20	305	135	300	20	75	1518	190	50
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1509	1812	1812	1485			3677	1316	
Flt Permitted		0.63	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		1000	1812	1812	1485			3677	1316	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	411	21	318	141	312	21	78	1581	198	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	432	318	141	334	0	0	1659	212	0
Confl. Peds. (#/hr)							8			3
Confl. Bikes (#/hr)					4	4				
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Effective Green, g (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Actuated g/C Ratio		0.41	0.41	0.21	0.21			0.48	0.48	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		485	742	380	311			1783	638	
v/s Ratio Prot		c0.13	0.18	0.08	c0.22					
v/s Ratio Perm		0.23						0.45	0.16	
v/c Ratio		0.89	0.43	0.37	1.07			0.93	0.33	
Uniform Delay, d1		21.7	16.9	27.1	31.6			19.3	12.6	
Progression Factor		0.72	0.75	1.00	1.00			0.45	0.23	
Incremental Delay, d2		16.7	1.3	2.8	72.1			6.5	0.8	
Delay (s)		32.5	14.0	29.8	103.7			15.1	3.7	
Level of Service		C	B	C	F			B	A	
Approach Delay (s)			24.7	81.8				13.6		
Approach LOS			C	F				B		

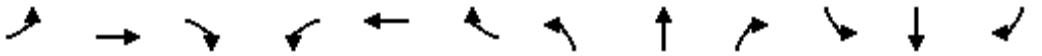
Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	370	40	30	250	50	40	420	50	60	330	40
Future Volume (veh/h)	80	370	40	30	250	50	40	420	50	60	330	40
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)	0.99		0.98	1.00		0.98	0.98		0.92	0.98		0.92
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	1412	1560	1530	1412	1500	1530	1440	1500	1469	1440	1500	1469
Adj Flow Rate, veh/h	83	385	37	31	260	43	42	438	41	62	344	32
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	520	706	68	333	632	104	104	890	81	159	778	73
Arrive On Green	0.50	0.50	0.50	1.00	1.00	1.00	0.76	0.76	0.76	0.76	0.76	0.76
Sat Flow, veh/h	852	1398	134	768	1251	207	138	2342	214	268	2047	192
Grp Volume(v), veh/h	83	0	422	31	0	303	271	0	250	219	0	219
Grp Sat Flow(s),veh/h/ln	852	0	1532	768	0	1457	1389	0	1306	1194	0	1313
Q Serve(g_s), s	4.3	0.0	15.1	1.3	0.0	0.0	0.0	0.0	5.9	0.5	0.0	4.8
Cycle Q Clear(g_c), s	4.3	0.0	15.1	16.4	0.0	0.0	5.4	0.0	5.9	6.5	0.0	4.8
Prop In Lane	1.00		0.09	1.00		0.14	0.15		0.16	0.28		0.15
Lane Grp Cap(c), veh/h	520	0	774	333	0	736	580	0	496	512	0	499
V/C Ratio(X)	0.16	0.00	0.55	0.09	0.00	0.41	0.47	0.00	0.50	0.43	0.00	0.44
Avail Cap(c_a), veh/h	520	0	774	333	0	736	580	0	496	512	0	499
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.84	0.00	0.84	0.75	0.00	0.75
Uniform Delay (d), s/veh	10.9	0.0	13.5	3.0	0.0	0.0	6.6	0.0	6.7	6.4	0.0	6.5
Incr Delay (d2), s/veh	0.7	0.0	2.8	0.5	0.0	1.7	2.3	0.0	3.1	2.0	0.0	2.1
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	1.1	0.0	6.9	0.3	0.0	0.3	2.5	0.0	2.4	1.9	0.0	1.9
LnGrp Delay(d),s/veh	11.5	0.0	16.3	3.6	0.0	1.7	8.9	0.0	9.7	8.4	0.0	8.6
LnGrp LOS	B		B	A		A	A		A	A		A
Approach Vol, veh/h		505			334			521			438	
Approach Delay, s/veh		15.5			1.8			9.3			8.5	
Approach LOS		B			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		40.4		30.4		40.4		30.4
Max Q Clear Time (g_c+I1), s		17.1		7.9		18.4		8.5
Green Ext Time (p_c), s		2.5		2.3		1.5		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	325	180	60	170	0	0	0	0	50	1076	130
Future Volume (vph)	0	325	180	60	170	0	0	0	0	50	1076	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.96
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1697			1775						4163	1148
Flt Permitted		1.00			0.67						1.00	1.00
Satd. Flow (perm)		1697			1213						4163	1148
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	339	188	62	177	0	0	0	0	52	1121	135
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	508	0	0	240	0	0	0	0	0	1173	135
Confl. Peds. (#/hr)	12		12	12		12			12	12		7
Confl. Bikes (#/hr)			6			4			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		35.8			35.8						35.4	28.4
Effective Green, g (s)		35.8			35.8						35.4	28.4
Actuated g/C Ratio		0.45			0.45						0.44	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		759			542						1842	407
v/s Ratio Prot		c0.30										
v/s Ratio Perm					0.20						0.28	0.12
v/c Ratio		0.67			0.44						0.64	0.33
Uniform Delay, d1		17.4			15.2						17.3	18.9
Progression Factor		0.32			1.00						0.35	0.43
Incremental Delay, d2		4.4			2.1						0.6	0.8
Delay (s)		10.0			17.3						6.7	9.0
Level of Service		B			B						A	A
Approach Delay (s)		10.0			17.3			0.0			6.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	150	0	0	130	110	90	1463	20	0	0	0
Future Volume (veh/h)	245	150	0	0	130	110	90	1463	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1620	1588	1620			
Adj Flow Rate, veh/h	255	156	0	0	135	107	94	1524	19			
Adj No. of Lanes	1	1	0	0	1	0	0	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	358	643	0	0	285	226	119	2061	26			
Arrive On Green	0.68	0.68	0.00	0.00	0.41	0.41	0.16	0.16	0.16			
Sat Flow, veh/h	1015	1588	0	0	703	557	248	4294	55			
Grp Volume(v), veh/h	255	156	0	0	0	242	596	498	543			
Grp Sat Flow(s),veh/h/ln	1015	1588	0	0	0	1260	1576	1445	1576			
Q Serve(g_s), s	19.4	3.0	0.0	0.0	0.0	11.3	29.1	26.2	26.2			
Cycle Q Clear(g_c), s	30.7	3.0	0.0	0.0	0.0	11.3	29.1	26.2	26.2			
Prop In Lane	1.00		0.00	0.00		0.44	0.16		0.04			
Lane Grp Cap(c), veh/h	358	643	0	0	0	510	756	694	757			
V/C Ratio(X)	0.71	0.24	0.00	0.00	0.00	0.47	0.79	0.72	0.72			
Avail Cap(c_a), veh/h	358	643	0	0	0	510	756	694	757			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	18.1	8.2	0.0	0.0	0.0	17.5	29.8	28.5	28.5			
Incr Delay (d2), s/veh	11.5	0.9	0.0	0.0	0.0	3.1	8.2	6.3	5.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.5	1.5	0.0	0.0	0.0	4.3	14.4	11.7	12.6			
LnGrp Delay(d),s/veh	29.6	9.1	0.0	0.0	0.0	20.7	37.9	34.8	34.3			
LnGrp LOS	C	A				C	D	C	C			
Approach Vol, veh/h		411			242			1637				
Approach Delay, s/veh		21.8			20.7			35.8				
Approach LOS		C			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		37.0		43.0		37.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		32.4		38.4		32.4		
Max Q Clear Time (g_c+I1), s		32.7		31.1		13.3		
Green Ext Time (p_c), s		0.0		4.4		1.0		

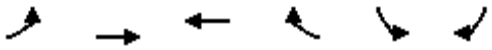
Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	230	40	105	250	70	30	400	85	45	290	65
Future Volume (veh/h)	55	230	40	105	250	70	30	400	85	45	290	65
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)	0.99		0.91	0.97		0.91	0.92		0.83	0.96		0.83
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	1588	1525	1620	1588	1588	1620	1620	1588	1555	1620	1588	1555
Adj Flow Rate, veh/h	57	240	34	109	260	59	31	417	67	47	302	47
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	390	657	93	472	626	142	85	902	140	121	719	119
Arrive On Green	0.51	0.51	0.51	0.17	0.17	0.17	0.13	0.13	0.13	0.77	0.77	0.77
Sat Flow, veh/h	937	1288	182	960	1227	278	92	2344	363	170	1867	309
Grp Volume(v), veh/h	57	0	274	109	0	319	277	0	238	196	0	200
Grp Sat Flow(s),veh/h/ln	937	0	1471	960	0	1505	1509	0	1290	1030	0	1316
Q Serve(g_s), s	3.5	0.0	9.0	8.2	0.0	15.2	0.0	0.0	13.7	3.3	0.0	4.0
Cycle Q Clear(g_c), s	18.7	0.0	9.0	17.2	0.0	15.2	12.9	0.0	13.7	17.0	0.0	4.0
Prop In Lane	1.00		0.12	1.00		0.18	0.11		0.28	0.24		0.24
Lane Grp Cap(c), veh/h	390	0	750	472	0	768	631	0	497	452	0	507
V/C Ratio(X)	0.15	0.00	0.37	0.23	0.00	0.42	0.44	0.00	0.48	0.43	0.00	0.39
Avail Cap(c_a), veh/h	390	0	750	472	0	768	631	0	497	452	0	507
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.87	0.00	0.87	0.85	0.00	0.85
Uniform Delay (d), s/veh	19.7	0.0	11.8	27.5	0.0	22.6	27.1	0.0	27.5	7.0	0.0	6.1
Incr Delay (d2), s/veh	0.8	0.0	1.4	1.1	0.0	1.5	1.9	0.0	2.9	2.6	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	3.9	2.3	0.0	6.7	6.0	0.0	5.3	1.5	0.0	1.6
LnGrp Delay(d),s/veh	20.5	0.0	13.2	28.5	0.0	24.1	29.1	0.0	30.3	9.6	0.0	8.1
LnGrp LOS	C		B	C		C	C		C	A		A
Approach Vol, veh/h		331			428			515			396	
Approach Delay, s/veh		14.4			25.3			29.6			8.8	
Approach LOS		B			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 41		* 31		* 41		* 31
Max Q Clear Time (g_c+I1), s		20.7		15.7		19.2		19.0
Green Ext Time (p_c), s		2.9		4.0		4.1		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

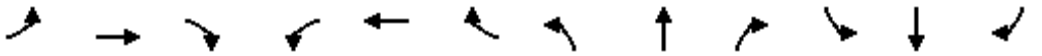
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	370	380	65	0	55
Future Volume (vph)	0	370	380	65	0	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0			5.6
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.97			0.78
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.98			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1588	1516			1074
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1588	1516			1074
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	385	396	68	0	57
RTOR Reduction (vph)	0	0	7	0	0	48
Lane Group Flow (vph)	0	385	457	0	0	9
Confl. Peds. (#/hr)				59		78
Confl. Bikes (#/hr)				14		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		55.1	56.1			12.3
Effective Green, g (s)		55.1	56.1			12.3
Actuated g/C Ratio		0.69	0.70			0.15
Clearance Time (s)						5.6
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1093	1063			165
v/s Ratio Prot		c0.24	c0.30			
v/s Ratio Perm						0.01
v/c Ratio		0.35	0.43			0.05
Uniform Delay, d1		5.1	5.1			28.9
Progression Factor		0.96	0.17			1.00
Incremental Delay, d2		0.2	0.2			0.1
Delay (s)		5.1	1.1			29.0
Level of Service		A	A			C
Approach Delay (s)		5.1	1.1		29.0	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	4.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	270	110	80	240	0	0	0	0	125	961	230
Future Volume (vph)	0	270	110	80	240	0	0	0	0	125	961	230
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.93	1.00	1.00						1.00	0.92
Flpb, ped/bikes		1.00	1.00	0.97	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1641	1173	1605	1535						4143	1102
Flt Permitted		1.00	1.00	0.52	1.00						0.99	1.00
Satd. Flow (perm)		1641	1173	874	1535						4143	1102
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	281	115	83	250	0	0	0	0	130	1001	240
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	281	86	83	250	0	0	0	0	0	1131	240
Confl. Peds. (#/hr)			51	51		28			11	11		19
Confl. Bikes (#/hr)			10			16			1			1
Parking (#/hr)											2	2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		34.8	34.8	34.8	34.8						36.4	29.4
Effective Green, g (s)		34.8	34.8	34.8	34.8						36.4	29.4
Actuated g/C Ratio		0.43	0.43	0.43	0.43						0.45	0.37
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		713	510	380	667						1885	404
v/s Ratio Prot		c0.17			0.16							
v/s Ratio Perm			0.07	0.10							0.27	0.22
v/c Ratio		0.39	0.17	0.22	0.37						0.60	0.59
Uniform Delay, d1		15.4	13.8	14.1	15.3						16.3	20.5
Progression Factor		0.52	0.38	0.89	0.92						0.38	0.49
Incremental Delay, d2		1.6	0.7	1.2	1.5						1.1	4.9
Delay (s)		9.6	6.0	13.7	15.5						7.4	14.9
Level of Service		A	A	B	B						A	B
Approach Delay (s)		8.5			15.1			0.0			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	210	0	0	195	90	125	1313	160	0	0	0
Future Volume (veh/h)	175	210	0	0	195	90	125	1313	160	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1525	1588	1620			
Adj Flow Rate, veh/h	182	219	0	0	203	72	130	1368	147			
Adj No. of Lanes	1	1	0	0	1	0	1	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	234	552	0	0	333	118	795	2174	234			
Arrive On Green	0.11	0.11	0.00	0.00	0.11	0.11	0.18	0.18	0.18			
Sat Flow, veh/h	985	1588	0	0	959	340	1452	3971	427			
Grp Volume(v), veh/h	182	219	0	0	0	275	130	996	519			
Grp Sat Flow(s),veh/h/ln	985	1588	0	0	0	1299	1452	1445	1507			
Q Serve(g_s), s	11.7	10.2	0.0	0.0	0.0	16.1	6.0	25.5	25.5			
Cycle Q Clear(g_c), s	27.8	10.2	0.0	0.0	0.0	16.1	6.0	25.5	25.5			
Prop In Lane	1.00		0.00	0.00		0.26	1.00		0.28			
Lane Grp Cap(c), veh/h	234	552	0	0	0	451	795	1583	825			
V/C Ratio(X)	0.78	0.40	0.00	0.00	0.00	0.61	0.16	0.63	0.63			
Avail Cap(c_a), veh/h	234	552	0	0	0	451	795	1583	825			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.92	0.92	0.00	0.00	0.00	1.00	0.29	0.29	0.29			
Uniform Delay (d), s/veh	44.7	27.6	0.0	0.0	0.0	30.2	17.3	25.3	25.3			
Incr Delay (d2), s/veh	20.7	2.0	0.0	0.0	0.0	6.0	0.1	0.6	1.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.4	4.8	0.0	0.0	0.0	6.6	2.5	10.3	10.9			
LnGrp Delay(d),s/veh	65.4	29.6	0.0	0.0	0.0	36.3	17.4	25.8	26.3			
LnGrp LOS	E	C				D	B	C	C			
Approach Vol, veh/h		401			275			1645				
Approach Delay, s/veh		45.9			36.3			25.3				
Approach LOS		D			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		32.0		48.0		32.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 28		* 44		* 28		
Max Q Clear Time (g_c+I1), s		29.8		27.5		18.1		
Green Ext Time (p_c), s		0.0		7.9		0.8		

Intersection Summary	
HCM 2010 Ctrl Delay	30.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	1495	0	0	0	0	0	280	50
Future Volume (veh/h)	0	0	0	300	1495	0	0	0	0	0	280	50
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.95
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.82
Adj Sat Flow, veh/h/ln				1530	1500	0				0	1500	1530
Adj Flow Rate, veh/h				312	1557	0				0	292	33
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				453	1997	0				0	626	70
Arrive On Green				0.21	0.21	0.00				0.00	0.27	0.27
Sat Flow, veh/h				621	3330	0				0	2415	261
Grp Volume(v), veh/h				675	1194	0				0	176	149
Grp Sat Flow(s),veh/h/ln				1345	1242	0				0	1425	1176
Q Serve(g_s), s				38.2	36.3	0.0				0.0	8.3	8.5
Cycle Q Clear(g_c), s				38.2	36.3	0.0				0.0	8.3	8.5
Prop In Lane				0.46		0.00				0.00		0.22
Lane Grp Cap(c), veh/h				903	1546	0				0	381	315
V/C Ratio(X)				0.75	0.77	0.00				0.00	0.46	0.47
Avail Cap(c_a), veh/h				903	1546	0				0	381	315
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				27.2	26.4	0.0				0.0	24.5	24.6
Incr Delay (d2), s/veh				5.6	3.8	0.0				0.0	4.0	5.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.7	13.3	0.0				0.0	3.7	3.2
LnGrp Delay(d),s/veh				32.8	30.2	0.0				0.0	28.5	29.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1869						325	
Approach Delay, s/veh					31.2						29.0	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.0		26.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 50		21.4				
Max Q Clear Time (g_c+I1), s		40.2		10.5				
Green Ext Time (p_c), s		6.3		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1665	150	140	310	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1665	150	140	310	0	0	0	0
Number				5	2	12	7	4	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				0	1412	1412	1440	1412	0			
Adj Flow Rate, veh/h				0	1734	120	146	323	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2351	717	266	507	0			
Arrive On Green				0.00	0.20	0.20	0.09	0.09	0.00			
Sat Flow, veh/h				0	3981	1175	683	1842	0			
Grp Volume(v), veh/h				0	1734	120	253	216	0			
Grp Sat Flow(s),veh/h/ln				0	1285	1175	1241	1220	0			
Q Serve(g_s), s				0.0	33.8	6.8	14.8	13.6	0.0			
Cycle Q Clear(g_c), s				0.0	33.8	6.8	15.8	13.6	0.0			
Prop In Lane				0.00		1.00	0.58		0.00			
Lane Grp Cap(c), veh/h				0	2351	717	425	348	0			
V/C Ratio(X)				0.00	0.74	0.17	0.60	0.62	0.00			
Avail Cap(c_a), veh/h				0	2351	717	425	348	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	25.9	15.2	33.0	32.1	0.0			
Incr Delay (d2), s/veh				0.0	2.1	0.5	6.0	8.1	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	12.5	2.3	6.1	5.4	0.0			
LnGrp Delay(d),s/veh				0.0	28.1	15.7	39.0	40.2	0.0			
LnGrp LOS					C	B	D	D				
Approach Vol, veh/h					1854			469				
Approach Delay, s/veh					27.3			39.6				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		53.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 49		* 23				
Max Q Clear Time (g_c+I1), s		35.8		17.8				
Green Ext Time (p_c), s		8.2		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	29.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	180	1730	0	0	0	0	0	275	90
Future Volume (veh/h)	0	0	0	180	1730	0	0	0	0	0	275	90
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1412	0				0	1412	1440
Adj Flow Rate, veh/h				188	1802	0				0	286	77
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				263	2124	0				0	499	129
Arrive On Green				0.21	0.21	0.00				0.00	0.26	0.26
Sat Flow, veh/h				325	3460	0				0	1988	496
Grp Volume(v), veh/h				733	1257	0				0	196	167
Grp Sat Flow(s),veh/h/ln				1331	1169	0				0	1341	1072
Q Serve(g_s), s				40.2	41.3	0.0				0.0	10.2	10.9
Cycle Q Clear(g_c), s				42.5	41.3	0.0				0.0	10.2	10.9
Prop In Lane				0.26		0.00				0.00		0.46
Lane Grp Cap(c), veh/h				901	1485	0				0	349	279
V/C Ratio(X)				0.81	0.85	0.00				0.00	0.56	0.60
Avail Cap(c_a), veh/h				901	1485	0				0	349	279
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				28.3	27.9	0.0				0.0	25.7	25.9
Incr Delay (d2), s/veh				7.9	6.1	0.0				0.0	6.4	9.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.7	14.7	0.0				0.0	4.4	3.9
LnGrp Delay(d),s/veh				36.2	34.0	0.0				0.0	32.1	35.1
LnGrp LOS				D	C						C	D
Approach Vol, veh/h					1990						363	
Approach Delay, s/veh					34.8						33.5	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		55.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 51		* 21				
Max Q Clear Time (g_c+I1), s		44.5		12.9				
Green Ext Time (p_c), s		4.7		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	34.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	70	1580	90	240	155	0	0	170	50
Future Volume (veh/h)	0	0	0	70	1580	90	240	155	0	0	170	50
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				73	1646	87	250	161	0	0	177	38
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				105	2506	137	299	649	0	0	299	64
Arrive On Green				0.18	0.18	0.18	0.10	0.58	0.00	0.00	0.23	0.23
Sat Flow, veh/h				192	4609	251	1765	1853	0	0	1294	278
Grp Volume(v), veh/h				666	554	586	250	161	0	0	0	215
Grp Sat Flow(s),veh/h/ln				1755	1606	1692	1765	1853	0	0	0	1571
Q Serve(g_s), s				28.5	25.6	25.6	2.1	3.4	0.0	0.0	0.0	9.7
Cycle Q Clear(g_c), s				28.5	25.6	25.6	2.1	3.4	0.0	0.0	0.0	9.7
Prop In Lane				0.11		0.15	1.00		0.00	0.00		0.18
Lane Grp Cap(c), veh/h				954	873	920	299	649	0	0	0	363
V/C Ratio(X)				0.70	0.63	0.64	0.84	0.25	0.00	0.00	0.00	0.59
Avail Cap(c_a), veh/h				954	873	920	299	649	0	0	0	363
HCM Platoon Ratio				0.33	0.33	0.33	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				26.7	25.5	25.5	32.4	11.5	0.0	0.0	0.0	27.4
Incr Delay (d2), s/veh				4.2	3.5	3.4	23.3	0.9	0.0	0.0	0.0	6.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.9	12.2	12.9	7.0	1.9	0.0	0.0	0.0	4.9
LnGrp Delay(d),s/veh				30.9	29.0	28.9	55.7	12.4	0.0	0.0	0.0	34.3
LnGrp LOS				C	C	C	E	B				C
Approach Vol, veh/h					1806			411			215	
Approach Delay, s/veh					29.6			38.7			34.3	
Approach LOS					C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.0	23.0		48.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			5.0	18.5		43.5		28.0
Max Q Clear Time (g_c+I1), s			4.1	11.7		30.5		5.4
Green Ext Time (p_c), s			0.2	0.8		10.9		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	41	37	90.8%	10.9	3.2	B
	Through	5	7	130.6%	12.6	12.2	B
	Right Turn						
	Subtotal	46	44	95.2%	12.4	3.4	B
SB	Left Turn						
	Through	10	12	115.2%	25.1	12.5	D
	Right Turn	5	7	138.2%	15.5	13.6	C
	Subtotal	15	18	122.9%	20.7	7.1	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	65	70	107.5%	3.0	0.3	A
	Through	1,699	1,687	99.3%	2.1	0.2	A
	Right Turn	5	4	76.8%	1.7	0.2	A
	Subtotal	1,769	1,760	99.5%	2.2	0.2	A
Total		1,830	1,822	99.6%	2.6	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	119	127	106.8%	25.8	3.2	C
	Through	20	26	128.6%	28.0	4.4	C
	Right Turn						
	Subtotal	139	153	110.0%	26.2	2.9	C
SB	Left Turn						
	Through	50	52	103.7%	22.1	5.0	C
	Right Turn	10	13	126.7%	14.1	9.2	B
	Subtotal	60	65	107.5%	20.6	4.9	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	232	239	103.0%	12.4	2.0	B
	Through	1,727	1,694	98.1%	9.4	1.5	A
	Right Turn	40	39	97.9%	8.1	1.6	A
	Subtotal	1,999	1,972	98.6%	9.7	1.5	A
Total		2,198	2,189	99.6%	11.2	1.4	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	100	1699	130	40	330	0	0	265	150
Future Volume (veh/h)	0	0	0	100	1699	130	40	330	0	0	265	150
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.97		1.00	1.00		0.83
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				1620	1588	1620	1620	1588	0	0	1525	1555
Adj Flow Rate, veh/h				104	1770	125	42	344	0	0	276	149
Adj No. of Lanes				0	3	0	0	2	0	0	2	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				126	2285	166	100	738	0	0	552	279
Arrive On Green				0.19	0.19	0.19	0.64	0.64	0.00	0.00	0.11	0.11
Sat Flow, veh/h				222	4017	292	142	2387	0	0	1807	874
Grp Volume(v), veh/h				738	615	646	193	193	0	0	228	197
Grp Sat Flow(s),veh/h/ln				1577	1445	1509	1084	1373	0	0	1448	1157
Q Serve(g_s), s				36.0	32.2	32.4	2.5	5.7	0.0	0.0	11.9	12.9
Cycle Q Clear(g_c), s				36.0	32.2	32.4	15.4	5.7	0.0	0.0	11.9	12.9
Prop In Lane				0.14		0.19	0.22		0.00	0.00		0.76
Lane Grp Cap(c), veh/h				897	822	858	400	438	0	0	462	369
V/C Ratio(X)				0.82	0.75	0.75	0.48	0.44	0.00	0.00	0.49	0.53
Avail Cap(c_a), veh/h				897	822	858	400	438	0	0	462	369
HCM Platoon Ratio				0.33	0.33	0.33	2.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				28.6	27.1	27.2	11.4	10.9	0.0	0.0	29.7	30.2
Incr Delay (d2), s/veh				8.4	6.2	6.1	4.1	3.2	0.0	0.0	3.7	5.5
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				17.8	14.3	15.0	2.4	2.4	0.0	0.0	5.3	4.7
LnGrp Delay(d),s/veh				37.0	33.2	33.2	15.5	14.1	0.0	0.0	33.4	35.6
LnGrp LOS				D	C	C	B	B			C	D
Approach Vol, veh/h					1999			386			425	
Approach Delay, s/veh					34.6			14.8			34.5	
Approach LOS					C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				30.0		50.0		30.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				25.5		45.5		25.5
Max Q Clear Time (g_c+I1), s				17.4		38.0		14.9
Green Ext Time (p_c), s				1.1		5.4		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	1774	30	110	50	0	0	30	30
Future Volume (vph)	0	0	0	300	1774	30	110	50	0	0	30	30
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6			7.6	
Lane Util. Factor					0.91		1.00	1.00			1.00	
Frpb, ped/bikes					1.00		1.00	1.00			0.97	
Flpb, ped/bikes					0.97		0.96	1.00			1.00	
Frt					1.00		1.00	1.00			0.93	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3682		1100	1249			1128	
Flt Permitted					0.99		0.72	1.00			1.00	
Satd. Flow (perm)					3682		830	1249			1128	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	312	1848	31	115	52	0	0	31	31
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	2190	0	115	52	0	0	54	0
Confl. Peds. (#/hr)			106	106		44	30		69			30
Confl. Bikes (#/hr)						2			3			8
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			4			8	
Permitted Phases				6			4					
Actuated Green, G (s)					51.4		19.4	19.4			19.4	
Effective Green, g (s)					51.4		19.4	19.4			19.4	
Actuated g/C Ratio					0.57		0.22	0.22			0.22	
Clearance Time (s)					11.6		7.6	7.6			7.6	
Lane Grp Cap (vph)					2102		178	269			243	
v/s Ratio Prot								0.04			0.05	
v/s Ratio Perm					0.59		c0.14					
v/c Ratio					1.04		0.65	0.19			0.22	
Uniform Delay, d1					19.3		32.2	28.9			29.1	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					31.6		16.7	1.6			2.1	
Delay (s)					50.9		48.9	30.5			31.2	
Level of Service					D		D	C			C	
Approach Delay (s)		0.0			50.9			43.2			31.2	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	49.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	157.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	480	1593	0	0	0	0	0	665	486
Future Volume (veh/h)	0	0	0	480	1593	0	0	0	0	0	665	486
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.85
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1560	1588	0				0	1588	1500
Adj Flow Rate, veh/h				500	1659	0				0	693	498
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				740	2085	0				0	1951	489
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1486	4765	0				0	4479	1088
Grp Volume(v), veh/h				500	1659	0				0	693	498
Grp Sat Flow(s),veh/h/ln				1486	1588	0				0	1445	1088
Q Serve(g_s), s				25.9	26.9	0.0				0.0	11.5	36.0
Cycle Q Clear(g_c), s				25.9	26.9	0.0				0.0	11.5	36.0
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				740	2085	0				0	1951	489
V/C Ratio(X)				0.68	0.80	0.00				0.00	0.36	1.02
Avail Cap(c_a), veh/h				740	2085	0				0	1951	489
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				30.3	30.8	0.0				0.0	23.6	34.1
Incr Delay (d2), s/veh				4.9	3.3	0.0				0.0	0.5	45.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.7	12.5	0.0				0.0	4.7	17.0
LnGrp Delay(d),s/veh				35.2	34.0	0.0				0.0	24.1	79.2
LnGrp LOS				D	C						C	F
Approach Vol, veh/h					2159						1191	
Approach Delay, s/veh					34.3						47.2	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						39.0		41.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						35.0		36.0
Max Q Clear Time (g_c+I1), s						28.9		38.0
Green Ext Time (p_c), s						4.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	38.9
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1150	195	918	1403	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1150	195	918	1403	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1500	1500	1398	1398	0			
Adj Flow Rate, veh/h				0	1198	189	1053	1326	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	3	3	0			
Cap, veh/h				0	1510	441	1381	1450	0			
Arrive On Green				0.00	0.37	0.37	0.17	0.17	0.00			
Sat Flow, veh/h				0	4230	1195	2663	2796	0			
Grp Volume(v), veh/h				0	1198	189	1053	1326	0			
Grp Sat Flow(s),veh/h/ln				0	1365	1195	1331	1398	0			
Q Serve(g_s), s				0.0	20.9	9.5	30.2	37.3	0.0			
Cycle Q Clear(g_c), s				0.0	20.9	9.5	30.2	37.3	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1510	441	1381	1450	0			
V/C Ratio(X)				0.00	0.79	0.43	0.76	0.91	0.00			
Avail Cap(c_a), veh/h				0	1510	441	1381	1450	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.5	18.9	28.5	31.4	0.0			
Incr Delay (d2), s/veh				0.0	4.4	3.0	4.0	10.4	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				0.0	8.4	3.5	11.9	16.5	0.0			
LnGrp Delay(d),s/veh				0.0	26.9	22.0	32.5	41.8	0.0			
LnGrp LOS					C	C	C	D				
Approach Vol, veh/h					1387			2379				
Approach Delay, s/veh					26.2			37.7				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				46.0		34.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				41.5		29.5		
Max Q Clear Time (g_c+I1), s				39.3		22.9		
Green Ext Time (p_c), s				2.0		3.9		

Intersection Summary	
HCM 2010 Ctrl Delay	33.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1526	100	0	0	0	0	0	400	170	430	0
Future Volume (veh/h)	0	1526	100	0	0	0	0	0	400	170	430	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		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	0	1676	1710				0	1588	1620	1765	1765	0
Adj Flow Rate, veh/h	0	1590	95				0	0	402	177	448	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1145	992	1526	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.86	0.29	0.29	0.00
Sat Flow, veh/h		0					0	0	1324	969	1765	0
Grp Volume(v), veh/h		0.0					0	0	402	177	448	0
Grp Sat Flow(s),veh/h/ln							0	0	1324	969	1765	0
Q Serve(g_s), s							0.0	0.0	2.0	4.9	6.7	0.0
Cycle Q Clear(g_c), s							0.0	0.0	2.0	6.9	6.7	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1145	992	1526	0
V/C Ratio(X)							0.00	0.00	0.35	0.18	0.29	0.00
Avail Cap(c_a), veh/h							0	0	1145	992	1526	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.9	4.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.8	0.4	0.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.9	1.4	3.6	0.0
LnGrp Delay(d),s/veh							0.0	0.0	1.3	5.3	4.5	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								402			625	
Approach Delay, s/veh								1.3			4.7	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				34.0				34.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				29.4				29.4
Max Q Clear Time (g_c+I1), s				8.9				4.0
Green Ext Time (p_c), s				1.8				1.2

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	1916	0	0	0	0	0	245	120	0	0	0
Future Volume (veh/h)	185	1916	0	0	0	0	0	245	120	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1500	0				0	1500	1440			
Adj Flow Rate, veh/h	193	1996	0				0	255	120			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	251	2157	0				0	626	284			
Arrive On Green	0.19	0.19	0.00				0.00	0.32	0.32			
Sat Flow, veh/h	344	3801	0				0	1940	881			
Grp Volume(v), veh/h	763	1426	0				0	195	180			
Grp Sat Flow(s),veh/h/ln	1414	1365	0				0	1500	1322			
Q Serve(g_s), s	40.9	41.0	0.0				0.0	8.1	8.5			
Cycle Q Clear(g_c), s	42.7	41.0	0.0				0.0	8.1	8.5			
Prop In Lane	0.25		0.00				0.00		0.67			
Lane Grp Cap(c), veh/h	859	1549	0				0	484	426			
V/C Ratio(X)	0.89	0.92	0.00				0.00	0.40	0.42			
Avail Cap(c_a), veh/h	859	1549	0				0	484	426			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	31.3	30.7	0.0				0.0	21.1	21.3			
Incr Delay (d2), s/veh	13.2	10.4	0.0				0.0	2.5	3.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	19.9	17.8	0.0				0.0	3.7	3.5			
LnGrp Delay(d),s/veh	44.5	41.2	0.0				0.0	23.6	24.3			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2189						375				
Approach Delay, s/veh		42.3						23.9				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				30.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 26		45.4		
Max Q Clear Time (g_c+I1), s				10.5		44.7		
Green Ext Time (p_c), s				2.8		0.7		

Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1961	80	0	0	0	0	0	230	200	270	0
Future Volume (veh/h)	0	1961	80	0	0	0	0	0	230	200	270	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1500	1382				0	1588	1591	1560	1500	0
Adj Flow Rate, veh/h	0	2043	78				0	0	224	208	281	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1101	1057	1282	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1288	1001	1500	0
Grp Volume(v), veh/h		0.0					0	0	224	208	281	0
Grp Sat Flow(s),veh/h/ln							0	0	1288	1001	1500	0
Q Serve(g_s), s							0.0	0.0	0.9	5.0	4.4	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.9	6.0	4.4	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1101	1057	1282	0
V/C Ratio(X)							0.00	0.00	0.20	0.20	0.22	0.00
Avail Cap(c_a), veh/h							0	0	1101	1057	1282	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.1	3.2	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.4	0.4	0.4	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.4	1.5	2.0	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.8	4.5	3.6	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								224			489	
Approach Delay, s/veh								0.8			4.0	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				26.5				26.5
Max Q Clear Time (g_c+I1), s				8.0				2.9
Green Ext Time (p_c), s				1.4				0.6

Intersection Summary	
HCM 2010 Ctrl Delay	3.0
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	2116	175	0	0	0	0	305	30	110	130	0
Future Volume (veh/h)	100	2116	175	0	0	0	0	305	30	110	130	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.92	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	104	2204	171				0	318	22	115	135	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	116	2597	205				0	629	43	255	543	0
Arrive On Green	0.19	0.19	0.19				0.00	0.21	0.21	0.03	0.21	0.00
Sat Flow, veh/h	200	4488	355				0	3088	206	1597	1744	0
Grp Volume(v), veh/h	911	757	811				0	167	173	115	135	0
Grp Sat Flow(s),veh/h/ln	1755	1606	1682				0	1593	1618	1597	1744	0
Q Serve(g_s), s	40.7	36.2	37.2				0.0	7.4	7.6	0.0	5.2	0.0
Cycle Q Clear(g_c), s	40.7	36.2	37.2				0.0	7.4	7.6	0.0	5.2	0.0
Prop In Lane	0.11		0.21				0.00		0.13	1.00		0.00
Lane Grp Cap(c), veh/h	1015	929	973				0	334	339	255	543	0
V/C Ratio(X)	0.90	0.81	0.83				0.00	0.50	0.51	0.45	0.25	0.00
Avail Cap(c_a), veh/h	1015	929	973				0	334	339	255	543	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.1	28.3	28.7				0.0	28.0	28.1	34.1	23.9	0.0
Incr Delay (d2), s/veh	12.3	7.8	8.3				0.0	5.3	5.4	5.7	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.2	18.1	19.6				0.0	3.7	3.9	2.9	2.7	0.0
LnGrp Delay(d),s/veh	42.4	36.1	37.1				0.0	33.3	33.4	39.8	25.0	0.0
LnGrp LOS	D	D	D					C	C	D	C	
Approach Vol, veh/h		2479						340			250	
Approach Delay, s/veh		38.7						33.4			31.8	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		51.0		29.2			8.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		46.4		* 25			* 4	* 17
Max Q Clear Time (g_c+I1), s		42.7		7.2			2.0	9.6
Green Ext Time (p_c), s		3.7		0.9			0.1	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	89	97	108.7%	31.7	5.8	D
	Through						
	Right Turn						
	Subtotal	89	97	108.7%	31.7	5.8	D
EB	Left Turn	45	43	96.4%	3.1	0.4	A
	Through	2,246	2,286	101.8%	2.8	0.2	A
	Right Turn						
	Subtotal	2,291	2,330	101.7%	2.8	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,380	2,426	102.0%	4.0	0.6	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	89	93	104.8%	18.9	4.5	B
	Right Turn	413	401	97.2%	26.7	10.4	C
	Subtotal	502	495	98.5%	25.1	8.5	C
SB	Left Turn	107	106	98.7%	26.2	3.6	C
	Through	180	184	102.4%	18.5	2.7	B
	Right Turn						
	Subtotal	287	290	101.0%	21.2	1.6	C
EB	Left Turn	50	56	112.9%	17.1	4.4	B
	Through	2,213	2,223	100.4%	15.9	1.5	B
	Right Turn	42	40	94.2%	9.6	2.6	A
	Subtotal	2,305	2,319	100.6%	15.8	1.5	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,094	3,103	100.3%	17.9	1.9	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	2402	51	0	0	0	0	200	130	130	180	0
Future Volume (veh/h)	220	2402	51	0	0	0	0	200	130	130	180	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1412	1382	1355	0
Adj Flow Rate, veh/h	229	2502	31				0	208	125	135	188	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	216	2541	642				0	491	404	257	439	0
Arrive On Green	0.18	0.18	0.18				0.00	0.35	0.35	0.69	0.69	0.00
Sat Flow, veh/h	394	4640	1172				0	1412	1162	496	1324	0
Grp Volume(v), veh/h	809	1922	31				0	208	125	156	167	0
Grp Sat Flow(s),veh/h/ln	1392	1214	1172				0	1412	1162	587	1172	0
Q Serve(g_s), s	43.8	41.9	1.7				0.0	9.0	6.3	11.6	4.9	0.0
Cycle Q Clear(g_c), s	43.8	41.9	1.7				0.0	9.0	6.3	20.6	4.9	0.0
Prop In Lane	0.28		1.00				0.00		1.00	0.87		0.00
Lane Grp Cap(c), veh/h	762	1994	642				0	491	404	288	407	0
V/C Ratio(X)	1.06	0.96	0.05				0.00	0.42	0.31	0.54	0.41	0.00
Avail Cap(c_a), veh/h	762	1994	642				0	491	404	288	407	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.8	32.0	15.5				0.0	20.0	19.1	14.3	8.7	0.0
Incr Delay (d2), s/veh	50.2	13.2	0.1				0.0	2.7	2.0	7.1	3.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	27.5	16.5	0.6				0.0	3.9	2.2	3.3	1.8	0.0
LnGrp Delay(d),s/veh	83.0	45.2	15.7				0.0	22.6	21.1	21.4	11.8	0.0
LnGrp LOS	F	D	B					C	C	C	B	
Approach Vol, veh/h		2762						333			323	
Approach Delay, s/veh		56.0						22.1			16.4	
Approach LOS		E						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.0		32.0				32.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 44		* 28				* 28
Max Q Clear Time (g_c+I1), s		45.8		11.0				22.6
Green Ext Time (p_c), s		0.0		1.3				0.7

Intersection Summary	
HCM 2010 Ctrl Delay	48.9
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	2512	120	0	0	0	0	140	340	85	235	0
Future Volume (veh/h)	30	2512	120	0	0	0	0	140	340	85	235	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1468	1412	1412	0
Adj Flow Rate, veh/h	31	2617	78				0	146	319	89	245	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	30	2740	614				0	408	351	243	408	0
Arrive On Green	0.18	0.18	0.18				0.00	0.29	0.29	0.58	0.58	0.00
Sat Flow, veh/h	55	4996	1119				0	1412	1216	738	1412	0
Grp Volume(v), veh/h	790	1858	78				0	146	319	89	245	0
Grp Sat Flow(s),veh/h/ln	1409	1214	1119				0	1412	1216	738	1412	0
Q Serve(g_s), s	43.9	40.2	4.7				0.0	6.6	20.2	7.4	9.0	0.0
Cycle Q Clear(g_c), s	43.9	40.2	4.7				0.0	6.6	20.2	14.0	9.0	0.0
Prop In Lane	0.04		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	773	1998	614				0	408	351	243	408	0
V/C Ratio(X)	1.02	0.93	0.13				0.00	0.36	0.91	0.37	0.60	0.00
Avail Cap(c_a), veh/h	773	1998	614				0	468	403	274	468	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.97	0.97	0.00
Uniform Delay (d), s/veh	32.8	31.2	16.7				0.0	22.6	27.4	17.5	13.9	0.0
Incr Delay (d2), s/veh	16.1	1.0	0.0				0.0	0.5	22.1	0.9	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.6	13.7	1.5				0.0	2.6	8.9	1.5	3.6	0.0
LnGrp Delay(d),s/veh	48.8	32.3	16.7				0.0	23.1	49.5	18.4	15.5	0.0
LnGrp LOS	F	C	B					C	D	B	B	
Approach Vol, veh/h		2726						465			334	
Approach Delay, s/veh		36.6						41.2			16.3	
Approach LOS		D						D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.4		29.6				29.6
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		40.5		26.5				26.5
Max Q Clear Time (g_c+I1), s		45.9		22.2				16.0
Green Ext Time (p_c), s		0.0		0.9				1.2

Intersection Summary	
HCM 2010 Ctrl Delay	35.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1848	1084	0	0	0	0	0	0	365	780	0
Future Volume (veh/h)	0	1848	1084	0	0	0	0	0	0	365	780	0
Number	5	2	12							7	4	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	0	1500	1500							1500	1500	0
Adj Flow Rate, veh/h	0	1907	1072							380	812	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.96	0.96	0.96							0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2							2	2	0
Cap, veh/h	0	2268	1285							476	1000	0
Arrive On Green	0.00	0.17	0.17							0.11	0.11	0.00
Sat Flow, veh/h	0	4500	2550							1429	3000	0
Grp Volume(v), veh/h	0	1907	1072							380	812	0
Grp Sat Flow(s),veh/h/ln	0	1500	1275							1429	1500	0
Q Serve(g_s), s	0.0	32.9	32.6							20.8	21.2	0.0
Cycle Q Clear(g_c), s	0.0	32.9	32.6							20.8	21.2	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2268	1285							476	1000	0
V/C Ratio(X)	0.00	0.84	0.83							0.80	0.81	0.00
Avail Cap(c_a), veh/h	0	2268	1285							545	1144	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.88	0.88	0.00
Uniform Delay (d), s/veh	0.0	30.2	30.1							33.0	33.1	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.6							6.5	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.7	11.6							9.1	9.3	0.0
LnGrp Delay(d),s/veh	0.0	30.6	30.7							39.4	36.7	0.0
LnGrp LOS		C	C							D	D	
Approach Vol, veh/h		2979									1192	
Approach Delay, s/veh		30.7									37.6	
Approach LOS		C									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.8		31.2				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		36.5		30.5				
Max Q Clear Time (g_c+I1), s		34.9		23.2				
Green Ext Time (p_c), s		1.6		3.5				

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	953	1310	0	0	0	0	0	1388	560	0	0	0
Future Volume (veh/h)	953	1310	0	0	0	0	0	1388	560	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1468	1500	0				0	1412	1412			
Adj Flow Rate, veh/h	1030	1314	0				0	1539	503			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	1473	1388	0				0	1779	492			
Arrive On Green	0.15	0.15	0.00				0.00	0.42	0.42			
Sat Flow, veh/h	2797	3000	0				0	4235	1172			
Grp Volume(v), veh/h	1030	1314	0				0	1539	503			
Grp Sat Flow(s),veh/h/ln	1398	1500	0				0	1412	1172			
Q Serve(g_s), s	28.4	34.7	0.0				0.0	26.5	33.6			
Cycle Q Clear(g_c), s	28.4	34.7	0.0				0.0	26.5	33.6			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1473	1388	0				0	1779	492			
V/C Ratio(X)	0.70	0.95	0.00				0.00	0.87	1.02			
Avail Cap(c_a), veh/h	1473	1388	0				0	1779	492			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	30.3	32.9	0.0				0.0	21.1	23.2			
Incr Delay (d2), s/veh	2.8	14.4	0.0				0.0	5.9	46.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	11.6	17.2	0.0				0.0	11.2	17.1			
LnGrp Delay(d),s/veh	33.0	47.4	0.0				0.0	27.1	69.5			
LnGrp LOS	C	D						C	F			
Approach Vol, veh/h		2344						2042				
Approach Delay, s/veh		41.1						37.5				
Approach LOS		D						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		41.2		38.8				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 37		* 34				
Max Q Clear Time (g_c+I1), s		36.7		35.6				
Green Ext Time (p_c), s		0.3		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	39.4
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	280	40	70	280	51	60	221	170	102	139	30
Future Volume (veh/h)	20	280	40	70	280	51	60	221	170	102	139	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		0.96	1.00		0.96	1.00		0.96	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2039	2039	2000	1961	1961	2000	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	21	292	35	73	292	46	62	230	145	106	145	23
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	388	47	154	446	70	268	302	190	222	406	64
Arrive On Green	0.03	0.22	0.22	0.08	0.27	0.27	0.15	0.29	0.29	0.12	0.26	0.26
Sat Flow, veh/h	1942	1778	213	1867	1644	259	1774	1049	662	1774	1551	246
Grp Volume(v), veh/h	21	0	327	73	0	338	62	0	375	106	0	168
Grp Sat Flow(s),veh/h/ln	1942	0	1991	1867	0	1903	1774	0	1711	1774	0	1796
Q Serve(g_s), s	0.6	0.0	9.2	2.2	0.0	9.4	1.8	0.0	11.9	3.3	0.0	4.5
Cycle Q Clear(g_c), s	0.6	0.0	9.2	2.2	0.0	9.4	1.8	0.0	11.9	3.3	0.0	4.5
Prop In Lane	1.00		0.11	1.00		0.14	1.00		0.39	1.00		0.14
Lane Grp Cap(c), veh/h	57	0	434	154	0	516	268	0	492	222	0	470
V/C Ratio(X)	0.37	0.00	0.75	0.47	0.00	0.66	0.23	0.00	0.76	0.48	0.00	0.36
Avail Cap(c_a), veh/h	261	0	831	313	0	858	298	0	660	298	0	693
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	21.8	26.1	0.0	19.3	22.3	0.0	19.4	24.3	0.0	17.9
Incr Delay (d2), s/veh	1.4	0.0	2.7	0.8	0.0	1.4	0.2	0.0	3.6	0.6	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	5.3	1.2	0.0	5.1	0.9	0.0	6.1	1.7	0.0	2.3
LnGrp Delay(d),s/veh	29.8	0.0	24.5	27.0	0.0	20.7	22.4	0.0	23.0	24.9	0.0	18.4
LnGrp LOS	C		C	C		C	C		C	C		B
Approach Vol, veh/h		348			411			437			274	
Approach Delay, s/veh		24.8			21.8			22.9			20.9	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	17.9	13.0	19.8	5.8	21.1	11.4	21.4
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	24.9	10.0	* 23	8.0	26.9	10.0	* 23
Max Q Clear Time (g_c+I1), s	4.2	11.2	3.8	6.5	2.6	11.4	5.3	13.9
Green Ext Time (p_c), s	0.0	1.1	0.0	0.5	0.0	1.2	0.1	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.7
HCM 2010 LOS	C

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	490	50	0	635	10	25
Future Volume (vph)	490	50	0	635	10	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			3.0	5.6	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	0.99	
Frt	0.99			1.00	0.90	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1561			1588	1401	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1561			1588	1401	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	510	52	0	661	10	26
RTOR Reduction (vph)	5	0	0	0	21	0
Lane Group Flow (vph)	557	0	0	661	15	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA	Perm	
Protected Phases	2			3 4 6		
Permitted Phases					8	
Actuated Green, G (s)	34.1			54.9	13.9	
Effective Green, g (s)	34.1			48.9	13.9	
Actuated g/C Ratio	0.43			0.61	0.17	
Clearance Time (s)	6.0				5.6	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	665			970	243	
v/s Ratio Prot	c0.36			c0.42		
v/s Ratio Perm					c0.01	
v/c Ratio	0.84			0.68	0.06	
Uniform Delay, d1	20.5			10.4	27.6	
Progression Factor	0.64			0.35	0.72	
Incremental Delay, d2	10.7			0.5	0.1	
Delay (s)	23.8			4.2	20.0	
Level of Service	C			A	C	
Approach Delay (s)	23.8			4.2	20.0	
Approach LOS	C			A	C	

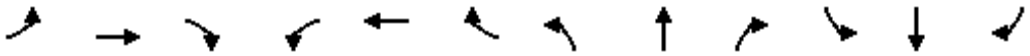
Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	455	5	0	290	15	30	25	20	10	20	20
Future Volume (vph)	0	455	5	0	290	15	30	25	20	10	20	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1585			1574			1487			1461	
Flt Permitted		1.00			1.00			0.85			0.92	
Satd. Flow (perm)		1585			1574			1285			1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	474	5	0	302	16	31	26	21	10	21	21
RTOR Reduction (vph)	0	0	0	0	2	0	0	19	0	0	19	0
Lane Group Flow (vph)	0	479	0	0	316	0	0	59	0	0	33	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			4 6			8			8	
Permitted Phases							8			8		
Actuated Green, G (s)		43.0			58.8			9.2			9.2	
Effective Green, g (s)		43.0			58.8			9.2			9.2	
Actuated g/C Ratio		0.54			0.73			0.11			0.11	
Clearance Time (s)		6.0						6.0			6.0	
Vehicle Extension (s)		3.0						1.5			1.5	
Lane Grp Cap (vph)		851			1156			147			155	
v/s Ratio Prot		c0.30			c0.20							
v/s Ratio Perm								c0.05			0.02	
v/c Ratio		0.56			0.27			0.40			0.22	
Uniform Delay, d1		12.3			3.5			32.9			32.1	
Progression Factor		0.58			0.05			0.38			0.84	
Incremental Delay, d2		2.3			0.0			0.6			0.1	
Delay (s)		9.4			0.2			13.0			27.1	
Level of Service		A			A			B			C	
Approach Delay (s)		9.4			0.2			13.0			27.1	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

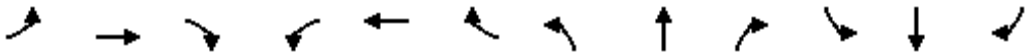
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	515	0	0	625	10	25
Future Volume (vph)	515	0	0	625	10	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			6.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.90	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1588			1588	1414	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1588			1588	1414	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	536	0	0	651	10	26
RTOR Reduction (vph)	0	0	0	0	21	0
Lane Group Flow (vph)	536	0	0	651	15	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	53.6			34.1	14.8	
Effective Green, g (s)	48.0			34.1	14.8	
Actuated g/C Ratio	0.60			0.43	0.19	
Clearance Time (s)				6.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	952			676	261	
v/s Ratio Prot	c0.34			c0.41	c0.01	
v/s Ratio Perm						
v/c Ratio	0.56			0.96	0.06	
Uniform Delay, d1	9.7			22.3	26.9	
Progression Factor	0.29			1.04	1.83	
Incremental Delay, d2	0.4			20.9	0.0	
Delay (s)	3.3			44.0	49.1	
Level of Service	A			D	D	
Approach Delay (s)	3.3			44.0	49.1	
Approach LOS	A			D	D	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	485	0	0	285	15	20	20	20	0	0	0
Future Volume (vph)	0	485	0	0	285	15	20	20	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1573			1470				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1573			1470				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	505	0	0	297	16	21	21	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	505	0	0	311	0	0	45	0	0	0	0
Confl. Peds. (#/hr)	10		10			10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		58.2			43.0			9.8				
Effective Green, g (s)		58.2			43.0			9.8				
Actuated g/C Ratio		0.73			0.54			0.12				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1155			845			180				
v/s Ratio Prot		c0.32			0.20			c0.03				
v/s Ratio Perm												
v/c Ratio		0.44			0.37			0.25				
Uniform Delay, d1		4.4			10.7			31.8				
Progression Factor		0.09			0.51			1.01				
Incremental Delay, d2		0.1			1.2			0.2				
Delay (s)		0.5			6.7			32.2				
Level of Service		A			A			C				
Approach Delay (s)		0.5			6.7			32.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	370	0	0	425	50	20	5	20	0	0	0
Future Volume (vph)	0	370	0	0	425	50	20	5	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1537			1442				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1537			1442				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	385	0	0	443	52	21	5	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	5	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	385	0	0	490	0	0	29	0	0	0	0
Confl. Peds. (#/hr)	59		21			59			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		55.1			36.8			13.3				
Effective Green, g (s)		55.1			36.8			13.3				
Actuated g/C Ratio		0.69			0.46			0.17				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1093			707			239				
v/s Ratio Prot		c0.24			c0.32			c0.02				
v/s Ratio Perm												
v/c Ratio		0.35			0.69			0.12				
Uniform Delay, d1		5.1			17.1			28.4				
Progression Factor		0.21			0.78			1.01				
Incremental Delay, d2		0.2			5.0			0.2				
Delay (s)		1.2			18.4			28.8				
Level of Service		A			B			C				
Approach Delay (s)		1.2			18.4			28.8			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	28.8	46.9	0.07	5.2	F
C	IV	25	18.9	11.8	30.7	0.07	8.4	E
B	IV	25	17.9	45.4	63.3	0.07	3.8	F
A	IV	25	18.5	13.6	32.1	0.07	7.8	E
Lindaro	IV	25	25.3	20.3	45.6	0.14	11.1	D
Lincoln	IV	25	21.4	60.1	81.5	0.10	4.3	F
Francisco W.	IV	25	12.2	33.5	45.7	0.05	3.6	F
101 SBOn 2nd	IV	25	14.2	23.0	37.2	0.05	5.2	F
Total	IV		146.5	236.5	383.0	0.61	5.8	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	36.2	55.2	0.07	4.7	F
Tamalpais	IV	25	14.4	53.9	68.3	0.05	2.9	F
Lincoln	IV	25	13.2	20.0	33.2	0.05	5.4	F
Lindaro	IV	25	21.4	2.9	24.3	0.10	14.4	C
A	IV	25	25.3	14.8	40.1	0.14	12.6	D
B	IV	25	17.9	8.8	26.7	0.07	9.1	D
C	IV	25	19.0	4.5	23.5	0.07	11.0	D
D	IV	25	18.7	2.6	21.3	0.07	11.9	D
Total	IV		148.9	143.7	292.6	0.62	7.7	E

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	29	24.0	54.8	78.8	0.16	7.3	E
5th	IV	25	16.3	3.1	19.4	0.06	11.4	D
4th	IV	25	14.6	6.2	20.8	0.05	9.5	D
3rd	IV	25	17.7	10.4	28.1	0.07	8.5	E
2nd	IV	25	15.6	75.5	91.1	0.06	2.3	F
Total	IV		88.2	150.0	238.2	0.40	6.1	F

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	30	25.2	32.1	57.3	0.17	10.6	D
3rd St	IV	25	14.8	20.3	35.1	0.06	5.7	F
4th	IV	25	18.3	17.0	35.3	0.07	7.0	E
5th	IV	25	14.6	9.8	24.4	0.06	8.1	E
Mission	IV	25	15.7	5.9	21.6	0.06	9.9	D
Total	IV		88.6	85.1	173.7	0.41	8.4	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	14.6	43.1	0.16	13.2	C
Tamalpais	IV	25	16.0	49.8	65.8	0.06	3.3	F
Tamalpais	IV	25	3.1	5.7	8.8	0.01	4.8	F
Hetherton	IV	25	8.7	10.3	19.0	0.03	6.2	F
Irwin	IV	25	18.9	14.7	33.6	0.07	7.6	E
Total	IV		75.2	95.1	170.3	0.33	7.1	E

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	27.6	49.2	0.10	7.2	E
Hetherton	IV	25	18.9	23.4	42.3	0.07	6.1	F
Tamalpais	IV	25	8.7	115.6	124.3	0.03	1.0	F
Tamalpais	IV	25	3.1	4.7	7.8	0.01	5.4	F
Lincoln	IV	25	16.0	80.8	96.8	0.06	2.2	F
Total	IV		68.3	252.1	320.4	0.27	3.1	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	17.6	35.7	0.07	6.9	F
C	IV	25	18.9	13.8	32.7	0.07	7.9	E
B	IV	25	17.9	14.9	32.8	0.07	7.4	E
A	IV	25	18.5	12.1	30.6	0.07	8.2	E
Lindaro	IV	25	25.3	13.2	38.5	0.14	13.1	C
Lincoln	IV	25	21.4	63.0	84.4	0.10	4.1	F
Francisco W.	IV	25	12.2	35.3	47.5	0.05	3.5	F
101 SBOn Hetherton	IV	25	14.2	81.7	95.9	0.05	2.0	F
Total	IV		146.5	251.6	398.1	0.61	5.6	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	42.1	61.1	0.07	4.2	F
Tamalpais	IV	25	14.4	52.1	66.5	0.05	2.9	F
Lincoln	IV	25	13.2	18.0	31.2	0.05	5.8	F
Lindaro	IV	25	21.4	4.5	25.9	0.10	13.5	C
A	IV	25	25.3	6.4	31.7	0.14	16.0	C
B	IV	25	17.9	7.2	25.1	0.07	9.7	D
C	IV	25	19.0	4.3	23.3	0.07	11.1	D
D	IV	25	18.7	2.9	21.6	0.07	11.7	D
Total	IV		148.9	137.5	286.4	0.62	7.8	E

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	35	22.2	36.4	58.6	0.16	9.8	D
5th	IV	25	16.3	6.8	23.1	0.06	9.6	D
4th	IV	25	14.6	7.4	22.0	0.05	9.0	E
3rd	IV	25	17.7	22.8	40.5	0.07	5.9	F
2nd	IV	25	15.6	25.7	41.3	0.06	5.1	F
Total	IV		86.4	99.1	185.5	0.40	7.8	E

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	38	19.3	57.5	76.8	0.17	7.9	E
3rd St	IV	25	14.8	20.3	35.1	0.06	5.7	F
4th	IV	25	18.9	3.7	22.6	0.07	11.4	D
5th	IV	25	14.0	12.6	26.6	0.05	7.2	E
Mission	IV	25	15.7	3.0	18.7	0.06	11.4	D
Total	IV		82.7	97.1	179.8	0.41	8.2	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	12.1	40.6	0.16	14.0	C
Tamalpais	IV	25	16.1	25.9	42.0	0.06	5.2	F
Tamalpais	IV	25	4.3	3.1	7.4	0.02	7.9	E
Hetherton	IV	25	7.5	8.0	15.5	0.03	6.6	F
Irwin	IV	25	18.9	14.4	33.3	0.07	7.7	E
Total	IV		75.3	63.5	138.8	0.33	8.7	E

Arterial Level of Service: WB Mission

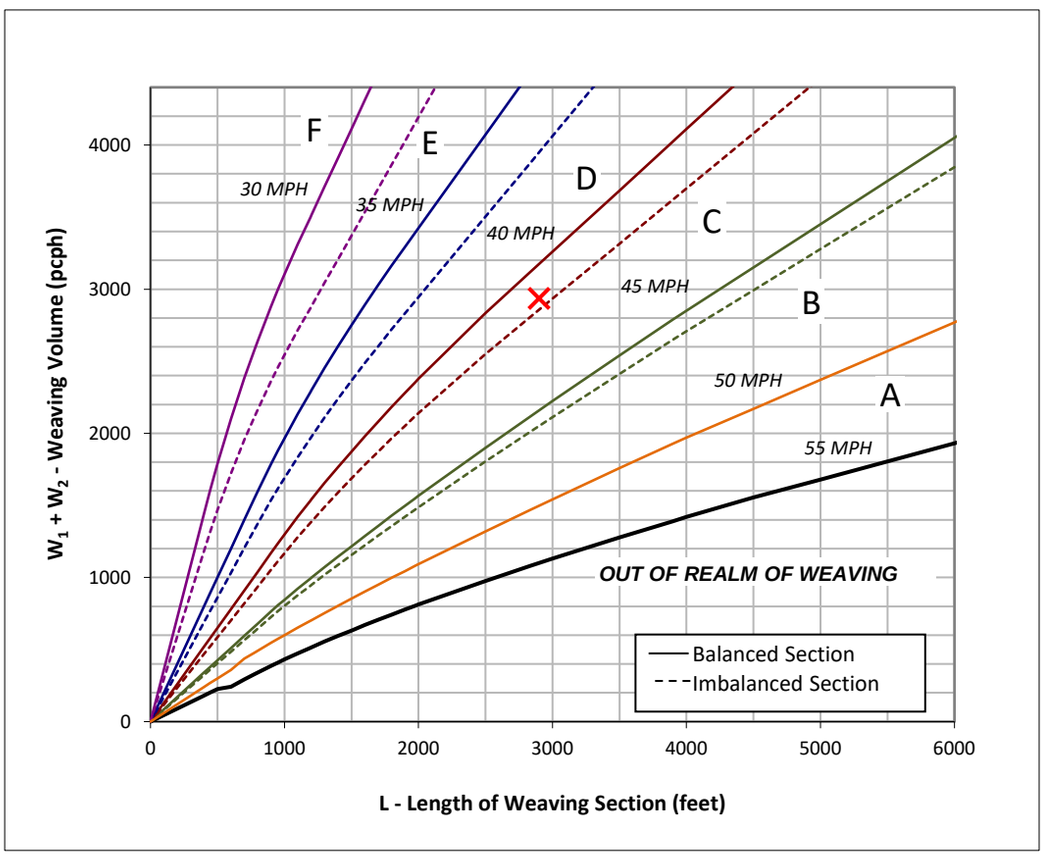
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	30.4	52.0	0.10	6.8	F
Hetherton	IV	25	18.9	8.1	27.0	0.07	9.5	D
Tamalpais	IV	25	7.5	46.6	54.1	0.03	1.9	F
Tamalpais	IV	25	4.3	2.7	7.0	0.02	8.4	E
Lincoln	IV	25	16.1	31.9	48.0	0.06	4.6	F
Total	IV		68.4	119.7	188.1	0.27	5.3	F

Leisch Method for Weaving Analysis

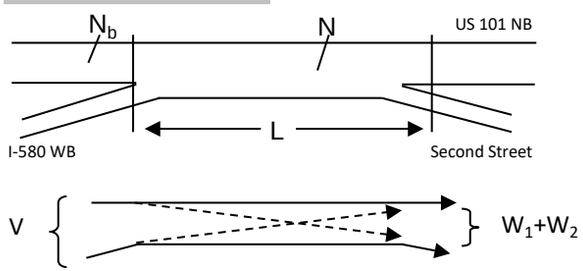
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Baseline + Project No SenCent AM PH
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,787	Volume (vph)*	1,755	Volume (vph)*	1,061
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	4%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	6,042	Volume (pcph)	1,832	Volume (pcph)	1,104



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	N
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.6
4. Weaving Intensity Factor (k)	2.55
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,550
6. Level of Service (LOS)	D

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3833	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1404
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.61
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	23.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	820
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.50
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.8
Speed 2 (S_2), mi/h	0.2	Density (D_{ML}), pc/mi/ln	13.7
Speed 2 (S_3), mi/h	1.4	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5617	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1596
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.69
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	26.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5857	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	2116
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.92
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	55.2
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	38.3
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	3/17/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	Baseline + Project No Senior Center, AM Peak Hour
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5857	1508
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	4.40	3.72
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.958
Flow Rate (v_i), pc/h	6349	1711
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.92	0.81

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	65224.1	Density in Ramp Influence Area (D_R), pc/mi/ln	38.3
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.387
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2212
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	53.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.523	Outer Lanes Freeway Speed (S_O), mi/h	61.1
Flow in Lanes 1 and 2 (v_{12}), pc/h	4137	Ramp Junction Speed (S), mi/h	55.6
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	38.1
Level of Service (LOS)	E		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	Baseline + Project No Senior Center, AM Peak Hour
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4355	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1628
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.71
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	27.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

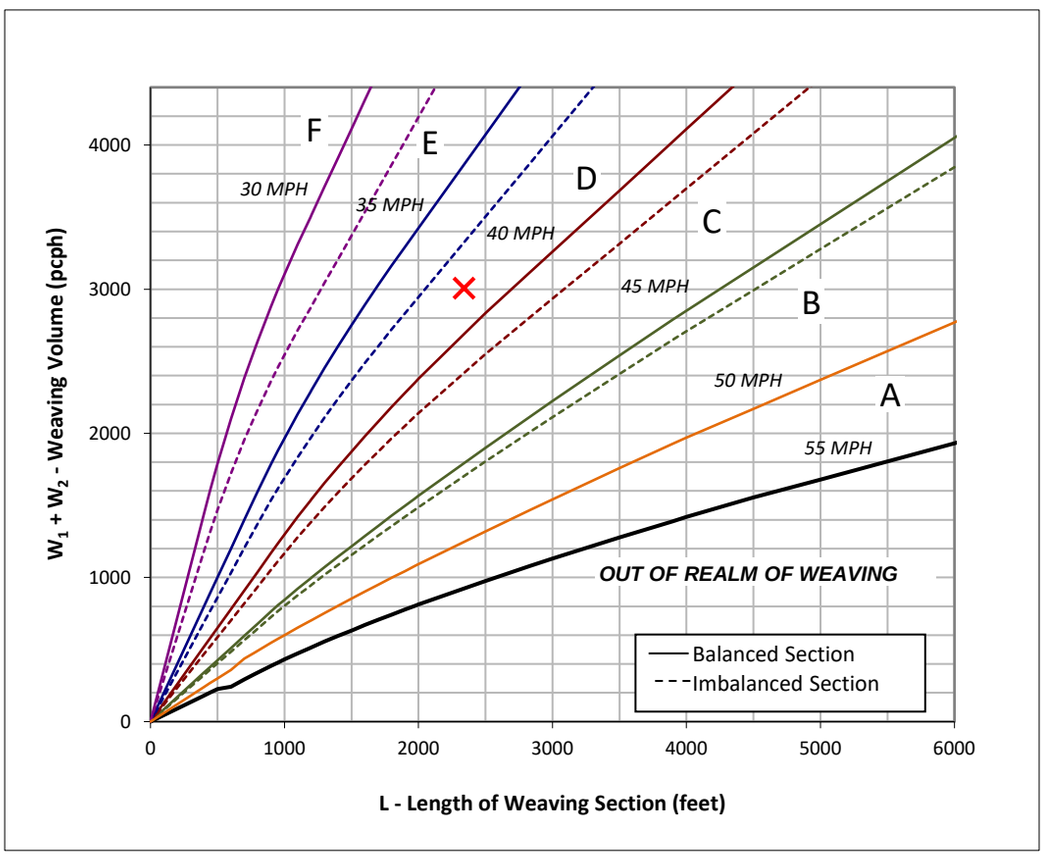
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	998	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1104
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.0
Speed 2 (S_2), mi/h	1.0	Density (D_{ML}), pc/mi/ln	18.7
Speed 2 (S_3), mi/h	5.0	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

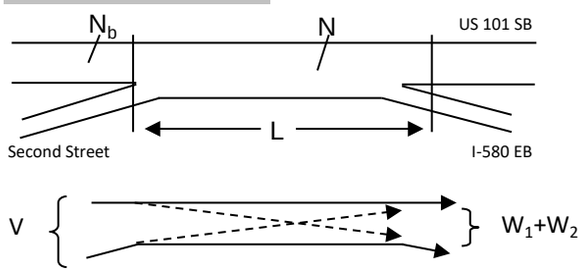
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Baseline + Project No SenCent AM PH
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,705	Volume (vph)*	1,714	Volume (vph)*	1,178
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	7,000	Volume (pcph)	1,760	Volume (pcph)	1,248



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	Y
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.7
4. Weaving Intensity Factor (k)	2.60
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	2,251
6. Level of Service (LOS)	F

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

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

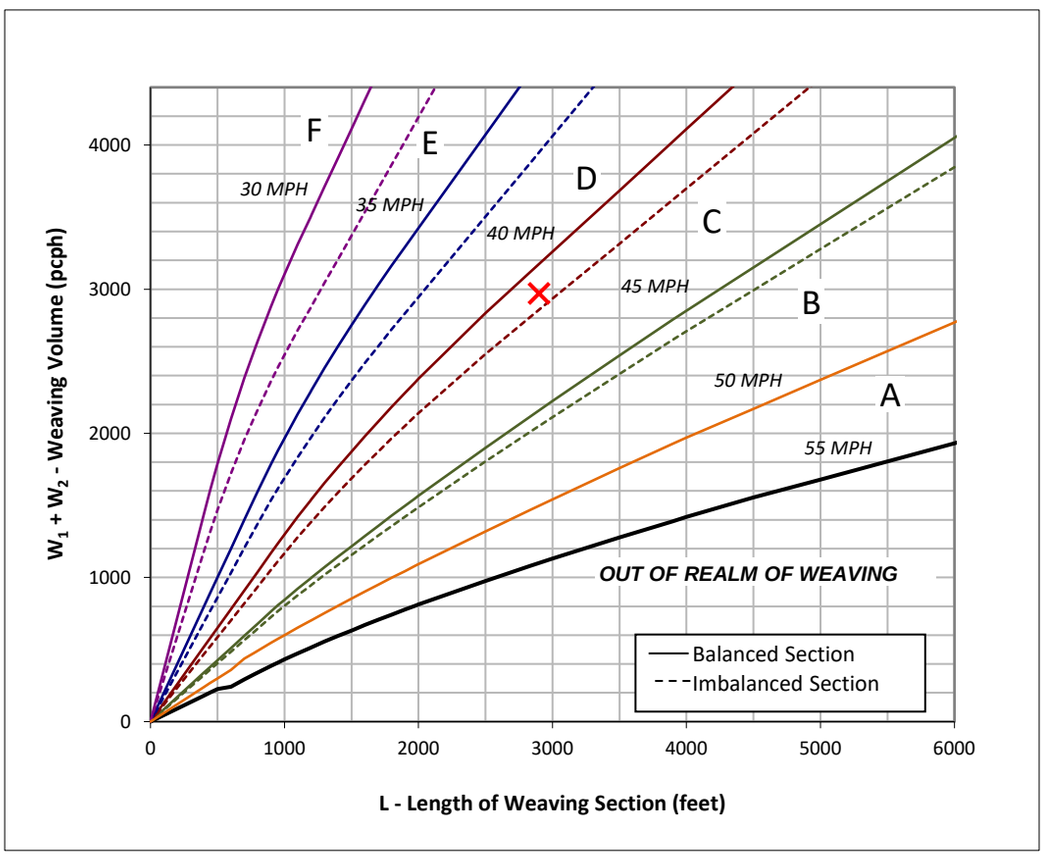
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Leisch Method for Weaving Analysis

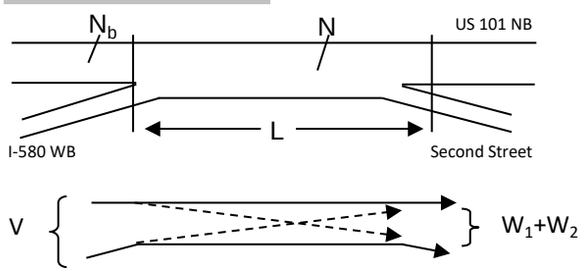
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Baseline + Project No SenCent PM PH
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,746	Volume (vph)*	1,547	Volume (vph)*	1,321
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	7,043	Volume (pcph)	1,615	Volume (pcph)	1,356



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	N
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.5
4. Weaving Intensity Factor (k)	2.55
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,830
6. Level of Service (LOS)	E

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4799	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1776
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.77
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	29.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	848	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	890
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.7
Speed 2 (S_2), mi/h	0.3	Density (D_{ML}), pc/mi/ln	14.9
Speed 2 (S_3), mi/h	2.1	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	7010	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	2012
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	56.9
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	35.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1217	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	1342
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.81
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	47.9
Speed 2 (S_2), mi/h	2.3	Density (D_{ML}), pc/mi/ln	28.0
Speed 2 (S_3), mi/h	9.8	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5077	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1835
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.80
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	31.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1377	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1555
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	56.0
Speed 2 (S_2), mi/h	4.0	Density (D_{ML}), pc/mi/ln	27.8
Speed 2 (S_3), mi/h	15.4	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5077	1749
Peak Hour Factor (PHF)	0.97	0.96
Total Trucks, %	4.40	2.00
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.973
Flow Rate (v_i), pc/h	5504	1872
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.80	0.89

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	102565.3	Density in Ramp Influence Area (D_R), pc/mi/ln	35.6
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.401
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1685
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	52.8
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.536	Outer Lanes Freeway Speed (S_O), mi/h	63.1
Flow in Lanes 1 and 2 (v_{12}), pc/h	3819	Ramp Junction Speed (S), mi/h	55.6
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	33.0
Level of Service (LOS)	E		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1380	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1559
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	55.9
Speed 2 (S_2), mi/h	4.1	Density (D_{ML}), pc/mi/ln	27.9
Speed 2 (S_3), mi/h	15.5	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project No Senior Center Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3335	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1247
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	20.8
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

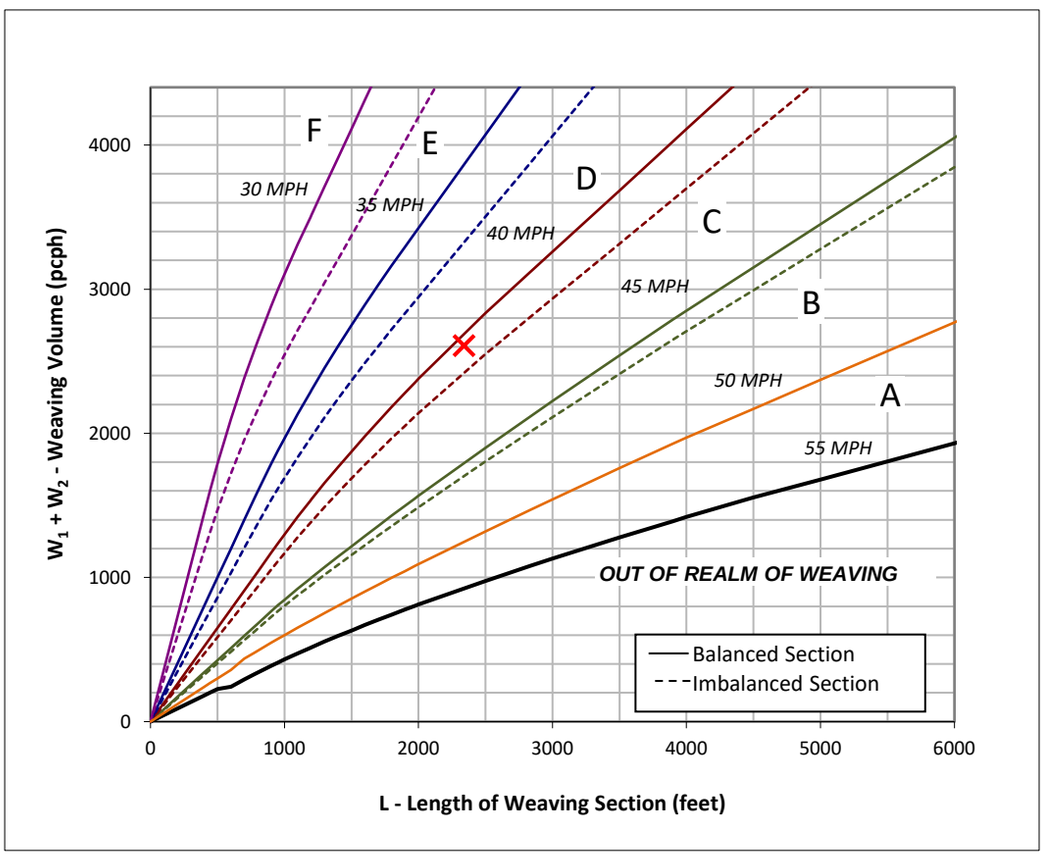
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	918	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1049
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.64
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.2
Speed 2 (S_2), mi/h	0.8	Density (D_{ML}), pc/mi/ln	17.7
Speed 2 (S_3), mi/h	4.2	Level of Service (LOS)	B

Leisch Method for Weaving Analysis

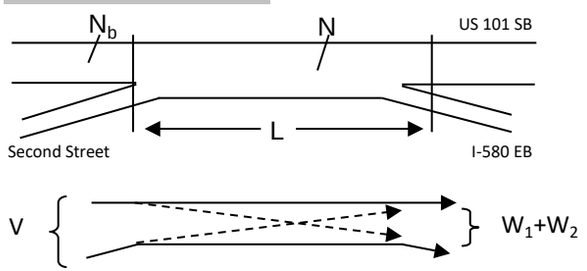
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Baseline + Project PM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,130	Volume (vph)*	1,035	Volume (vph)*	1,411
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	5,356	Volume (pcph)	1,061	Volume (pcph)	1,548



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	Y
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	40.5
4. Weaving Intensity Factor (k)	2.49
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,733
6. Level of Service (LOS)	E

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

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

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

Appendix D:
Baseline Plus Project Conditions (R&D and Senior Services and Housing) – Technical Calculations

Transportation Impact Study

for BioMarin 999 3rd Street

San Rafael Campus Expansion

April 5, 2019

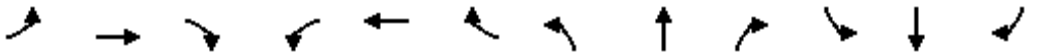
FEHR PEERS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	460	20	70	570	50	20	210	40	60	391	360
Future Volume (veh/h)	110	460	20	70	570	50	20	210	40	60	391	360
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1660	1660	1710	1660	1660	1710	1800	1678	1728	1800	1748	1728
Adj Flow Rate, veh/h	120	500	20	76	620	50	22	228	34	65	425	182
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	148	865	35	372	625	50	73	508	72	144	846	349
Arrive On Green	0.09	0.55	0.55	0.55	0.55	0.55	0.85	0.85	0.85	0.43	0.43	0.43
Sat Flow, veh/h	1581	1582	63	817	1512	122	49	1192	169	205	1983	818
Grp Volume(v), veh/h	120	0	520	76	0	670	284	0	0	364	0	308
Grp Sat Flow(s),veh/h/ln	1581	0	1646	817	0	1634	1410	0	0	1621	0	1384
Q Serve(g_s), s	5.6	0.0	15.7	4.4	0.0	30.5	0.0	0.0	0.0	3.0	0.0	12.3
Cycle Q Clear(g_c), s	5.6	0.0	15.7	10.1	0.0	30.5	3.5	0.0	0.0	11.7	0.0	12.3
Prop In Lane	1.00		0.04	1.00		0.07	0.08		0.12	0.18		0.59
Lane Grp Cap(c), veh/h	148	0	900	372	0	675	653	0	0	748	0	590
V/C Ratio(X)	0.81	0.00	0.58	0.20	0.00	0.99	0.43	0.00	0.00	0.49	0.00	0.52
Avail Cap(c_a), veh/h	148	0	900	372	0	675	653	0	0	748	0	590
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.72	0.00	0.72	0.87	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.4	0.0	11.3	14.0	0.0	16.8	3.4	0.0	0.0	15.6	0.0	15.9
Incr Delay (d2), s/veh	36.9	0.0	2.7	0.9	0.0	27.5	1.8	0.0	0.0	2.3	0.0	3.3
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	3.9	0.0	7.8	1.1	0.0	18.6	1.5	0.0	0.0	5.9	0.0	5.2
LnGrp Delay(d),s/veh	70.3	0.0	14.0	14.9	0.0	44.2	5.2	0.0	0.0	17.9	0.0	19.1
LnGrp LOS	E		B	B		D	A			B		B
Approach Vol, veh/h		640			746			284			672	
Approach Delay, s/veh		24.5			41.2			5.2			18.4	
Approach LOS		C			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.2		36.8	10.0	35.2		36.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 41		25.4	7.0	* 31		25.4
Max Q Clear Time (g_c+I1), s		17.7		5.5	7.6	32.5		14.3
Green Ext Time (p_c), s		5.1		2.4	0.0	0.0		4.5

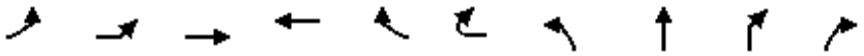
Intersection Summary	
HCM 2010 Ctrl Delay	25.8
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	80	40	220	0	0	0	0	220	1032	465
Future Volume (vph)	0	490	80	40	220	0	0	0	0	220	1032	465
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.97
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.98			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2715			1766						2962	1302
Flt Permitted		1.00			0.86						0.99	1.00
Satd. Flow (perm)		2715			1534						2962	1302
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	533	87	43	239	0	0	0	0	239	1122	505
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	603	0	0	282	0	0	0	0	0	1361	505
Confl. Peds. (#/hr)	15		22	22		15			16			1
Confl. Bikes (#/hr)			3			2			1			3
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1187			670						1319	458
v/s Ratio Prot		c0.22									c0.46	
v/s Ratio Perm					0.18							0.39
v/c Ratio		0.51			0.42						1.03	1.10
Uniform Delay, d1		15.3			14.6						20.8	24.3
Progression Factor		0.61			1.45						1.00	1.00
Incremental Delay, d2		1.3			1.5						33.3	72.9
Delay (s)		10.5			22.6						54.1	97.2
Level of Service		B			C						D	F
Approach Delay (s)		10.5			22.6			0.0			65.8	
Approach LOS		B			C			A			E	

Intersection Summary			
HCM 2000 Control Delay	49.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



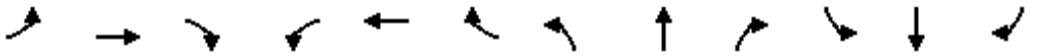
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	380	20	310	160	320	5	110	1075	130	40
Future Volume (vph)	380	20	310	160	320	5	110	1075	130	40
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1494	1794	1615	1471			3428	1295	
Flt Permitted		0.60	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		938	1794	1615	1471			3428	1295	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	22	337	174	348	5	120	1168	141	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	44	0
Lane Group Flow (vph)	0	435	337	174	353	0	0	1288	140	0
Confl. Peds. (#/hr)							13			6
Confl. Bikes (#/hr)					2	2				2
Parking (#/hr)				0				2		
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Effective Green, g (s)		33.8	33.8	18.8	18.8			32.8	32.8	
Actuated g/C Ratio		0.45	0.45	0.25	0.25			0.44	0.44	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		502	808	404	368			1499	566	
v/s Ratio Prot		c0.12	0.19	0.11	c0.24					
v/s Ratio Perm		0.27						0.38	0.11	
v/c Ratio		0.87	0.42	0.43	0.96			0.86	0.25	
Uniform Delay, d1		19.1	13.9	23.6	27.7			19.0	13.3	
Progression Factor		0.99	0.95	1.00	1.00			0.74	0.67	
Incremental Delay, d2		13.8	1.2	3.3	37.7			3.1	0.5	
Delay (s)		32.8	14.4	26.9	65.4			17.2	9.3	
Level of Service		C	B	C	E			B	A	
Approach Delay (s)			24.8	52.7				16.2		
Approach LOS			C	D				B		

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	300	40	70	280	30	10	220	45	40	401	40
Future Volume (veh/h)	30	300	40	70	280	30	10	220	45	40	401	40
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1398	1545	1530	1398	1485	1530	1440	1485	1469	1440	1485	1469
Adj Flow Rate, veh/h	33	326	36	76	304	28	11	239	39	43	436	39
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	243	534	59	257	524	48	58	523	83	82	534	46
Arrive On Green	0.39	0.39	0.39	0.13	0.13	0.13	0.97	0.97	0.97	0.97	0.97	0.97
Sat Flow, veh/h	825	1361	150	802	1336	123	16	1077	171	62	1101	95
Grp Volume(v), veh/h	33	0	362	76	0	332	289	0	0	518	0	0
Grp Sat Flow(s),veh/h/ln	825	0	1511	802	0	1459	1264	0	0	1258	0	0
Q Serve(g_s), s	2.6	0.0	14.4	6.9	0.0	16.1	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.6	0.0	14.4	21.2	0.0	16.1	0.9	0.0	0.0	4.4	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.08	0.04		0.13	0.08		0.08
Lane Grp Cap(c), veh/h	243	0	592	257	0	572	663	0	0	662	0	0
V/C Ratio(X)	0.14	0.00	0.61	0.30	0.00	0.58	0.44	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	243	0	592	257	0	572	663	0	0	662	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	0.85	0.00	0.00	0.50	0.00	0.00
Uniform Delay (d), s/veh	26.4	0.0	18.2	36.0	0.0	26.8	0.6	0.0	0.0	0.6	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	4.6	2.8	0.0	4.0	1.8	0.0	0.0	4.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	6.7	1.7	0.0	7.1	0.6	0.0	0.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	27.6	0.0	22.9	38.8	0.0	30.9	2.3	0.0	0.0	5.3	0.0	0.0
LnGrp LOS	C		C	D		C	A			A		
Approach Vol, veh/h		395			408			289			518	
Approach Delay, s/veh		23.3			32.3			2.3			5.3	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		34.0		41.0		34.0		41.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		29.4		36.4		29.4		36.4
Max Q Clear Time (g_c+I1), s		20.6		2.9		23.2		6.4
Green Ext Time (p_c), s		1.2		1.3		1.0		2.6

Intersection Summary	
HCM 2010 Ctrl Delay	16.0
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	240	165	40	245	0	0	0	0	50	987	115
Future Volume (vph)	0	240	165	40	245	0	0	0	0	50	987	115
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1665			1769						4118	1127
Flt Permitted		1.00			0.91						1.00	1.00
Satd. Flow (perm)		1665			1612						4118	1127
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	261	179	43	266	0	0	0	0	54	1073	125
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	417	0	0	309	0	0	0	0	0	1127	125
Confl. Peds. (#/hr)			15	15		14			22	22		10
Confl. Bikes (#/hr)			4			2			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		32.8			32.8						33.4	26.4
Effective Green, g (s)		32.8			32.8						33.4	26.4
Actuated g/C Ratio		0.44			0.44						0.45	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		728			704						1833	396
v/s Ratio Prot		c0.25										
v/s Ratio Perm					0.19						0.27	0.11
v/c Ratio		0.57			0.44						0.61	0.32
Uniform Delay, d1		15.8			14.7						15.9	17.7
Progression Factor		0.44			1.25						0.17	0.24
Incremental Delay, d2		3.1			1.2						0.4	0.6
Delay (s)		10.1			19.5						3.1	4.9
Level of Service		B			B						A	A
Approach Delay (s)		10.1			19.5			0.0			3.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	100	0	0	155	120	155	1125	10	0	0	0
Future Volume (veh/h)	140	100	0	0	155	120	155	1125	10	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1620	1573	1620			
Adj Flow Rate, veh/h	152	109	0	0	168	90	168	1223	10			
Adj No. of Lanes	1	1	0	0	1	0	0	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0			
Cap, veh/h	237	491	0	0	265	142	180	1380	12			
Arrive On Green	0.10	0.10	0.00	0.00	0.31	0.31	0.19	0.19	0.19			
Sat Flow, veh/h	993	1573	0	0	849	455	318	2441	21			
Grp Volume(v), veh/h	152	109	0	0	0	258	731	0	670			
Grp Sat Flow(s),veh/h/ln	993	1573	0	0	0	1304	1384	0	1396			
Q Serve(g_s), s	10.7	4.8	0.0	0.0	0.0	12.7	39.0	0.0	34.8			
Cycle Q Clear(g_c), s	23.4	4.8	0.0	0.0	0.0	12.7	39.0	0.0	34.8			
Prop In Lane	1.00		0.00	0.00		0.35	0.23		0.01			
Lane Grp Cap(c), veh/h	237	491	0	0	0	407	782	0	789			
V/C Ratio(X)	0.64	0.22	0.00	0.00	0.00	0.63	0.93	0.00	0.85			
Avail Cap(c_a), veh/h	237	491	0	0	0	407	782	0	789			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	40.4	25.3	0.0	0.0	0.0	22.1	29.1	0.0	27.4			
Incr Delay (d2), s/veh	12.5	1.0	0.0	0.0	0.0	7.3	19.7	0.0	11.0			
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	4.0	2.2	0.0	0.0	0.0	5.4	19.2	0.0	15.9			
LnGrp Delay(d),s/veh	52.9	26.3	0.0	0.0	0.0	29.5	48.8	0.0	38.4			
LnGrp LOS	D	C				C	D		D			
Approach Vol, veh/h		261			258			1401				
Approach Delay, s/veh		41.8			29.5			43.8				
Approach LOS		D			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		23.4		42.4		23.4		
Max Q Clear Time (g_c+I1), s		25.4		41.0		14.7		
Green Ext Time (p_c), s		0.0		0.9		0.7		

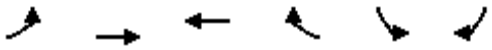
Intersection Summary	
HCM 2010 Ctrl Delay	41.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	260	20	70	310	30	20	225	65	65	371	80
Future Volume (veh/h)	30	260	20	70	310	30	20	225	65	65	371	80
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)	0.99		0.92	0.98		0.92	0.97		0.91	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1573	1510	1620	1573	1573	1620	1620	1573	1555	1620	1573	1555
Adj Flow Rate, veh/h	33	283	18	76	337	28	22	245	57	71	403	77
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	238	536	34	309	546	45	71	517	115	113	496	90
Arrive On Green	0.38	0.38	0.38	0.13	0.13	0.13	0.17	0.17	0.17	1.00	1.00	1.00
Sat Flow, veh/h	894	1396	89	937	1422	118	40	1026	228	116	984	179
Grp Volume(v), veh/h	33	0	301	76	0	365	324	0	0	551	0	0
Grp Sat Flow(s),veh/h/ln	894	0	1485	937	0	1540	1294	0	0	1279	0	0
Q Serve(g_s), s	2.4	0.0	11.7	5.8	0.0	16.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	19.3	0.0	11.7	17.5	0.0	16.8	16.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.08	0.07		0.18	0.13		0.14
Lane Grp Cap(c), veh/h	238	0	570	309	0	591	703	0	0	699	0	0
V/C Ratio(X)	0.14	0.00	0.53	0.25	0.00	0.62	0.46	0.00	0.00	0.79	0.00	0.00
Avail Cap(c_a), veh/h	238	0	570	309	0	591	703	0	0	699	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.43	0.00	0.00	0.45	0.00	0.00
Uniform Delay (d), s/veh	27.5	0.0	17.8	33.4	0.0	27.5	22.4	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	3.5	1.7	0.0	4.4	0.9	0.0	0.0	4.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	5.3	1.6	0.0	7.9	6.3	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	28.7	0.0	21.3	35.2	0.0	31.9	23.3	0.0	0.0	4.2	0.0	0.0
LnGrp LOS	C		C	D		C	C			A		
Approach Vol, veh/h		334			441			324			551	
Approach Delay, s/veh		22.1			32.5			23.3			4.2	
Approach LOS		C			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		42.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 29		* 38		* 29		* 38
Max Q Clear Time (g_c+I1), s		21.3		18.5		19.5		2.0
Green Ext Time (p_c), s		1.6		2.8		2.6		6.7

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

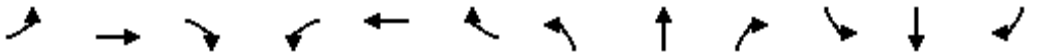
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	410	380	35	0	35
Future Volume (vph)	0	410	380	35	0	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6	5.6			5.2
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.99			0.87
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.99			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1573	1540			1188
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1573	1540			1188
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	413	38	0	38
RTOR Reduction (vph)	0	0	4	0	0	32
Lane Group Flow (vph)	0	446	447	0	0	6
Confl. Peds. (#/hr)				39		46
Confl. Bikes (#/hr)				4		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		50.7	51.8			12.4
Effective Green, g (s)		50.7	51.8			12.4
Actuated g/C Ratio		0.68	0.69			0.17
Clearance Time (s)						5.2
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1063	1063			196
v/s Ratio Prot		c0.28	c0.29			
v/s Ratio Perm						0.01
v/c Ratio		0.42	0.42			0.03
Uniform Delay, d1		5.5	5.1			26.3
Progression Factor		1.63	0.49			1.00
Incremental Delay, d2		0.2	0.2			0.1
Delay (s)		9.1	2.6			26.3
Level of Service		A	A			C
Approach Delay (s)		9.1	2.6		26.3	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	285	130	185	285	0	0	0	0	105	887	200
Future Volume (vph)	0	285	130	185	285	0	0	0	0	105	887	200
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	0.89
Flpb, ped/bikes		1.00	1.00	0.98	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1625	1180	1606	1520						4264	1185
Flt Permitted		1.00	1.00	0.49	1.00						0.99	1.00
Satd. Flow (perm)		1625	1180	832	1520						4264	1185
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	310	141	201	310	0	0	0	0	114	964	217
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	310	112	201	310	0	0	0	0	0	1078	217
Confl. Peds. (#/hr)			40	40		22			9	9		30
Confl. Bikes (#/hr)			8			4						2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		32.8	32.8	32.8	32.8						33.4	26.4
Effective Green, g (s)		32.8	32.8	32.8	32.8						33.4	26.4
Actuated g/C Ratio		0.44	0.44	0.44	0.44						0.45	0.35
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		710	516	363	664						1898	417
v/s Ratio Prot		0.19			0.20							
v/s Ratio Perm			0.09	c0.24							0.25	0.18
v/c Ratio		0.44	0.22	0.55	0.47						0.57	0.52
Uniform Delay, d1		14.7	13.1	15.7	14.9						15.4	19.3
Progression Factor		0.39	0.26	1.01	1.03						0.33	0.43
Incremental Delay, d2		1.8	0.9	4.4	1.7						1.0	3.7
Delay (s)		7.5	4.3	20.3	17.2						6.1	11.9
Level of Service		A	A	C	B						A	B
Approach Delay (s)		6.5			18.4			0.0			7.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

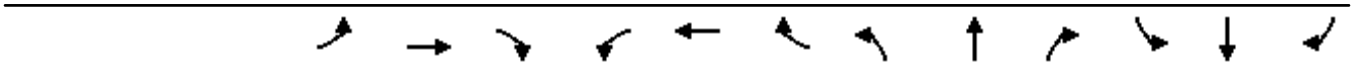
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	230	0	0	345	70	130	1090	50	0	0	0
Future Volume (veh/h)	160	230	0	0	345	70	130	1090	50	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1510	1573	1620			
Adj Flow Rate, veh/h	174	250	0	0	375	65	141	1185	50			
Adj No. of Lanes	1	1	0	0	1	0	1	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	152	604	0	0	443	77	725	1389	59			
Arrive On Green	0.77	0.77	0.00	0.00	0.13	0.13	0.17	0.17	0.17			
Sat Flow, veh/h	842	1573	0	0	1153	200	1438	2756	116			
Grp Volume(v), veh/h	174	250	0	0	0	440	141	642	593			
Grp Sat Flow(s),veh/h/ln	842	1573	0	0	0	1353	1438	1494	1378			
Q Serve(g_s), s	4.9	4.1	0.0	0.0	0.0	23.9	6.3	31.3	31.3			
Cycle Q Clear(g_c), s	28.8	4.1	0.0	0.0	0.0	23.9	6.3	31.3	31.3			
Prop In Lane	1.00		0.00	0.00		0.15	1.00		0.08			
Lane Grp Cap(c), veh/h	152	604	0	0	0	520	725	753	695			
V/C Ratio(X)	1.15	0.41	0.00	0.00	0.00	0.85	0.19	0.85	0.85			
Avail Cap(c_a), veh/h	152	604	0	0	0	520	725	753	695			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.00	1.00	0.29	0.29	0.29			
Uniform Delay (d), s/veh	22.2	5.8	0.0	0.0	0.0	30.6	18.1	28.6	28.6			
Incr Delay (d2), s/veh	114.7	1.9	0.0	0.0	0.0	15.6	0.2	3.8	4.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	7.9	1.9	0.0	0.0	0.0	11.2	2.6	13.8	12.8			
LnGrp Delay(d),s/veh	136.9	7.7	0.0	0.0	0.0	46.2	18.3	32.4	32.7			
LnGrp LOS	F	A				D	B	C	C			
Approach Vol, veh/h		424			440			1376				
Approach Delay, s/veh		60.7			46.2			31.1				
Approach LOS		E			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		33.0		42.0		33.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 29		* 38		* 29		
Max Q Clear Time (g_c+I1), s		30.8		33.3		25.9		
Green Ext Time (p_c), s		0.0		2.6		0.6		

Intersection Summary	
HCM 2010 Ctrl Delay	39.7
HCM 2010 LOS	D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	295	1137	0	0	0	0	0	230	30
Future Volume (veh/h)	0	0	0	295	1137	0	0	0	0	0	230	30
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.99
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1530	1485	0				0	1485	1530
Adj Flow Rate, veh/h				321	1236	0				0	250	18
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				502	1719	0				0	786	56
Arrive On Green				0.19	0.19	0.00				0.00	0.31	0.31
Sat Flow, veh/h				747	3134	0				0	2593	180
Grp Volume(v), veh/h				558	999	0				0	139	129
Grp Sat Flow(s),veh/h/ln				1299	1230	0				0	1411	1288
Q Serve(g_s), s				30.5	28.5	0.0				0.0	5.6	5.7
Cycle Q Clear(g_c), s				30.5	28.5	0.0				0.0	5.6	5.7
Prop In Lane				0.57		0.00				0.00		0.14
Lane Grp Cap(c), veh/h				817	1404	0				0	440	402
V/C Ratio(X)				0.68	0.71	0.00				0.00	0.32	0.32
Avail Cap(c_a), veh/h				817	1404	0				0	440	402
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				25.4	24.6	0.0				0.0	19.7	19.7
Incr Delay (d2), s/veh				4.6	3.1	0.0				0.0	1.9	2.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.0	10.3	0.0				0.0	2.4	2.3
LnGrp Delay(d),s/veh				30.1	27.7	0.0				0.0	21.6	21.8
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1557						268	
Approach Delay, s/veh					28.6						21.7	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		47.0		28.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 43		23.4				
Max Q Clear Time (g_c+I1), s		32.5		7.7				
Green Ext Time (p_c), s		5.7		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	27.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1317	110	100	235	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1317	110	100	235	0	0	0	0
Number				5	2	12	7	4	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				0	1398	1398	1440	1398	0			
Adj Flow Rate, veh/h				0	1432	82	109	255	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	2229	679	266	553	0			
Arrive On Green				0.00	0.19	0.19	0.10	0.10	0.00			
Sat Flow, veh/h				0	3943	1163	630	1883	0			
Grp Volume(v), veh/h				0	1432	82	197	167	0			
Grp Sat Flow(s),veh/h/ln				0	1272	1163	1241	1209	0			
Q Serve(g_s), s				0.0	25.9	4.4	9.6	9.7	0.0			
Cycle Q Clear(g_c), s				0.0	25.9	4.4	11.2	9.7	0.0			
Prop In Lane				0.00		1.00	0.55		0.00			
Lane Grp Cap(c), veh/h				0	2229	679	452	367	0			
V/C Ratio(X)				0.00	0.64	0.12	0.44	0.45	0.00			
Avail Cap(c_a), veh/h				0	2229	679	452	367	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	23.1	14.4	28.4	27.9	0.0			
Incr Delay (d2), s/veh				0.0	1.4	0.4	3.1	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				0.0	9.4	1.5	4.3	3.7	0.0			
LnGrp Delay(d),s/veh				0.0	24.5	14.7	31.5	31.9	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1514			364				
Approach Delay, s/veh					24.0			31.7				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 44		* 23				
Max Q Clear Time (g_c+I1), s		27.9		13.2				
Green Ext Time (p_c), s		7.6		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	1372	0	0	0	0	0	190	50
Future Volume (veh/h)	0	0	0	90	1372	0	0	0	0	0	190	50
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.87
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1398	0				0	1398	1440
Adj Flow Rate, veh/h				98	1491	0				0	207	25
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				167	2129	0				0	616	72
Arrive On Green				0.20	0.20	0.00				0.00	0.28	0.28
Sat Flow, veh/h				181	3601	0				0	2290	261
Grp Volume(v), veh/h				590	999	0				0	122	110
Grp Sat Flow(s),veh/h/ln				1353	1158	0				0	1328	1153
Q Serve(g_s), s				21.9	30.1	0.0				0.0	5.5	5.7
Cycle Q Clear(g_c), s				30.4	30.1	0.0				0.0	5.5	5.7
Prop In Lane				0.17		0.00				0.00		0.23
Lane Grp Cap(c), veh/h				882	1414	0				0	368	320
V/C Ratio(X)				0.67	0.71	0.00				0.00	0.33	0.34
Avail Cap(c_a), veh/h				882	1414	0				0	368	320
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.7	23.7	0.0				0.0	21.6	21.7
Incr Delay (d2), s/veh				4.0	3.0	0.0				0.0	2.4	2.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.4	10.3	0.0				0.0	2.2	2.1
LnGrp Delay(d),s/veh				27.7	26.7	0.0				0.0	24.0	24.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1589						232	
Approach Delay, s/veh					27.1						24.3	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		50.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 46		* 21				
Max Q Clear Time (g_c+I1), s		32.4		7.7				
Green Ext Time (p_c), s		6.8		0.7				

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	40	1227	80	195	120	0	0	130	30
Future Volume (veh/h)	0	0	0	40	1227	80	195	120	0	0	130	30
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.97		1.00	1.00		0.93
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				43	1334	77	212	130	0	0	141	21
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				72	2357	141	371	685	0	0	358	53
Arrive On Green				0.17	0.17	0.17	0.02	0.12	0.00	0.00	0.26	0.26
Sat Flow, veh/h				139	4591	274	1748	1835	0	0	1375	205
Grp Volume(v), veh/h				537	447	470	212	130	0	0	0	162
Grp Sat Flow(s),veh/h/ln				1741	1590	1674	1748	1835	0	0	0	1580
Q Serve(g_s), s				21.4	19.3	19.3	0.0	4.8	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s				21.4	19.3	19.3	0.0	4.8	0.0	0.0	0.0	6.3
Prop In Lane				0.08		0.16	1.00		0.00	0.00		0.13
Lane Grp Cap(c), veh/h				894	816	859	371	685	0	0	0	411
V/C Ratio(X)				0.60	0.55	0.55	0.57	0.19	0.00	0.00	0.00	0.39
Avail Cap(c_a), veh/h				894	816	859	371	685	0	0	0	411
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				24.0	23.2	23.2	30.1	22.7	0.0	0.0	0.0	22.9
Incr Delay (d2), s/veh				3.0	2.6	2.5	6.2	0.6	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				11.0	9.1	9.5	5.0	2.5	0.0	0.0	0.0	3.1
LnGrp Delay(d),s/veh				27.0	25.8	25.7	36.3	23.3	0.0	0.0	0.0	25.7
LnGrp LOS				C	C	C	D	C				C
Approach Vol, veh/h					1454			342			162	
Approach Delay, s/veh					26.2			31.4			25.7	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.0	24.0		43.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			4.0	19.5		38.5		28.0
Max Q Clear Time (g_c+I1), s			2.0	8.3		23.4		6.8
Green Ext Time (p_c), s			0.3	0.8		10.6		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	27.1
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	18	84.1%	8.7	2.9	A
	Through	5	5	103.0%	24.9	20.1	C
	Right Turn						
	Subtotal	26	23	87.8%	13.0	4.3	B
SB	Left Turn						
	Through	5	7	132.5%	23.5	17.4	C
	Right Turn	5	4	88.3%	8.9	9.5	A
	Subtotal	10	11	110.4%	22.3	11.5	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	51	54	106.1%	2.7	0.2	A
	Through	1,321	1,301	98.5%	2.4	0.3	A
	Right Turn	5	6	110.4%	2.2	1.9	A
	Subtotal	1,377	1,361	98.8%	2.4	0.3	A
Total		1,413	1,395	98.7%	2.8	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	86	82	95.0%	15.7	5.4	B
	Through	10	11	114.1%	10.5	9.9	B
	Right Turn						
	Subtotal	96	93	97.0%	15.5	5.5	B
SB	Left Turn						
	Through	40	37	92.0%	28.3	7.5	C
	Right Turn	10	8	77.3%	16.1	12.4	B
	Subtotal	50	45	89.1%	26.5	7.9	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	452	426	94.3%	20.0	11.1	B
	Through	1,311	1,304	99.5%	7.4	3.5	A
	Right Turn	30	28	94.5%	5.8	2.4	A
	Subtotal	1,793	1,759	98.1%	10.4	5.3	B
Total		1,939	1,896	97.8%	11.1	5.1	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	160	1675	55	32	195	0	0	280	166
Future Volume (veh/h)	0	0	0	160	1675	55	32	195	0	0	280	166
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.92	1.00		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1620	1573	1620	1620	1573	0	0	1510	1555
Adj Flow Rate, veh/h				174	1821	56	35	212	0	0	304	175
Adj No. of Lanes				0	3	0	0	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				200	2233	71	55	212	0	0	250	144
Arrive On Green				0.18	0.18	0.18	0.11	0.11	0.00	0.00	0.11	0.11
Sat Flow, veh/h				361	4035	127	0	649	0	0	765	440
Grp Volume(v), veh/h				749	626	675	247	0	0	0	0	479
Grp Sat Flow(s),veh/h/ln				1555	1431	1537	649	0	0	0	0	1205
Q Serve(g_s), s				35.1	31.4	31.5	0.0	0.0	0.0	0.0	0.0	24.5
Cycle Q Clear(g_c), s				35.1	31.4	31.5	24.5	0.0	0.0	0.0	0.0	24.5
Prop In Lane				0.23		0.08	0.14		0.00	0.00		0.37
Lane Grp Cap(c), veh/h				860	792	851	267	0	0	0	0	394
V/C Ratio(X)				0.87	0.79	0.79	0.93	0.00	0.00	0.00	0.00	1.22
Avail Cap(c_a), veh/h				860	792	851	267	0	0	0	0	394
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				28.0	26.5	26.6	29.0	0.0	0.0	0.0	0.0	33.5
Incr Delay (d2), s/veh				11.7	7.9	7.5	38.9	0.0	0.0	0.0	0.0	118.6
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.9	14.2	15.2	8.0	0.0	0.0	0.0	0.0	21.1
LnGrp Delay(d),s/veh				39.8	34.4	34.1	68.0	0.0	0.0	0.0	0.0	152.0
LnGrp LOS				D	C	C	E					F
Approach Vol, veh/h					2051			247			479	
Approach Delay, s/veh					36.3			68.0			152.0	
Approach LOS					D			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.0		46.0		29.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				24.5		41.5		24.5
Max Q Clear Time (g_c+I1), s				26.5		37.1		26.5
Green Ext Time (p_c), s				0.0		3.4		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		59.1
HCM 2010 LOS		E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	235	1815	20	50	50	0	0	50	10
Future Volume (vph)	0	0	0	235	1815	20	50	50	0	0	50	10
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6			7.6	
Lane Util. Factor					0.91		1.00	1.00			1.00	
Frpb, ped/bikes					1.00		1.00	1.00			0.99	
Flpb, ped/bikes					0.98		0.93	1.00			1.00	
Frt					1.00		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3715		1060	1237			1191	
Flt Permitted					0.99		0.71	1.00			1.00	
Satd. Flow (perm)					3715		797	1237			1191	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	255	1973	22	54	54	0	0	54	11
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	0	0	0	2249	0	54	54	0	0	59	0
Confl. Peds. (#/hr)			73	73		38	49		63			49
Confl. Bikes (#/hr)						2			2			2
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			4			8	
Permitted Phases				6			4					
Actuated Green, G (s)					51.6		19.2	19.2			19.2	
Effective Green, g (s)					51.6		19.2	19.2			19.2	
Actuated g/C Ratio					0.57		0.21	0.21			0.21	
Clearance Time (s)					11.6		7.6	7.6			7.6	
Lane Grp Cap (vph)					2129		170	263			254	
v/s Ratio Prot								0.04			0.05	
v/s Ratio Perm					0.61		c0.07					
v/c Ratio					1.06		0.32	0.21			0.23	
Uniform Delay, d1					19.2		29.9	29.1			29.3	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					36.4		4.9	1.8			2.1	
Delay (s)					55.6		34.7	30.9			31.4	
Level of Service					E		C	C			C	
Approach Delay (s)		0.0			55.6			32.8			31.4	
Approach LOS		A			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	146.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	420	1563	0	0	0	0	0	750	452
Future Volume (veh/h)	0	0	0	420	1563	0	0	0	0	0	750	452
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.83
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1545	1573	0				0	1573	1485
Adj Flow Rate, veh/h				457	1699	0				0	815	482
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				743	2076	0				0	1889	462
Arrive On Green				0.15	0.15	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1471	4718	0				0	4435	1051
Grp Volume(v), veh/h				457	1699	0				0	815	482
Grp Sat Flow(s),veh/h/ln				1471	1573	0				0	1431	1051
Q Serve(g_s), s				22.2	26.2	0.0				0.0	13.0	33.0
Cycle Q Clear(g_c), s				22.2	26.2	0.0				0.0	13.0	33.0
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				743	2076	0				0	1889	462
V/C Ratio(X)				0.61	0.82	0.00				0.00	0.43	1.04
Avail Cap(c_a), veh/h				743	2076	0				0	1889	462
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				27.4	29.1	0.0				0.0	23.5	32.1
Incr Delay (d2), s/veh				3.8	3.7	0.0				0.0	0.7	53.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.8	12.2	0.0				0.0	5.3	16.4
LnGrp Delay(d),s/veh				31.2	32.9	0.0				0.0	24.2	85.4
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2156						1297	
Approach Delay, s/veh					32.5						47.0	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						37.0		38.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						33.0		33.0
Max Q Clear Time (g_c+I1), s						28.2		35.0
Green Ext Time (p_c), s						3.9		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		37.9
HCM 2010 LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1026	120	967	1155	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1026	120	967	1155	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1485	1485	1398	1398	0			
Adj Flow Rate, veh/h				0	1115	100	1051	1255	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	1379	403	1438	1510	0			
Arrive On Green				0.00	0.34	0.34	0.18	0.18	0.00			
Sat Flow, veh/h				0	4189	1186	2663	2796	0			
Grp Volume(v), veh/h				0	1115	100	1051	1255	0			
Grp Sat Flow(s),veh/h/ln				0	1352	1186	1331	1398	0			
Q Serve(g_s), s				0.0	18.8	4.6	28.0	32.5	0.0			
Cycle Q Clear(g_c), s				0.0	18.8	4.6	28.0	32.5	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1379	403	1438	1510	0			
V/C Ratio(X)				0.00	0.81	0.25	0.73	0.83	0.00			
Avail Cap(c_a), veh/h				0	1379	403	1438	1510	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.5	17.8	25.7	27.5	0.0			
Incr Delay (d2), s/veh				0.0	5.2	1.5	3.3	5.5	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	7.6	1.6	11.0	13.7	0.0			
LnGrp Delay(d),s/veh				0.0	27.7	19.3	29.0	33.0	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1215			2306				
Approach Delay, s/veh					27.0			31.2				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				45.0		30.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				40.5		25.5		
Max Q Clear Time (g_c+I1), s				34.5		20.8		
Green Ext Time (p_c), s				5.0		2.7		

Intersection Summary	
HCM 2010 Ctrl Delay	29.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1932	80	0	0	0	0	0	255	70	450	0
Future Volume (veh/h)	0	1932	80	0	0	0	0	0	255	70	450	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	0.99		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	0	1660	1710				0	1573	1620	1748	1748	0
Adj Flow Rate, veh/h	0	2100	80				0	0	261	76	489	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1126	1125	1488	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1323	1095	1748	0
Grp Volume(v), veh/h		0.0					0	0	261	76	489	0
Grp Sat Flow(s),veh/h/ln							0	0	1323	1095	1748	0
Q Serve(g_s), s							0.0	0.0	1.1	1.6	6.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	1.1	2.7	6.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1126	1125	1488	0
V/C Ratio(X)							0.00	0.00	0.23	0.07	0.33	0.00
Avail Cap(c_a), veh/h							0	0	1126	1125	1488	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	3.1	4.1	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.5	0.1	0.6	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.5	0.5	3.6	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.9	3.2	4.7	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								261			565	
Approach Delay, s/veh								0.9			4.5	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				26.4				26.4
Max Q Clear Time (g_c+I1), s				8.9				3.1
Green Ext Time (p_c), s				1.4				0.7

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2147	0	0	0	0	0	200	90	0	0	0
Future Volume (veh/h)	110	2147	0	0	0	0	0	200	90	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1485	0				0	1485	1440			
Adj Flow Rate, veh/h	120	2334	0				0	217	94			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	158	2406	0				0	549	228			
Arrive On Green	0.20	0.20	0.00				0.00	0.28	0.28			
Sat Flow, veh/h	171	3975	0				0	1978	823			
Grp Volume(v), veh/h	866	1588	0				0	161	150			
Grp Sat Flow(s),veh/h/ln	1443	1352	0				0	1485	1315			
Q Serve(g_s), s	38.7	43.7	0.0				0.0	6.6	7.0			
Cycle Q Clear(g_c), s	44.9	43.7	0.0				0.0	6.6	7.0			
Prop In Lane	0.14		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	928	1637	0				0	412	365			
V/C Ratio(X)	0.93	0.97	0.00				0.00	0.39	0.41			
Avail Cap(c_a), veh/h	928	1637	0				0	412	365			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	29.7	29.3	0.0				0.0	22.0	22.1			
Incr Delay (d2), s/veh	17.3	16.2	0.0				0.0	2.8	3.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	22.4	20.1	0.0				0.0	3.0	2.9			
LnGrp Delay(d),s/veh	47.0	45.6	0.0				0.0	24.7	25.5			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2454						311				
Approach Delay, s/veh		46.1						25.1				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				25.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		45.4		
Max Q Clear Time (g_c+I1), s				9.0		46.9		
Green Ext Time (p_c), s				1.9		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	43.7
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2162	70	0	0	0	0	0	160	70	220	0
Future Volume (veh/h)	0	2162	70	0	0	0	0	0	160	70	220	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97	0.99		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	0	1485	1382				0	1573	1591	1545	1485	0
Adj Flow Rate, veh/h	0	2350	71				0	0	157	76	239	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	1077	1127	1238	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.83	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1292	1061	1485	0
Grp Volume(v), veh/h		0.0					0	0	157	76	239	0
Grp Sat Flow(s),veh/h/ln							0	0	1292	1061	1485	0
Q Serve(g_s), s							0.0	0.0	0.6	1.5	3.3	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.6	2.1	3.3	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1077	1127	1238	0
V/C Ratio(X)							0.00	0.00	0.15	0.07	0.19	0.00
Avail Cap(c_a), veh/h							0	0	1077	1127	1238	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	2.6	2.8	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.3	0.1	0.3	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.3	0.5	1.5	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.7	2.7	3.2	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								157			315	
Approach Delay, s/veh								0.7			3.1	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				27.0				27.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				22.5				22.5
Max Q Clear Time (g_c+I1), s				5.3				2.6
Green Ext Time (p_c), s				0.7				0.4

Intersection Summary	
HCM 2010 Ctrl Delay	2.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	2097	195	0	0	0	0	240	20	50	115	0
Future Volume (veh/h)	90	2097	195	0	0	0	0	240	20	50	115	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	98	2279	197				0	261	12	54	125	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	102	2494	219				0	685	31	285	530	0
Arrive On Green	0.19	0.19	0.19				0.00	0.22	0.22	0.01	0.11	0.00
Sat Flow, veh/h	180	4423	388				0	3149	140	1581	1660	0
Grp Volume(v), veh/h	945	785	844				0	134	139	54	125	0
Grp Sat Flow(s),veh/h/ln	1739	1590	1662				0	1577	1629	1581	1660	0
Q Serve(g_s), s	40.6	36.1	37.3				0.0	5.4	5.5	0.0	5.2	0.0
Cycle Q Clear(g_c), s	40.6	36.1	37.3				0.0	5.4	5.5	0.0	5.2	0.0
Prop In Lane	0.10		0.23				0.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	980	897	937				0	352	364	285	530	0
V/C Ratio(X)	0.96	0.87	0.90				0.00	0.38	0.38	0.19	0.24	0.00
Avail Cap(c_a), veh/h	980	897	937				0	352	364	285	530	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.9	28.0	28.5				0.0	24.8	24.8	28.6	25.2	0.0
Incr Delay (d2), s/veh	21.3	11.6	13.4				0.0	3.1	3.0	1.5	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.4	18.8	20.6				0.0	2.6	2.7	1.1	2.5	0.0
LnGrp Delay(d),s/veh	51.2	39.7	41.9				0.0	27.9	27.8	30.0	26.3	0.0
LnGrp LOS	D	D	D					C	C	C	C	
Approach Vol, veh/h		2574						273			179	
Approach Delay, s/veh		44.6						27.8			27.4	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		47.0		28.2			7.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		42.4		* 24			* 3	* 17
Max Q Clear Time (g_c+I1), s		42.6		7.2			2.0	7.5
Green Ext Time (p_c), s		0.0		0.7			0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	42.1
HCM 2010 LOS	D

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	50	50	100.8%	19.9	7.9	C
	Through						
	Right Turn						
	Subtotal	50	50	100.8%	19.9	7.9	C
EB	Left Turn	25	22	89.8%	2.8	0.4	A
	Through	2,152	2,093	97.3%	2.6	0.2	A
	Right Turn						
	Subtotal	2,177	2,116	97.2%	2.6	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,227	2,166	97.3%	3.0	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	54	54	100.2%	15.6	2.7	B
	Right Turn	261	274	104.9%	16.6	5.2	B
	Subtotal	315	328	104.1%	16.5	4.2	B
SB	Left Turn	62	60	96.7%	35.1	7.0	D
	Through	427	394	92.4%	33.4	3.2	C
	Right Turn						
	Subtotal	489	454	92.9%	33.7	3.4	C
EB	Left Turn	42	43	101.6%	13.1	3.4	B
	Through	2,134	2,074	97.2%	12.6	1.3	B
	Right Turn	61	61	100.7%	11.7	2.5	B
	Subtotal	2,237	2,178	97.4%	12.6	1.3	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,041	2,961	97.4%	16.3	1.1	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	2281	41	0	0	0	0	107	50	130	255	0
Future Volume (veh/h)	135	2281	41	0	0	0	0	107	50	130	255	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1398	1382	1342	0
Adj Flow Rate, veh/h	147	2479	23				0	116	42	141	277	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	139	2511	598				0	500	411	283	541	0
Arrive On Green	0.18	0.18	0.18				0.00	0.36	0.36	0.12	0.12	0.00
Sat Flow, veh/h	261	4731	1126				0	1398	1151	570	1574	0
Grp Volume(v), veh/h	780	1846	23				0	116	42	215	203	0
Grp Sat Flow(s),veh/h/ln	1385	1202	1126				0	1398	1151	923	1160	0
Q Serve(g_s), s	39.8	38.1	1.3				0.0	4.4	1.8	13.6	12.3	0.0
Cycle Q Clear(g_c), s	39.8	38.1	1.3				0.0	4.4	1.8	17.9	12.3	0.0
Prop In Lane	0.19		1.00				0.00		1.00	0.66		0.00
Lane Grp Cap(c), veh/h	735	1914	598				0	500	411	409	415	0
V/C Ratio(X)	1.06	0.96	0.04				0.00	0.23	0.10	0.53	0.49	0.00
Avail Cap(c_a), veh/h	735	1914	598				0	500	411	409	415	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.9	30.2	15.0				0.0	16.9	16.1	30.3	26.7	0.0
Incr Delay (d2), s/veh	50.6	13.7	0.1				0.0	1.1	0.5	4.8	4.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.6	15.1	0.4				0.0	1.8	0.6	4.8	4.4	0.0
LnGrp Delay(d),s/veh	81.6	44.0	15.2				0.0	18.0	16.6	35.1	30.8	0.0
LnGrp LOS	F	D	B					B	B	D	C	
Approach Vol, veh/h		2649						158			418	
Approach Delay, s/veh		54.8						17.6			33.0	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		44.0		31.0				31.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 40		* 27				* 27
Max Q Clear Time (g_c+I1), s		41.8		6.4				19.9
Green Ext Time (p_c), s		0.0		0.6				1.0

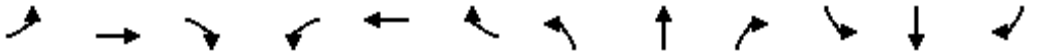
Intersection Summary	
HCM 2010 Ctrl Delay	50.1
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2336	60	0	0	0	0	50	250	110	180	0
Future Volume (veh/h)	50	2336	60	0	0	0	0	50	250	110	180	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1454	1398	1398	0
Adj Flow Rate, veh/h	54	2539	39				0	54	233	120	196	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	58	2940	651				0	317	273	265	317	0
Arrive On Green	0.20	0.20	0.20				0.00	0.23	0.23	0.07	0.07	0.00
Sat Flow, veh/h	97	4903	1086				0	1398	1203	862	1398	0
Grp Volume(v), veh/h	773	1820	39				0	54	233	120	196	0
Grp Sat Flow(s),veh/h/ln	1393	1202	1086				0	1398	1203	862	1398	0
Q Serve(g_s), s	40.9	36.4	2.2				0.0	2.3	13.9	10.2	10.2	0.0
Cycle Q Clear(g_c), s	40.9	36.4	2.2				0.0	2.3	13.9	12.6	10.2	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	835	2163	651				0	317	273	265	317	0
V/C Ratio(X)	0.93	0.84	0.06				0.00	0.17	0.85	0.45	0.62	0.00
Avail Cap(c_a), veh/h	835	2163	651				0	569	489	420	569	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.97	0.97	0.00
Uniform Delay (d), s/veh	28.4	26.7	12.9				0.0	23.3	27.8	33.8	31.5	0.0
Incr Delay (d2), s/veh	2.2	0.4	0.0				0.0	0.3	7.4	1.2	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.3	12.2	0.7				0.0	0.9	5.2	2.5	4.1	0.0
LnGrp Delay(d),s/veh	30.7	27.0	12.9				0.0	23.6	35.2	34.9	33.4	0.0
LnGrp LOS	C	C	B					C	D	C	C	
Approach Vol, veh/h		2632						287			316	
Approach Delay, s/veh		27.9						33.0			34.0	
Approach LOS		C						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		51.5		23.5				23.5
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		31.5		30.5				30.5
Max Q Clear Time (g_c+I1), s		42.9		15.9				14.6
Green Ext Time (p_c), s		0.0		1.1				1.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.0
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1175	1361	0	0	0	0	0	0	195	975	0
Future Volume (veh/h)	0	1175	1361	0	0	0	0	0	0	195	975	0
Number	5	2	12							7	4	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	0	1485	1485							1485	1485	0
Adj Flow Rate, veh/h	0	1277	1454							212	1060	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.92	0.92	0.92							0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3							3	3	0
Cap, veh/h	0	2050	1162							519	1089	0
Arrive On Green	0.00	0.15	0.15							0.12	0.12	0.00
Sat Flow, veh/h	0	4456	2525							1415	2971	0
Grp Volume(v), veh/h	0	1277	1454							212	1060	0
Grp Sat Flow(s),veh/h/ln	0	1485	1263							1415	1485	0
Q Serve(g_s), s	0.0	20.1	34.5							10.4	26.7	0.0
Cycle Q Clear(g_c), s	0.0	20.1	34.5							10.4	26.7	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2050	1162							519	1089	0
V/C Ratio(X)	0.00	0.62	1.25							0.41	0.97	0.00
Avail Cap(c_a), veh/h	0	2050	1162							519	1089	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.11	0.11							0.81	0.81	0.00
Uniform Delay (d), s/veh	0.0	25.7	31.8							25.4	32.6	0.0
Incr Delay (d2), s/veh	0.0	0.2	114.1							0.4	18.4	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	0.0	8.3	30.5							4.1	13.8	0.0
LnGrp Delay(d),s/veh	0.0	25.9	145.9							25.9	51.0	0.0
LnGrp LOS		C	F							C	D	
Approach Vol, veh/h		2731									1272	
Approach Delay, s/veh		89.8									46.8	
Approach LOS		F									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		43.0		32.0				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		34.5		27.5				
Max Q Clear Time (g_c+I1), s		36.5		28.7				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	76.1
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	725	815	0	0	0	0	0	1407	460	0	0	0
Future Volume (veh/h)	725	815	0	0	0	0	0	1407	460	0	0	0
Number	5	2	12				7	4	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	1454	1485	0				0	1398	1398			
Adj Flow Rate, veh/h	788	886	0				0	1529	463			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	1329	1220	0				0	1946	551			
Arrive On Green	0.14	0.14	0.00				0.00	0.46	0.46			
Sat Flow, veh/h	2769	2971	0				0	4194	1188			
Grp Volume(v), veh/h	788	886	0				0	1529	463			
Grp Sat Flow(s),veh/h/ln	1385	1485	0				0	1398	1188			
Q Serve(g_s), s	20.4	21.4	0.0				0.0	23.1	25.7			
Cycle Q Clear(g_c), s	20.4	21.4	0.0				0.0	23.1	25.7			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1329	1220	0				0	1946	551			
V/C Ratio(X)	0.59	0.73	0.00				0.00	0.79	0.84			
Avail Cap(c_a), veh/h	1329	1220	0				0	1946	551			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	27.9	28.4	0.0				0.0	17.0	17.7			
Incr Delay (d2), s/veh	2.0	3.8	0.0				0.0	3.3	14.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.2	9.5	0.0				0.0	9.4	10.5			
LnGrp Delay(d),s/veh	29.9	32.2	0.0				0.0	20.2	31.9			
LnGrp LOS	C	C						C	C			
Approach Vol, veh/h		1674						1992				
Approach Delay, s/veh		31.1						23.0				
Approach LOS		C						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		35.0		40.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 31		* 35				
Max Q Clear Time (g_c+I1), s		23.4		27.7				
Green Ext Time (p_c), s		6.3		6.5				

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
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.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	310	50	5	80	210	64	50	280	150	61	202
Future Volume (veh/h)	20	310	50	5	80	210	64	50	280	150	61	202
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94		1.00		0.97	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2019	2019	2000		1942	1942	2000	1845	1845	1900	1845	1845
Adj Flow Rate, veh/h	22	337	46		87	228	57	54	304	139	66	220
Adj No. of Lanes	1	1	0		1	1	0	1	1	0	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
Percent Heavy Veh, %	3	3	3		3	3	3	3	3	3	3	3
Cap, veh/h	58	420	57		158	445	111	152	369	169	170	537
Arrive On Green	0.03	0.24	0.24		0.09	0.30	0.30	0.09	0.31	0.31	0.10	0.32
Sat Flow, veh/h	1923	1726	236		1849	1490	373	1757	1186	542	1757	1669
Grp Volume(v), veh/h	22	0	383		87	0	285	54	0	443	66	0
Grp Sat Flow(s),veh/h/ln	1923	0	1961		1849	0	1863	1757	0	1728	1757	0
Q Serve(g_s), s	0.7	0.0	11.9		2.9	0.0	8.2	1.9	0.0	15.4	2.3	0.0
Cycle Q Clear(g_c), s	0.7	0.0	11.9		2.9	0.0	8.2	1.9	0.0	15.4	2.3	0.0
Prop In Lane	1.00		0.12		1.00		0.20	1.00		0.31	1.00	
Lane Grp Cap(c), veh/h	58	0	477		158	0	556	152	0	538	170	0
V/C Ratio(X)	0.38	0.00	0.80		0.55	0.00	0.51	0.36	0.00	0.82	0.39	0.00
Avail Cap(c_a), veh/h	237	0	668		285	0	692	244	0	714	244	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
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.9	0.0	23.1		28.5	0.0	18.9	27.9	0.0	20.7	27.5	0.0
Incr Delay (d2), s/veh	1.5	0.0	4.8		1.1	0.0	0.7	0.5	0.0	5.9	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
%ile BackOfQ(50%),veh/ln	0.4	0.0	7.0		1.5	0.0	4.3	0.9	0.0	8.1	1.1	0.0
LnGrp Delay(d),s/veh	32.4	0.0	27.9		29.6	0.0	19.6	28.5	0.0	26.6	28.1	0.0
LnGrp LOS	C		C		C		B	C		C	C	
Approach Vol, veh/h		405				372			497			304
Approach Delay, s/veh		28.2				21.9			26.8			19.9
Approach LOS		C				C			C			B

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	9.5	20.7	9.6	25.1	6.0	24.3	10.3	24.4
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	22.1	9.0	* 27	8.0	24.1	9.0	* 27
Max Q Clear Time (g_c+I1), s	4.9	13.9	3.9	8.7	2.7	10.2	4.3	17.4
Green Ext Time (p_c), s	0.1	1.1	0.0	0.9	0.0	0.9	0.0	1.4

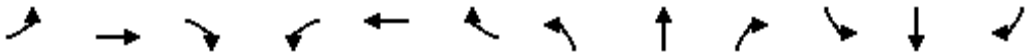
Intersection Summary	
HCM 2010 Ctrl Delay	24.7
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	20
Future Volume (veh/h)	20
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.91
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	18
Adj No. of Lanes	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	3
Cap, veh/h	44
Arrive On Green	0.32
Sat Flow, veh/h	137
Grp Volume(v), veh/h	238
Grp Sat Flow(s),veh/h/ln	1806
Q Serve(g_s), s	6.7
Cycle Q Clear(g_c), s	6.7
Prop In Lane	0.08
Lane Grp Cap(c), veh/h	581
V/C Ratio(X)	0.41
Avail Cap(c_a), veh/h	746
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	17.2
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.4
LnGrp Delay(d),s/veh	17.7
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	545	25	0	690	25	5
Future Volume (vph)	545	25	0	690	25	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			3.0	5.2	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	0.98	
Frt	0.99			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1560			1573	1441	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	1560			1573	1441	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	592	27	0	750	27	5
RTOR Reduction (vph)	2	0	0	0	4	0
Lane Group Flow (vph)	617	0	0	750	28	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA	Perm	
Protected Phases	2			3 4 6		
Permitted Phases					8	
Actuated Green, G (s)	30.1			51.2	13.4	
Effective Green, g (s)	30.1			45.6	13.4	
Actuated g/C Ratio	0.40			0.61	0.18	
Clearance Time (s)	5.6				5.2	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	626			956	257	
v/s Ratio Prot	c0.40			c0.48		
v/s Ratio Perm					c0.02	
v/c Ratio	0.98			0.78	0.11	
Uniform Delay, d1	22.2			11.0	25.8	
Progression Factor	0.78			0.69	1.05	
Incremental Delay, d2	28.6			0.4	0.2	
Delay (s)	46.0			7.9	27.3	
Level of Service	D			A	C	
Approach Delay (s)	46.0			7.9	27.3	
Approach LOS	D			A	C	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

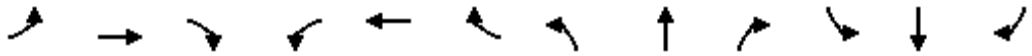


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	365	20	0	330	50	10	10	10	5	25	20
Future Volume (vph)	0	365	20	0	330	50	10	10	10	5	25	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6			5.6	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.98			0.95			0.94	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1558			1536			1466			1452	
Flt Permitted		1.00			1.00			0.87			0.97	
Satd. Flow (perm)		1558			1536			1293			1409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	397	22	0	359	54	11	11	11	5	27	22
RTOR Reduction (vph)	0	2	0	0	5	0	0	10	0	0	20	0
Lane Group Flow (vph)	0	417	0	0	408	0	0	23	0	0	34	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			4 6			8			8	
Permitted Phases							8			8		
Actuated Green, G (s)		39.8			56.0			7.8			7.8	
Effective Green, g (s)		39.8			56.0			7.8			7.8	
Actuated g/C Ratio		0.53			0.75			0.10			0.10	
Clearance Time (s)		5.6						5.6			5.6	
Vehicle Extension (s)		3.0						1.5			1.5	
Lane Grp Cap (vph)		826			1146			134			146	
v/s Ratio Prot		c0.27			c0.27							
v/s Ratio Perm								0.02			c0.02	
v/c Ratio		0.50			0.36			0.17			0.23	
Uniform Delay, d1		11.3			3.3			30.7			30.9	
Progression Factor		0.72			0.06			0.63			0.83	
Incremental Delay, d2		1.7			0.1			0.2			0.3	
Delay (s)		9.8			0.3			19.4			25.9	
Level of Service		A			A			B			C	
Approach Delay (s)		9.8			0.3			19.4			25.9	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

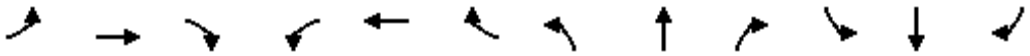
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	550	0	0	685	5	20
Future Volume (vph)	550	0	0	685	5	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			5.6	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.89	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1573			1573	1387	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1573			1573	1387	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	598	0	0	745	5	22
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	598	0	0	745	10	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	48.7			30.1	15.5	
Effective Green, g (s)	43.5			30.1	15.5	
Actuated g/C Ratio	0.58			0.40	0.21	
Clearance Time (s)				5.6		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	912			631	286	
v/s Ratio Prot	c0.38			c0.47	c0.01	
v/s Ratio Perm						
v/c Ratio	0.66			1.18	0.03	
Uniform Delay, d1	10.7			22.4	23.8	
Progression Factor	0.61			1.15	0.81	
Incremental Delay, d2	0.5			88.9	0.0	
Delay (s)	7.0			114.6	19.3	
Level of Service	A			F	B	
Approach Delay (s)	7.0			114.6	19.3	
Approach LOS	A			F	B	

Intersection Summary			
HCM 2000 Control Delay	65.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	380	0	0	340	20	40	5	25	0	0	0
Future Volume (vph)	0	380	0	0	340	20	40	5	25	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.98				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.97				
Satd. Flow (prot)		1573			1557			1431				
Flt Permitted		1.00			1.00			0.97				
Satd. Flow (perm)		1573			1557			1431				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	413	0	0	370	22	43	5	27	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	23	0	0	0	0
Lane Group Flow (vph)	0	413	0	0	390	0	0	52	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		53.2			39.8			10.6				
Effective Green, g (s)		53.2			39.8			10.6				
Actuated g/C Ratio		0.71			0.53			0.14				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1115			826			202				
v/s Ratio Prot		c0.26			c0.25			c0.04				
v/s Ratio Perm												
v/c Ratio		0.37			0.47			0.26				
Uniform Delay, d1		4.3			11.0			28.7				
Progression Factor		0.01			0.51			1.27				
Incremental Delay, d2		0.1			1.8			0.2				
Delay (s)		0.1			7.4			36.5				
Level of Service		A			A			D				
Approach Delay (s)		0.1			7.4			36.5			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	410	0	0	405	75	10	5	10	0	0	0
Future Volume (vph)	0	410	0	0	405	75	10	5	10	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1512			1441				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1512			1441				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	0	0	440	82	11	5	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	446	0	0	514	0	0	18	0	0	0	0
Confl. Peds. (#/hr)	39		22			39			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		50.7			32.7			13.5				
Effective Green, g (s)		50.7			32.7			13.5				
Actuated g/C Ratio		0.68			0.44			0.18				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1063			659			259				
v/s Ratio Prot		c0.28			c0.34			c0.01				
v/s Ratio Perm												
v/c Ratio		0.42			0.78			0.07				
Uniform Delay, d1		5.5			18.1			25.5				
Progression Factor		0.06			0.94			1.01				
Incremental Delay, d2		0.3			7.9			0.1				
Delay (s)		0.6			24.9			25.9				
Level of Service		A			C			C				
Approach Delay (s)		0.6			24.9			25.9			0.0	
Approach LOS		A			C			C			A	

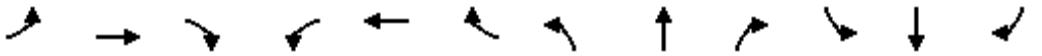
Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	465	20	50	530	70	10	491	50	0	361	300
Future Volume (veh/h)	260	465	20	50	530	70	10	491	50	0	361	300
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	0.99		0.93	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1800	1694	1728	0	1765	1728
Adj Flow Rate, veh/h	271	484	19	52	552	67	10	511	43	0	376	116
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	180	941	37	435	640	78	53	1123	93	0	968	294
Arrive On Green	0.11	0.59	0.59	0.87	0.87	0.87	0.77	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1597	1601	63	844	1463	178	18	2898	240	0	2587	758
Grp Volume(v), veh/h	271	0	503	52	0	619	299	0	265	0	250	242
Grp Sat Flow(s),veh/h/ln	1597	0	1664	844	0	1640	1677	0	1479	0	1676	1581
Q Serve(g_s), s	9.0	0.0	14.3	1.0	0.0	15.4	0.0	0.0	5.0	0.0	8.6	8.9
Cycle Q Clear(g_c), s	9.0	0.0	14.3	3.3	0.0	15.4	4.9	0.0	5.0	0.0	8.6	8.9
Prop In Lane	1.00		0.04	1.00		0.11	0.03		0.16	0.00		0.48
Lane Grp Cap(c), veh/h	180	0	978	435	0	718	696	0	573	0	650	612
V/C Ratio(X)	1.51	0.00	0.51	0.12	0.00	0.86	0.43	0.00	0.46	0.00	0.38	0.40
Avail Cap(c_a), veh/h	180	0	978	435	0	718	696	0	573	0	650	612
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.81	0.00	0.81	0.81	0.00	0.81	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	9.8	3.3	0.0	3.8	6.1	0.0	6.1	0.0	17.6	17.7
Incr Delay (d2), s/veh	255.5	0.0	1.9	0.5	0.0	10.9	1.6	0.0	2.2	0.0	1.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.7	0.0	7.1	0.3	0.0	8.0	2.5	0.0	2.2	0.0	4.3	4.2
LnGrp Delay(d),s/veh	291.0	0.0	11.7	3.7	0.0	14.6	7.6	0.0	8.2	0.0	19.4	19.6
LnGrp LOS	F		B	A		B	A		A		B	B
Approach Vol, veh/h		774			671			564			492	
Approach Delay, s/veh		109.5			13.8			7.9			19.5	
Approach LOS		F			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.2		35.8	12.0	39.2		35.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 47		24.4	9.0	* 35		24.4
Max Q Clear Time (g_c+I1), s		16.3		7.0	11.0	17.4		10.9
Green Ext Time (p_c), s		5.4		4.6	0.0	6.3		3.5

Intersection Summary	
HCM 2010 Ctrl Delay	43.2
HCM 2010 LOS	D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	50	40	175	0	0	0	0	230	1173	450
Future Volume (vph)	0	490	50	40	175	0	0	0	0	230	1173	450
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		1.00			1.00						1.00	0.98
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.99			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2769			1781						2993	1321
Flt Permitted		1.00			0.85						0.99	1.00
Satd. Flow (perm)		2769			1520						2993	1321
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	510	52	42	182	0	0	0	0	240	1222	469
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	224	0	0	0	0	0	1462	469
Confl. Peds. (#/hr)			15	15		4			11			
Confl. Bikes (#/hr)			3			3			3			2
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		30.8			30.8						40.4	33.4
Effective Green, g (s)		30.8			30.8						40.4	33.4
Actuated g/C Ratio		0.39			0.39						0.50	0.42
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		1066			585						1511	551
v/s Ratio Prot		c0.20									c0.49	
v/s Ratio Perm					0.15							0.36
v/c Ratio		0.52			0.38						0.97	0.85
Uniform Delay, d1		18.9			17.7						19.2	21.1
Progression Factor		0.34			0.36						1.00	1.00
Incremental Delay, d2		1.6			1.6						16.6	15.2
Delay (s)		8.1			7.9						35.8	36.3
Level of Service		A			A						D	D
Approach Delay (s)		8.1			7.9			0.0			35.9	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	395	20	305	135	300	20	75	1525	190	50
Future Volume (vph)	395	20	305	135	300	20	75	1525	190	50
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1509	1812	1812	1485			3677	1316	
Flt Permitted		0.63	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		1000	1812	1812	1485			3677	1316	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	411	21	318	141	312	21	78	1589	198	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	432	318	141	334	0	0	1667	212	0
Confl. Peds. (#/hr)							8			3
Confl. Bikes (#/hr)					4	4				
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Effective Green, g (s)		32.8	32.8	16.8	16.8			38.8	38.8	
Actuated g/C Ratio		0.41	0.41	0.21	0.21			0.48	0.48	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Grp Cap (vph)		485	742	380	311			1783	638	
v/s Ratio Prot		c0.13	0.18	0.08	c0.22					
v/s Ratio Perm		0.23						0.45	0.16	
v/c Ratio		0.89	0.43	0.37	1.07			0.93	0.33	
Uniform Delay, d1		21.7	16.9	27.1	31.6			19.4	12.6	
Progression Factor		0.72	0.75	1.00	1.00			0.44	0.23	
Incremental Delay, d2		16.7	1.3	2.8	72.1			6.8	0.8	
Delay (s)		32.4	14.0	29.8	103.7			15.4	3.7	
Level of Service		C	B	C	F			B	A	
Approach Delay (s)			24.6	81.8				13.9		
Approach LOS			C	F				B		

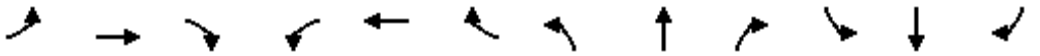
Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	370	40	30	250	50	40	421	50	60	331	40
Future Volume (veh/h)	80	370	40	30	250	50	40	421	50	60	331	40
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)	0.99		0.98	1.00		0.98	0.98		0.92	0.98		0.92
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	1412	1560	1530	1412	1500	1530	1440	1500	1469	1440	1500	1469
Adj Flow Rate, veh/h	83	385	37	31	260	43	42	439	42	62	345	32
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	520	706	68	333	632	104	104	888	83	159	778	73
Arrive On Green	0.50	0.50	0.50	1.00	1.00	1.00	0.76	0.76	0.76	0.76	0.76	0.76
Sat Flow, veh/h	852	1398	134	768	1251	207	137	2338	219	267	2048	191
Grp Volume(v), veh/h	83	0	422	31	0	303	272	0	251	220	0	219
Grp Sat Flow(s),veh/h/ln	852	0	1532	768	0	1457	1389	0	1305	1193	0	1313
Q Serve(g_s), s	4.3	0.0	15.1	1.3	0.0	0.0	0.0	0.0	6.0	0.6	0.0	4.8
Cycle Q Clear(g_c), s	4.3	0.0	15.1	16.4	0.0	0.0	5.5	0.0	6.0	6.5	0.0	4.8
Prop In Lane	1.00		0.09	1.00		0.14	0.15		0.17	0.28		0.15
Lane Grp Cap(c), veh/h	520	0	774	333	0	736	580	0	496	511	0	499
V/C Ratio(X)	0.16	0.00	0.55	0.09	0.00	0.41	0.47	0.00	0.51	0.43	0.00	0.44
Avail Cap(c_a), veh/h	520	0	774	333	0	736	580	0	496	511	0	499
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.84	0.00	0.84	0.75	0.00	0.75
Uniform Delay (d), s/veh	10.9	0.0	13.5	3.0	0.0	0.0	6.6	0.0	6.7	6.4	0.0	6.5
Incr Delay (d2), s/veh	0.7	0.0	2.8	0.5	0.0	1.7	2.3	0.0	3.1	2.0	0.0	2.1
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	1.1	0.0	6.9	0.3	0.0	0.3	2.5	0.0	2.4	1.9	0.0	1.9
LnGrp Delay(d),s/veh	11.5	0.0	16.3	3.6	0.0	1.7	8.9	0.0	9.8	8.4	0.0	8.6
LnGrp LOS	B		B	A		A	A		A	A		A
Approach Vol, veh/h		505			334			523			439	
Approach Delay, s/veh		15.5			1.8			9.3			8.5	
Approach LOS		B			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		40.4		30.4		40.4		30.4
Max Q Clear Time (g_c+I1), s		17.1		8.0		18.4		8.5
Green Ext Time (p_c), s		2.5		2.3		1.5		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	325	180	60	170	0	0	0	0	50	1083	130
Future Volume (vph)	0	325	180	60	170	0	0	0	0	50	1083	130
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.96
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1697			1775						4163	1148
Flt Permitted		1.00			0.67						1.00	1.00
Satd. Flow (perm)		1697			1213						4163	1148
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	339	188	62	177	0	0	0	0	52	1128	135
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	509	0	0	240	0	0	0	0	0	1180	135
Confl. Peds. (#/hr)	12		12	12		12			12	12		7
Confl. Bikes (#/hr)			6			4			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		35.8			35.8						35.4	28.4
Effective Green, g (s)		35.8			35.8						35.4	28.4
Actuated g/C Ratio		0.45			0.45						0.44	0.35
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		759			542						1842	407
v/s Ratio Prot		c0.30										
v/s Ratio Perm					0.20						0.28	0.12
v/c Ratio		0.67			0.44						0.64	0.33
Uniform Delay, d1		17.4			15.2						17.4	18.9
Progression Factor		0.32			1.00						0.35	0.43
Incremental Delay, d2		4.4			2.1						0.6	0.8
Delay (s)		10.1			17.3						6.7	9.0
Level of Service		B			B						A	A
Approach Delay (s)		10.1			17.3			0.0			6.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	150	0	0	130	110	90	1470	20	0	0	0
Future Volume (veh/h)	245	150	0	0	130	110	90	1470	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1620	1588	1620			
Adj Flow Rate, veh/h	255	156	0	0	135	107	94	1531	19			
Adj No. of Lanes	1	1	0	0	1	0	0	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	358	643	0	0	285	226	119	2062	26			
Arrive On Green	0.68	0.68	0.00	0.00	0.41	0.41	0.16	0.16	0.16			
Sat Flow, veh/h	1015	1588	0	0	703	557	247	4295	55			
Grp Volume(v), veh/h	255	156	0	0	0	242	599	500	545			
Grp Sat Flow(s),veh/h/ln	1015	1588	0	0	0	1260	1576	1445	1576			
Q Serve(g_s), s	19.4	3.0	0.0	0.0	0.0	11.3	29.3	26.3	26.3			
Cycle Q Clear(g_c), s	30.7	3.0	0.0	0.0	0.0	11.3	29.3	26.3	26.3			
Prop In Lane	1.00		0.00	0.00		0.44	0.16		0.03			
Lane Grp Cap(c), veh/h	358	643	0	0	0	510	756	694	757			
V/C Ratio(X)	0.71	0.24	0.00	0.00	0.00	0.47	0.79	0.72	0.72			
Avail Cap(c_a), veh/h	358	643	0	0	0	510	756	694	757			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	18.1	8.2	0.0	0.0	0.0	17.5	29.8	28.6	28.6			
Incr Delay (d2), s/veh	11.5	0.9	0.0	0.0	0.0	3.1	8.3	6.4	5.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.5	1.5	0.0	0.0	0.0	4.3	14.5	11.7	12.7			
LnGrp Delay(d),s/veh	29.6	9.1	0.0	0.0	0.0	20.7	38.1	34.9	34.4			
LnGrp LOS	C	A				C	D	C	C			
Approach Vol, veh/h		411			242			1644				
Approach Delay, s/veh		21.8			20.7			35.9				
Approach LOS		C			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		37.0		43.0		37.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		32.4		38.4		32.4		
Max Q Clear Time (g_c+I1), s		32.7		31.3		13.3		
Green Ext Time (p_c), s		0.0		4.3		1.0		

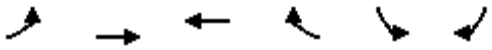
Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	230	40	105	250	70	30	401	85	45	291	65
Future Volume (veh/h)	55	230	40	105	250	70	30	401	85	45	291	65
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)	0.99		0.91	0.97		0.91	0.92		0.83	0.96		0.83
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	1588	1525	1620	1588	1588	1620	1620	1588	1555	1620	1588	1555
Adj Flow Rate, veh/h	57	240	34	109	260	59	31	418	67	47	303	47
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	390	657	93	472	626	142	85	903	140	121	719	119
Arrive On Green	0.51	0.51	0.51	0.17	0.17	0.17	0.13	0.13	0.13	0.77	0.77	0.77
Sat Flow, veh/h	937	1288	182	960	1227	278	92	2345	363	169	1869	309
Grp Volume(v), veh/h	57	0	274	109	0	319	278	0	238	197	0	200
Grp Sat Flow(s),veh/h/ln	937	0	1471	960	0	1505	1509	0	1291	1030	0	1316
Q Serve(g_s), s	3.5	0.0	9.0	8.2	0.0	15.2	0.0	0.0	13.7	3.3	0.0	4.0
Cycle Q Clear(g_c), s	18.7	0.0	9.0	17.2	0.0	15.2	13.0	0.0	13.7	17.1	0.0	4.0
Prop In Lane	1.00		0.12	1.00		0.18	0.11		0.28	0.24		0.23
Lane Grp Cap(c), veh/h	390	0	750	472	0	768	631	0	497	452	0	507
V/C Ratio(X)	0.15	0.00	0.37	0.23	0.00	0.42	0.44	0.00	0.48	0.43	0.00	0.40
Avail Cap(c_a), veh/h	390	0	750	472	0	768	631	0	497	452	0	507
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.87	0.00	0.87	0.85	0.00	0.85
Uniform Delay (d), s/veh	19.7	0.0	11.8	27.5	0.0	22.6	27.1	0.0	27.5	7.0	0.0	6.1
Incr Delay (d2), s/veh	0.8	0.0	1.4	1.1	0.0	1.5	1.9	0.0	2.9	2.6	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	3.9	2.3	0.0	6.7	6.0	0.0	5.3	1.5	0.0	1.6
LnGrp Delay(d),s/veh	20.5	0.0	13.2	28.5	0.0	24.1	29.1	0.0	30.3	9.6	0.0	8.1
LnGrp LOS	C		B	C		C	C		C	A		A
Approach Vol, veh/h		331			428			516			397	
Approach Delay, s/veh		14.4			25.3			29.7			8.8	
Approach LOS		B			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		45.0		35.0		45.0		35.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 41		* 31		* 41		* 31
Max Q Clear Time (g_c+I1), s		20.7		15.7		19.2		19.1
Green Ext Time (p_c), s		2.9		4.0		4.1		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

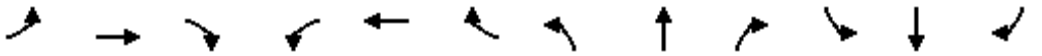
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	370	380	65	0	55
Future Volume (vph)	0	370	380	65	0	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0			5.6
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	0.97			0.78
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	0.98			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1588	1516			1074
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1588	1516			1074
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	385	396	68	0	57
RTOR Reduction (vph)	0	0	7	0	0	48
Lane Group Flow (vph)	0	385	457	0	0	9
Confl. Peds. (#/hr)				59		78
Confl. Bikes (#/hr)				14		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		55.1	56.1			12.3
Effective Green, g (s)		55.1	56.1			12.3
Actuated g/C Ratio		0.69	0.70			0.15
Clearance Time (s)						5.6
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1093	1063			165
v/s Ratio Prot		c0.24	c0.30			
v/s Ratio Perm						0.01
v/c Ratio		0.35	0.43			0.05
Uniform Delay, d1		5.1	5.1			28.9
Progression Factor		0.96	0.17			1.00
Incremental Delay, d2		0.2	0.2			0.1
Delay (s)		5.1	1.1			29.0
Level of Service		A	A			C
Approach Delay (s)		5.1	1.1		29.0	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	4.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	270	110	80	240	0	0	0	0	125	968	230
Future Volume (vph)	0	270	110	80	240	0	0	0	0	125	968	230
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.93	1.00	1.00						1.00	0.92
Flpb, ped/bikes		1.00	1.00	0.97	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1641	1173	1605	1535						4143	1102
Flt Permitted		1.00	1.00	0.52	1.00						0.99	1.00
Satd. Flow (perm)		1641	1173	874	1535						4143	1102
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	281	115	83	250	0	0	0	0	130	1008	240
RTOR Reduction (vph)	0	0	28	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	281	87	83	250	0	0	0	0	0	1138	240
Confl. Peds. (#/hr)			51	51		28			11	11		19
Confl. Bikes (#/hr)			10			16			1			1
Parking (#/hr)											2	2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		34.8	34.8	34.8	34.8						36.4	29.4
Effective Green, g (s)		34.8	34.8	34.8	34.8						36.4	29.4
Actuated g/C Ratio		0.43	0.43	0.43	0.43						0.45	0.37
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		713	510	380	667						1885	404
v/s Ratio Prot		c0.17			0.16							
v/s Ratio Perm			0.07	0.10							0.27	0.22
v/c Ratio		0.39	0.17	0.22	0.37						0.60	0.59
Uniform Delay, d1		15.4	13.8	14.1	15.3						16.4	20.5
Progression Factor		0.52	0.39	0.89	0.92						0.38	0.49
Incremental Delay, d2		1.6	0.7	1.2	1.5						1.1	4.9
Delay (s)		9.6	6.0	13.7	15.5						7.4	14.9
Level of Service		A	A	B	B						A	B
Approach Delay (s)		8.6			15.1			0.0			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	210	0	0	195	90	125	1320	160	0	0	0
Future Volume (veh/h)	175	210	0	0	195	90	125	1320	160	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1525	1588	1620			
Adj Flow Rate, veh/h	182	219	0	0	203	72	130	1375	147			
Adj No. of Lanes	1	1	0	0	1	0	1	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	234	552	0	0	333	118	795	2176	233			
Arrive On Green	0.11	0.11	0.00	0.00	0.11	0.11	0.18	0.18	0.18			
Sat Flow, veh/h	985	1588	0	0	959	340	1452	3974	425			
Grp Volume(v), veh/h	182	219	0	0	0	275	130	1000	522			
Grp Sat Flow(s),veh/h/ln	985	1588	0	0	0	1299	1452	1445	1508			
Q Serve(g_s), s	11.7	10.2	0.0	0.0	0.0	16.1	6.0	25.6	25.6			
Cycle Q Clear(g_c), s	27.8	10.2	0.0	0.0	0.0	16.1	6.0	25.6	25.6			
Prop In Lane	1.00		0.00	0.00		0.26	1.00		0.28			
Lane Grp Cap(c), veh/h	234	552	0	0	0	451	795	1583	825			
V/C Ratio(X)	0.78	0.40	0.00	0.00	0.00	0.61	0.16	0.63	0.63			
Avail Cap(c_a), veh/h	234	552	0	0	0	451	795	1583	825			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.92	0.92	0.00	0.00	0.00	1.00	0.28	0.28	0.28			
Uniform Delay (d), s/veh	44.7	27.6	0.0	0.0	0.0	30.2	17.3	25.3	25.3			
Incr Delay (d2), s/veh	20.7	2.0	0.0	0.0	0.0	6.0	0.1	0.5	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			
%ile BackOfQ(50%),veh/ln	5.4	4.8	0.0	0.0	0.0	6.6	2.5	10.4	10.9			
LnGrp Delay(d),s/veh	65.4	29.6	0.0	0.0	0.0	36.3	17.4	25.9	26.4			
LnGrp LOS	E	C				D	B	C	C			
Approach Vol, veh/h		401			275			1652				
Approach Delay, s/veh		45.9			36.3			25.4				
Approach LOS		D			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		32.0		48.0		32.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 28		* 44		* 28		
Max Q Clear Time (g_c+I1), s		29.8		27.6		18.1		
Green Ext Time (p_c), s		0.0		7.9		0.8		

Intersection Summary	
HCM 2010 Ctrl Delay	30.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	1496	0	0	0	0	0	280	50
Future Volume (veh/h)	0	0	0	300	1496	0	0	0	0	0	280	50
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.95
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.82
Adj Sat Flow, veh/h/ln				1530	1500	0				0	1500	1530
Adj Flow Rate, veh/h				312	1558	0				0	292	33
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				452	1997	0				0	626	70
Arrive On Green				0.21	0.21	0.00				0.00	0.27	0.27
Sat Flow, veh/h				621	3331	0				0	2415	261
Grp Volume(v), veh/h				675	1195	0				0	176	149
Grp Sat Flow(s),veh/h/ln				1345	1242	0				0	1425	1176
Q Serve(g_s), s				38.3	36.3	0.0				0.0	8.3	8.5
Cycle Q Clear(g_c), s				38.3	36.3	0.0				0.0	8.3	8.5
Prop In Lane				0.46		0.00				0.00		0.22
Lane Grp Cap(c), veh/h				903	1546	0				0	381	315
V/C Ratio(X)				0.75	0.77	0.00				0.00	0.46	0.47
Avail Cap(c_a), veh/h				903	1546	0				0	381	315
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				27.2	26.4	0.0				0.0	24.5	24.6
Incr Delay (d2), s/veh				5.6	3.8	0.0				0.0	4.0	5.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.7	13.3	0.0				0.0	3.7	3.2
LnGrp Delay(d),s/veh				32.8	30.2	0.0				0.0	28.5	29.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1870						325	
Approach Delay, s/veh					31.2						29.0	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.0		26.0				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 50		21.4				
Max Q Clear Time (g_c+I1), s		40.3		10.5				
Green Ext Time (p_c), s		6.3		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1666	150	140	310	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1666	150	140	310	0	0	0	0
Number				5	2	12	7	4	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				0	1412	1412	1440	1412	0			
Adj Flow Rate, veh/h				0	1735	120	146	323	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2351	717	266	507	0			
Arrive On Green				0.00	0.20	0.20	0.09	0.09	0.00			
Sat Flow, veh/h				0	3981	1175	683	1842	0			
Grp Volume(v), veh/h				0	1735	120	253	216	0			
Grp Sat Flow(s),veh/h/ln				0	1285	1175	1241	1220	0			
Q Serve(g_s), s				0.0	33.8	6.8	14.8	13.6	0.0			
Cycle Q Clear(g_c), s				0.0	33.8	6.8	15.8	13.6	0.0			
Prop In Lane				0.00		1.00	0.58		0.00			
Lane Grp Cap(c), veh/h				0	2351	717	425	348	0			
V/C Ratio(X)				0.00	0.74	0.17	0.60	0.62	0.00			
Avail Cap(c_a), veh/h				0	2351	717	425	348	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	26.0	15.2	33.0	32.1	0.0			
Incr Delay (d2), s/veh				0.0	2.1	0.5	6.0	8.1	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	12.5	2.3	6.1	5.4	0.0			
LnGrp Delay(d),s/veh				0.0	28.1	15.7	39.0	40.2	0.0			
LnGrp LOS					C	B	D	D				
Approach Vol, veh/h					1855			469				
Approach Delay, s/veh					27.3			39.6				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		53.0		27.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 49		* 23				
Max Q Clear Time (g_c+I1), s		35.8		17.8				
Green Ext Time (p_c), s		8.2		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	29.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	180	1731	0	0	0	0	0	275	90
Future Volume (veh/h)	0	0	0	180	1731	0	0	0	0	0	275	90
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1412	0				0	1412	1440
Adj Flow Rate, veh/h				188	1803	0				0	286	77
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				263	2124	0				0	499	129
Arrive On Green				0.21	0.21	0.00				0.00	0.26	0.26
Sat Flow, veh/h				324	3460	0				0	1988	496
Grp Volume(v), veh/h				733	1258	0				0	196	167
Grp Sat Flow(s),veh/h/ln				1331	1169	0				0	1341	1072
Q Serve(g_s), s				40.2	41.3	0.0				0.0	10.2	10.9
Cycle Q Clear(g_c), s				42.6	41.3	0.0				0.0	10.2	10.9
Prop In Lane				0.26		0.00				0.00		0.46
Lane Grp Cap(c), veh/h				902	1485	0				0	349	279
V/C Ratio(X)				0.81	0.85	0.00				0.00	0.56	0.60
Avail Cap(c_a), veh/h				902	1485	0				0	349	279
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				28.3	27.9	0.0				0.0	25.7	25.9
Incr Delay (d2), s/veh				8.0	6.2	0.0				0.0	6.4	9.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.7	14.7	0.0				0.0	4.4	3.9
LnGrp Delay(d),s/veh				36.3	34.0	0.0				0.0	32.1	35.1
LnGrp LOS				D	C						C	D
Approach Vol, veh/h					1991						363	
Approach Delay, s/veh					34.9						33.5	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		55.0		25.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 51		* 21				
Max Q Clear Time (g_c+I1), s		44.6		12.9				
Green Ext Time (p_c), s		4.7		1.0				

Intersection Summary	
HCM 2010 Ctrl Delay	34.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	70	1581	90	240	155	0	0	170	50
Future Volume (veh/h)	0	0	0	70	1581	90	240	155	0	0	170	50
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				73	1647	87	250	161	0	0	177	38
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				105	2506	137	299	649	0	0	299	64
Arrive On Green				0.18	0.18	0.18	0.10	0.58	0.00	0.00	0.23	0.23
Sat Flow, veh/h				192	4610	251	1765	1853	0	0	1294	278
Grp Volume(v), veh/h				666	555	586	250	161	0	0	0	215
Grp Sat Flow(s),veh/h/ln				1755	1606	1692	1765	1853	0	0	0	1571
Q Serve(g_s), s				28.5	25.6	25.7	2.1	3.4	0.0	0.0	0.0	9.7
Cycle Q Clear(g_c), s				28.5	25.6	25.7	2.1	3.4	0.0	0.0	0.0	9.7
Prop In Lane				0.11		0.15	1.00		0.00	0.00		0.18
Lane Grp Cap(c), veh/h				954	873	920	299	649	0	0	0	363
V/C Ratio(X)				0.70	0.64	0.64	0.84	0.25	0.00	0.00	0.00	0.59
Avail Cap(c_a), veh/h				954	873	920	299	649	0	0	0	363
HCM Platoon Ratio				0.33	0.33	0.33	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				26.7	25.5	25.5	32.4	11.5	0.0	0.0	0.0	27.4
Incr Delay (d2), s/veh				4.2	3.5	3.4	23.3	0.9	0.0	0.0	0.0	6.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.0	12.2	12.9	7.0	1.9	0.0	0.0	0.0	4.9
LnGrp Delay(d),s/veh				30.9	29.0	28.9	55.7	12.4	0.0	0.0	0.0	34.3
LnGrp LOS				C	C	C	E	B				C
Approach Vol, veh/h					1807			411			215	
Approach Delay, s/veh					29.7			38.7			34.3	
Approach LOS					C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.0	23.0		48.0		32.0
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			5.0	18.5		43.5		28.0
Max Q Clear Time (g_c+I1), s			4.1	11.7		30.5		5.4
Green Ext Time (p_c), s			0.2	0.8		10.9		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	40	94.2%	12.5	3.8	B
	Through	5	3	69.1%	11.1	12.7	B
	Right Turn						
	Subtotal	47	43	91.5%	13.3	3.4	B
SB	Left Turn						
	Through	10	11	111.4%	25.8	13.0	D
	Right Turn	5	4	76.8%	7.7	11.6	A
	Subtotal	15	15	99.8%	22.1	9.8	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	88	86	97.3%	3.2	0.3	A
	Through	1,699	1,705	100.4%	2.4	0.2	A
	Right Turn	5	6	115.2%	1.9	0.2	A
	Subtotal	1,792	1,797	100.3%	2.4	0.2	A
Total		1,854	1,855	100.0%	2.9	0.3	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	122	118	96.6%	26.0	2.9	C
	Through	20	17	84.5%	26.7	5.1	C
	Right Turn						
	Subtotal	142	135	94.9%	25.8	2.6	C
SB	Left Turn						
	Through	50	48	96.0%	21.3	5.9	C
	Right Turn	10	8	76.8%	11.9	9.5	B
	Subtotal	60	56	92.8%	20.8	4.7	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	232	222	95.7%	13.6	6.8	B
	Through	1,747	1,739	99.5%	10.8	2.1	B
	Right Turn	40	42	105.6%	9.2	3.5	A
	Subtotal	2,019	2,003	99.2%	11.1	2.4	B
Total		2,221	2,193	98.8%	12.2	2.3	B

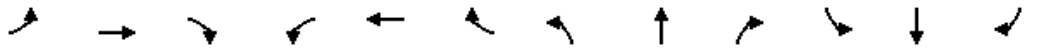
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	100	1717	130	41	331	0	0	265	151
Future Volume (veh/h)	0	0	0	100	1717	130	41	331	0	0	265	151
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.97		1.00	1.00		0.83
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				1620	1588	1620	1620	1588	0	0	1525	1555
Adj Flow Rate, veh/h				104	1789	125	43	345	0	0	276	150
Adj No. of Lanes				0	3	0	0	2	0	0	2	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				125	2288	164	101	733	0	0	550	280
Arrive On Green				0.19	0.19	0.19	0.64	0.64	0.00	0.00	0.11	0.11
Sat Flow, veh/h				220	4023	289	144	2371	0	0	1802	878
Grp Volume(v), veh/h				745	620	653	194	194	0	0	229	197
Grp Sat Flow(s),veh/h/ln				1577	1445	1510	1070	1373	0	0	1448	1155
Q Serve(g_s), s				36.4	32.5	32.8	2.6	5.7	0.0	0.0	11.9	13.0
Cycle Q Clear(g_c), s				36.4	32.5	32.8	15.5	5.7	0.0	0.0	11.9	13.0
Prop In Lane				0.14		0.19	0.22		0.00	0.00		0.76
Lane Grp Cap(c), veh/h				897	822	859	396	438	0	0	462	368
V/C Ratio(X)				0.83	0.75	0.76	0.49	0.44	0.00	0.00	0.50	0.54
Avail Cap(c_a), veh/h				897	822	859	396	438	0	0	462	368
HCM Platoon Ratio				0.33	0.33	0.33	2.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				28.8	27.2	27.3	11.4	10.9	0.0	0.0	29.7	30.2
Incr Delay (d2), s/veh				8.8	6.4	6.3	4.3	3.2	0.0	0.0	3.8	5.5
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				18.1	14.4	15.2	2.4	2.4	0.0	0.0	5.3	4.7
LnGrp Delay(d),s/veh				37.6	33.6	33.6	15.7	14.2	0.0	0.0	33.5	35.7
LnGrp LOS				D	C	C	B	B			C	D
Approach Vol, veh/h					2018			388			426	
Approach Delay, s/veh					35.1			14.9			34.5	
Approach LOS					D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				30.0		50.0		30.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				25.5		45.5		25.5
Max Q Clear Time (g_c+I1), s				17.5		38.4		15.0
Green Ext Time (p_c), s				1.0		5.2		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	300	1792	30	110	50	0	0	30	30
Future Volume (vph)	0	0	0	300	1792	30	110	50	0	0	30	30
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6			7.6	
Lane Util. Factor					0.91		1.00	1.00			1.00	
Frpb, ped/bikes					1.00		1.00	1.00			0.97	
Flpb, ped/bikes					0.97		0.96	1.00			1.00	
Frt					1.00		1.00	1.00			0.93	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3684		1100	1249			1128	
Flt Permitted					0.99		0.72	1.00			1.00	
Satd. Flow (perm)					3684		830	1249			1128	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	312	1867	31	115	52	0	0	31	31
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	2209	0	115	52	0	0	54	0
Confl. Peds. (#/hr)			106	106		44	30		69			30
Confl. Bikes (#/hr)						2			3			8
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			4			8	
Permitted Phases				6			4					
Actuated Green, G (s)					51.4		19.4	19.4			19.4	
Effective Green, g (s)					51.4		19.4	19.4			19.4	
Actuated g/C Ratio					0.57		0.22	0.22			0.22	
Clearance Time (s)					11.6		7.6	7.6			7.6	
Lane Grp Cap (vph)					2103		178	269			243	
v/s Ratio Prot								0.04			0.05	
v/s Ratio Perm					0.60		c0.14					
v/c Ratio					1.05		0.65	0.19			0.22	
Uniform Delay, d1					19.3		32.2	28.9			29.1	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					34.5		16.7	1.6			2.1	
Delay (s)					53.8		48.9	30.5			31.2	
Level of Service					D		D	C			C	
Approach Delay (s)		0.0			53.8			43.2			31.2	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	158.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	480	1604	0	0	0	0	0	665	493
Future Volume (veh/h)	0	0	0	480	1604	0	0	0	0	0	665	493
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.85
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1560	1588	0				0	1588	1500
Adj Flow Rate, veh/h				500	1671	0				0	693	506
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				740	2085	0				0	1951	489
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1486	4765	0				0	4479	1088
Grp Volume(v), veh/h				500	1671	0				0	693	506
Grp Sat Flow(s),veh/h/ln				1486	1588	0				0	1445	1088
Q Serve(g_s), s				25.9	27.1	0.0				0.0	11.5	36.0
Cycle Q Clear(g_c), s				25.9	27.1	0.0				0.0	11.5	36.0
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				740	2085	0				0	1951	489
V/C Ratio(X)				0.68	0.80	0.00				0.00	0.36	1.03
Avail Cap(c_a), veh/h				740	2085	0				0	1951	489
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				1.00	1.00	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				30.3	30.9	0.0				0.0	23.6	34.1
Incr Delay (d2), s/veh				4.9	3.4	0.0				0.0	0.5	49.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.7	12.6	0.0				0.0	4.7	17.6
LnGrp Delay(d),s/veh				35.2	34.2	0.0				0.0	24.1	83.8
LnGrp LOS				D	C						C	F
Approach Vol, veh/h					2171						1199	
Approach Delay, s/veh					34.5						49.3	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						39.0		41.0
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						35.0		36.0
Max Q Clear Time (g_c+I1), s						29.1		38.0
Green Ext Time (p_c), s						4.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	39.7
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1151	195	928	1410	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1151	195	928	1410	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1500	1500	1398	1398	0			
Adj Flow Rate, veh/h				0	1199	189	1061	1337	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	3	3	0			
Cap, veh/h				0	1510	441	1381	1450	0			
Arrive On Green				0.00	0.37	0.37	0.17	0.17	0.00			
Sat Flow, veh/h				0	4230	1195	2663	2796	0			
Grp Volume(v), veh/h				0	1199	189	1061	1337	0			
Grp Sat Flow(s),veh/h/ln				0	1365	1195	1331	1398	0			
Q Serve(g_s), s				0.0	20.9	9.5	30.4	37.6	0.0			
Cycle Q Clear(g_c), s				0.0	20.9	9.5	30.4	37.6	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1510	441	1381	1450	0			
V/C Ratio(X)				0.00	0.79	0.43	0.77	0.92	0.00			
Avail Cap(c_a), veh/h				0	1510	441	1381	1450	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	22.5	18.9	28.6	31.6	0.0			
Incr Delay (d2), s/veh				0.0	4.4	3.0	4.1	11.1	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	8.4	3.5	12.0	16.8	0.0			
LnGrp Delay(d),s/veh				0.0	26.9	22.0	32.7	42.7	0.0			
LnGrp LOS					C	C	C	D				
Approach Vol, veh/h					1388			2398				
Approach Delay, s/veh					26.3			38.3				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				46.0		34.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				41.5		29.5		
Max Q Clear Time (g_c+I1), s				39.6		22.9		
Green Ext Time (p_c), s				1.7		3.8		

Intersection Summary	
HCM 2010 Ctrl Delay	33.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1527	100	0	0	0	0	0	400	170	430	0
Future Volume (veh/h)	0	1527	100	0	0	0	0	0	400	170	430	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		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	0	1676	1710				0	1588	1620	1765	1765	0
Adj Flow Rate, veh/h	0	1591	95				0	0	402	177	448	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1145	992	1526	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.86	0.29	0.29	0.00
Sat Flow, veh/h		0					0	0	1324	969	1765	0
Grp Volume(v), veh/h		0.0					0	0	402	177	448	0
Grp Sat Flow(s),veh/h/ln							0	0	1324	969	1765	0
Q Serve(g_s), s							0.0	0.0	2.0	4.9	6.7	0.0
Cycle Q Clear(g_c), s							0.0	0.0	2.0	6.9	6.7	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1145	992	1526	0
V/C Ratio(X)							0.00	0.00	0.35	0.18	0.29	0.00
Avail Cap(c_a), veh/h							0	0	1145	992	1526	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.9	4.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.8	0.4	0.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.9	1.4	3.6	0.0
LnGrp Delay(d),s/veh							0.0	0.0	1.3	5.3	4.5	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								402			625	
Approach Delay, s/veh								1.3			4.7	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				34.0				34.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				29.4				29.4
Max Q Clear Time (g_c+I1), s				8.9				4.0
Green Ext Time (p_c), s				1.8				1.2

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	1917	0	0	0	0	0	245	120	0	0	0
Future Volume (veh/h)	185	1917	0	0	0	0	0	245	120	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1500	0				0	1500	1440			
Adj Flow Rate, veh/h	193	1997	0				0	255	120			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	251	2157	0				0	626	284			
Arrive On Green	0.19	0.19	0.00				0.00	0.32	0.32			
Sat Flow, veh/h	343	3801	0				0	1940	881			
Grp Volume(v), veh/h	763	1427	0				0	195	180			
Grp Sat Flow(s),veh/h/ln	1414	1365	0				0	1500	1322			
Q Serve(g_s), s	41.0	41.1	0.0				0.0	8.1	8.5			
Cycle Q Clear(g_c), s	42.7	41.1	0.0				0.0	8.1	8.5			
Prop In Lane	0.25		0.00				0.00		0.67			
Lane Grp Cap(c), veh/h	859	1549	0				0	484	426			
V/C Ratio(X)	0.89	0.92	0.00				0.00	0.40	0.42			
Avail Cap(c_a), veh/h	859	1549	0				0	484	426			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	31.4	30.7	0.0				0.0	21.1	21.3			
Incr Delay (d2), s/veh	13.2	10.5	0.0				0.0	2.5	3.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	19.9	17.8	0.0				0.0	3.7	3.5			
LnGrp Delay(d),s/veh	44.6	41.2	0.0				0.0	23.6	24.3			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		2190						375				
Approach Delay, s/veh		42.4						23.9				
Approach LOS		D						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				30.0		50.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 26		45.4		
Max Q Clear Time (g_c+I1), s				10.5		44.7		
Green Ext Time (p_c), s				2.8		0.7		

Intersection Summary	
HCM 2010 Ctrl Delay	39.7
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1962	80	0	0	0	0	0	230	200	270	0
Future Volume (veh/h)	0	1962	80	0	0	0	0	0	230	200	270	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1500	1382				0	1588	1591	1560	1500	0
Adj Flow Rate, veh/h	0	2044	78				0	0	224	208	281	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	1101	1057	1282	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.85	0.28	0.28	0.00
Sat Flow, veh/h		0					0	0	1288	1001	1500	0
Grp Volume(v), veh/h		0.0					0	0	224	208	281	0
Grp Sat Flow(s),veh/h/ln							0	0	1288	1001	1500	0
Q Serve(g_s), s							0.0	0.0	0.9	5.0	4.4	0.0
Cycle Q Clear(g_c), s							0.0	0.0	0.9	6.0	4.4	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	1101	1057	1282	0
V/C Ratio(X)							0.00	0.00	0.20	0.20	0.22	0.00
Avail Cap(c_a), veh/h							0	0	1101	1057	1282	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh							0.0	0.0	0.4	4.1	3.2	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.4	0.4	0.4	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	0.4	1.5	2.0	0.0
LnGrp Delay(d),s/veh							0.0	0.0	0.8	4.5	3.6	0.0
LnGrp LOS									A	A	A	
Approach Vol, veh/h								224			489	
Approach Delay, s/veh								0.8			4.0	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				31.0				31.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				26.5				26.5
Max Q Clear Time (g_c+I1), s				8.0				2.9
Green Ext Time (p_c), s				1.4				0.6

Intersection Summary	
HCM 2010 Ctrl Delay	3.0
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	2117	175	0	0	0	0	305	30	110	130	0
Future Volume (veh/h)	100	2117	175	0	0	0	0	305	30	110	130	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				1.00		0.92	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	104	2205	171				0	318	22	115	135	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	116	2597	205				0	629	43	255	543	0
Arrive On Green	0.19	0.19	0.19				0.00	0.21	0.21	0.03	0.21	0.00
Sat Flow, veh/h	200	4488	354				0	3088	206	1597	1744	0
Grp Volume(v), veh/h	911	757	812				0	167	173	115	135	0
Grp Sat Flow(s),veh/h/ln	1755	1606	1682				0	1593	1618	1597	1744	0
Q Serve(g_s), s	40.7	36.2	37.2				0.0	7.4	7.6	0.0	5.2	0.0
Cycle Q Clear(g_c), s	40.7	36.2	37.2				0.0	7.4	7.6	0.0	5.2	0.0
Prop In Lane	0.11		0.21				0.00		0.13	1.00		0.00
Lane Grp Cap(c), veh/h	1015	929	973				0	334	339	255	543	0
V/C Ratio(X)	0.90	0.81	0.83				0.00	0.50	0.51	0.45	0.25	0.00
Avail Cap(c_a), veh/h	1015	929	973				0	334	339	255	543	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.1	28.3	28.7				0.0	28.0	28.1	34.1	23.9	0.0
Incr Delay (d2), s/veh	12.3	7.8	8.3				0.0	5.3	5.4	5.7	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.3	18.1	19.6				0.0	3.7	3.9	2.9	2.7	0.0
LnGrp Delay(d),s/veh	42.4	36.1	37.1				0.0	33.3	33.4	39.8	25.0	0.0
LnGrp LOS	D	D	D					C	C	D	C	
Approach Vol, veh/h		2480						340			250	
Approach Delay, s/veh		38.8						33.4			31.8	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		51.0		29.2			8.2	21.0
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		46.4		* 25			* 4	* 17
Max Q Clear Time (g_c+I1), s		42.7		7.2			2.0	9.6
Green Ext Time (p_c), s		3.6		0.9			0.1	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	110	102	92.9%	27.8	5.4	D
	Through						
	Right Turn						
	Subtotal	110	102	92.9%	27.8	5.4	D
EB	Left Turn	45	43	94.7%	3.2	0.5	A
	Through	2,247	2,266	100.8%	2.8	0.2	A
	Right Turn						
	Subtotal	2,292	2,309	100.7%	2.8	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,402	2,411	100.4%	3.9	0.5	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	91	82	89.9%	20.0	5.0	B
	Right Turn	413	421	102.0%	36.4	12.9	D
	Subtotal	504	503	99.8%	34.0	11.5	C
SB	Left Turn	107	108	100.8%	33.0	21.5	C
	Through	180	164	91.1%	20.2	10.6	C
	Right Turn						
	Subtotal	287	272	94.7%	25.6	15.7	C
EB	Left Turn	51	52	101.6%	16.9	3.3	B
	Through	2,232	2,223	99.6%	16.1	1.8	B
	Right Turn	44	41	94.3%	11.9	3.8	B
	Subtotal	2,327	2,316	99.5%	16.0	1.8	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,118	3,091	99.1%	19.8	2.6	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	221	2419	52	0	0	0	0	201	130	130	180	0
Future Volume (veh/h)	221	2419	52	0	0	0	0	201	130	130	180	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1412	1382	1355	0
Adj Flow Rate, veh/h	230	2520	32				0	209	125	135	188	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	215	2541	642				0	491	404	256	438	0
Arrive On Green	0.18	0.18	0.18				0.00	0.35	0.35	0.69	0.69	0.00
Sat Flow, veh/h	393	4642	1172				0	1412	1162	495	1323	0
Grp Volume(v), veh/h	815	1935	32				0	209	125	155	168	0
Grp Sat Flow(s),veh/h/ln	1392	1214	1172				0	1412	1162	585	1172	0
Q Serve(g_s), s	43.8	42.2	1.8				0.0	9.1	6.3	11.6	4.9	0.0
Cycle Q Clear(g_c), s	43.8	42.2	1.8				0.0	9.1	6.3	20.7	4.9	0.0
Prop In Lane	0.28		1.00				0.00		1.00	0.87		0.00
Lane Grp Cap(c), veh/h	762	1994	642				0	491	404	287	407	0
V/C Ratio(X)	1.07	0.97	0.05				0.00	0.43	0.31	0.54	0.41	0.00
Avail Cap(c_a), veh/h	762	1994	642				0	491	404	287	407	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	1.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.8	32.1	15.6				0.0	20.0	19.1	14.4	8.7	0.0
Incr Delay (d2), s/veh	52.7	14.3	0.1				0.0	2.7	2.0	7.1	3.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.0	16.9	0.6				0.0	3.9	2.2	3.3	1.8	0.0
LnGrp Delay(d),s/veh	85.4	46.4	15.7				0.0	22.7	21.1	21.5	11.8	0.0
LnGrp LOS	F	D	B					C	C	C	B	
Approach Vol, veh/h		2782						334			323	
Approach Delay, s/veh		57.5						22.1			16.4	
Approach LOS		E						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.0		32.0				32.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 44		* 28				* 28
Max Q Clear Time (g_c+I1), s		45.8		11.1				22.7
Green Ext Time (p_c), s		0.0		1.3				0.7

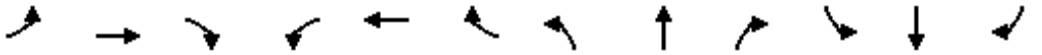
Intersection Summary	
HCM 2010 Ctrl Delay	50.2
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	2529	120	0	0	0	0	140	340	85	235	0
Future Volume (veh/h)	30	2529	120	0	0	0	0	140	340	85	235	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1468	1412	1412	0
Adj Flow Rate, veh/h	31	2634	78				0	146	319	89	245	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	30	2740	614				0	408	351	243	408	0
Arrive On Green	0.18	0.18	0.18				0.00	0.29	0.29	0.58	0.58	0.00
Sat Flow, veh/h	55	4996	1119				0	1412	1216	738	1412	0
Grp Volume(v), veh/h	795	1870	78				0	146	319	89	245	0
Grp Sat Flow(s),veh/h/ln	1409	1214	1119				0	1412	1216	738	1412	0
Q Serve(g_s), s	43.9	40.5	4.7				0.0	6.6	20.2	7.4	9.0	0.0
Cycle Q Clear(g_c), s	43.9	40.5	4.7				0.0	6.6	20.2	14.0	9.0	0.0
Prop In Lane	0.04		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	773	1998	614				0	408	351	243	408	0
V/C Ratio(X)	1.03	0.94	0.13				0.00	0.36	0.91	0.37	0.60	0.00
Avail Cap(c_a), veh/h	773	1998	614				0	468	403	274	468	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.97	0.97	0.00
Uniform Delay (d), s/veh	32.8	31.4	16.7				0.0	22.6	27.4	17.5	13.9	0.0
Incr Delay (d2), s/veh	18.3	1.1	0.0				0.0	0.5	22.1	0.9	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.1	13.9	1.5				0.0	2.6	8.9	1.5	3.6	0.0
LnGrp Delay(d),s/veh	51.1	32.5	16.7				0.0	23.1	49.5	18.4	15.5	0.0
LnGrp LOS	F	C	B					C	D	B	B	
Approach Vol, veh/h		2743						465			334	
Approach Delay, s/veh		37.4						41.2			16.3	
Approach LOS		D						D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.4		29.6				29.6
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		40.5		26.5				26.5
Max Q Clear Time (g_c+I1), s		45.9		22.2				16.0
Green Ext Time (p_c), s		0.0		0.9				1.2

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1856	1093	0	0	0	0	0	0	365	780	0
Future Volume (veh/h)	0	1856	1093	0	0	0	0	0	0	365	780	0
Number	5	2	12							7	4	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	0	1500	1500							1500	1500	0
Adj Flow Rate, veh/h	0	1919	1079							380	812	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.96	0.96	0.96							0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2							2	2	0
Cap, veh/h	0	2268	1285							476	1000	0
Arrive On Green	0.00	0.17	0.17							0.11	0.11	0.00
Sat Flow, veh/h	0	4500	2550							1429	3000	0
Grp Volume(v), veh/h	0	1919	1079							380	812	0
Grp Sat Flow(s),veh/h/ln	0	1500	1275							1429	1500	0
Q Serve(g_s), s	0.0	33.1	32.8							20.8	21.2	0.0
Cycle Q Clear(g_c), s	0.0	33.1	32.8							20.8	21.2	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2268	1285							476	1000	0
V/C Ratio(X)	0.00	0.85	0.84							0.80	0.81	0.00
Avail Cap(c_a), veh/h	0	2268	1285							545	1144	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.88	0.88	0.00
Uniform Delay (d), s/veh	0.0	30.3	30.2							33.0	33.1	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.7							6.5	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.8	11.7							9.1	9.3	0.0
LnGrp Delay(d),s/veh	0.0	30.7	30.9							39.4	36.7	0.0
LnGrp LOS		C	C							D	D	
Approach Vol, veh/h		2998									1192	
Approach Delay, s/veh		30.8									37.6	
Approach LOS		C									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.8		31.2				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		36.5		30.5				
Max Q Clear Time (g_c+I1), s		35.1		23.2				
Green Ext Time (p_c), s		1.3		3.5				

Intersection Summary	
HCM 2010 Ctrl Delay	32.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	960	1311	0	0	0	0	0	1398	560	0	0	0
Future Volume (veh/h)	960	1311	0	0	0	0	0	1398	560	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1468	1500	0				0	1412	1412			
Adj Flow Rate, veh/h	1033	1319	0				0	1545	505			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	1473	1388	0				0	1779	492			
Arrive On Green	0.15	0.15	0.00				0.00	0.42	0.42			
Sat Flow, veh/h	2797	3000	0				0	4235	1172			
Grp Volume(v), veh/h	1033	1319	0				0	1545	505			
Grp Sat Flow(s),veh/h/ln	1398	1500	0				0	1412	1172			
Q Serve(g_s), s	28.5	34.9	0.0				0.0	26.6	33.6			
Cycle Q Clear(g_c), s	28.5	34.9	0.0				0.0	26.6	33.6			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1473	1388	0				0	1779	492			
V/C Ratio(X)	0.70	0.95	0.00				0.00	0.87	1.03			
Avail Cap(c_a), veh/h	1473	1388	0				0	1779	492			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	30.3	33.0	0.0				0.0	21.2	23.2			
Incr Delay (d2), s/veh	2.8	14.9	0.0				0.0	6.1	47.4			
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	17.4	0.0				0.0	11.3	17.3			
LnGrp Delay(d),s/veh	33.1	47.9	0.0				0.0	27.2	70.6			
LnGrp LOS	C	D						C	F			
Approach Vol, veh/h		2352						2050				
Approach Delay, s/veh		41.4						37.9				
Approach LOS		D						D				

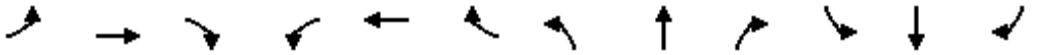
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		41.2		38.8				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 37		* 34				
Max Q Clear Time (g_c+I1), s		36.9		35.6				
Green Ext Time (p_c), s		0.1		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	39.8
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	280	40	70	280	52	60	222	170	103	140	30
Future Volume (veh/h)	20	280	40	70	280	52	60	222	170	103	140	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		0.96	1.00		0.96	1.00		0.96	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2039	2039	2000	1961	1961	2000	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	21	292	35	73	292	47	62	231	146	107	146	23
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	388	46	154	444	71	267	302	191	222	408	64
Arrive On Green	0.03	0.22	0.22	0.08	0.27	0.27	0.15	0.29	0.29	0.13	0.26	0.26
Sat Flow, veh/h	1942	1778	213	1867	1638	264	1774	1048	663	1774	1552	245
Grp Volume(v), veh/h	21	0	327	73	0	339	62	0	377	107	0	169
Grp Sat Flow(s),veh/h/ln	1942	0	1991	1867	0	1902	1774	0	1711	1774	0	1797
Q Serve(g_s), s	0.6	0.0	9.2	2.2	0.0	9.5	1.8	0.0	12.0	3.4	0.0	4.6
Cycle Q Clear(g_c), s	0.6	0.0	9.2	2.2	0.0	9.5	1.8	0.0	12.0	3.4	0.0	4.6
Prop In Lane	1.00		0.11	1.00		0.14	1.00		0.39	1.00		0.14
Lane Grp Cap(c), veh/h	57	0	434	154	0	515	267	0	493	222	0	472
V/C Ratio(X)	0.37	0.00	0.75	0.48	0.00	0.66	0.23	0.00	0.76	0.48	0.00	0.36
Avail Cap(c_a), veh/h	260	0	829	312	0	856	297	0	658	297	0	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	21.9	26.2	0.0	19.3	22.3	0.0	19.4	24.3	0.0	17.9
Incr Delay (d2), s/veh	1.4	0.0	2.7	0.8	0.0	1.4	0.2	0.0	3.8	0.6	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	5.3	1.2	0.0	5.1	0.9	0.0	6.2	1.7	0.0	2.3
LnGrp Delay(d),s/veh	29.9	0.0	24.5	27.0	0.0	20.8	22.5	0.0	23.2	24.9	0.0	18.4
LnGrp LOS	C		C	C		C	C		C	C		B
Approach Vol, veh/h		348			412			439			276	
Approach Delay, s/veh		24.9			21.9			23.1			20.9	
Approach LOS		C			C			C			C	

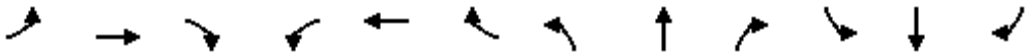
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	17.9	13.0	19.9	5.8	21.1	11.5	21.4
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	24.9	10.0	* 23	8.0	26.9	10.0	* 23
Max Q Clear Time (g_c+I1), s	4.2	11.2	3.8	6.6	2.6	11.5	5.4	14.0
Green Ext Time (p_c), s	0.0	1.1	0.0	0.5	0.0	1.2	0.1	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.8
HCM 2010 LOS	C

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	490	50	0	635	10	25
Future Volume (vph)	490	50	0	635	10	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			3.0	5.6	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	0.99	
Frt	0.99			1.00	0.90	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1561			1588	1401	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1561			1588	1401	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	510	52	0	661	10	26
RTOR Reduction (vph)	5	0	0	0	21	0
Lane Group Flow (vph)	557	0	0	661	15	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA	Perm	
Protected Phases	2			3 4 6		
Permitted Phases					8	
Actuated Green, G (s)	34.1			54.9	13.9	
Effective Green, g (s)	34.1			48.9	13.9	
Actuated g/C Ratio	0.43			0.61	0.17	
Clearance Time (s)	6.0				5.6	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	665			970	243	
v/s Ratio Prot	c0.36			c0.42		
v/s Ratio Perm					c0.01	
v/c Ratio	0.84			0.68	0.06	
Uniform Delay, d1	20.5			10.4	27.6	
Progression Factor	0.64			0.35	0.72	
Incremental Delay, d2	10.7			0.5	0.1	
Delay (s)	23.8			4.2	20.0	
Level of Service	C			A	C	
Approach Delay (s)	23.8			4.2	20.0	
Approach LOS	C			A	C	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

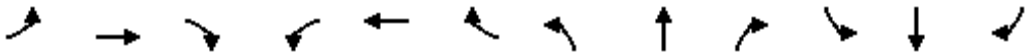


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	455	5	0	290	15	30	25	20	10	20	20
Future Volume (vph)	0	455	5	0	290	15	30	25	20	10	20	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		1.00			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1585			1574			1487			1461	
Flt Permitted		1.00			1.00			0.85			0.92	
Satd. Flow (perm)		1585			1574			1285			1356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	474	5	0	302	16	31	26	21	10	21	21
RTOR Reduction (vph)	0	0	0	0	2	0	0	19	0	0	19	0
Lane Group Flow (vph)	0	479	0	0	316	0	0	59	0	0	33	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			4 6			8			8	
Permitted Phases							8			8		
Actuated Green, G (s)		43.0			58.8			9.2			9.2	
Effective Green, g (s)		43.0			58.8			9.2			9.2	
Actuated g/C Ratio		0.54			0.73			0.11			0.11	
Clearance Time (s)		6.0						6.0			6.0	
Vehicle Extension (s)		3.0						1.5			1.5	
Lane Grp Cap (vph)		851			1156			147			155	
v/s Ratio Prot		c0.30			c0.20							
v/s Ratio Perm								c0.05			0.02	
v/c Ratio		0.56			0.27			0.40			0.22	
Uniform Delay, d1		12.3			3.5			32.9			32.1	
Progression Factor		0.58			0.05			0.38			0.84	
Incremental Delay, d2		2.3			0.0			0.6			0.1	
Delay (s)		9.4			0.2			13.0			27.1	
Level of Service		A			A			B			C	
Approach Delay (s)		9.4			0.2			13.0			27.1	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

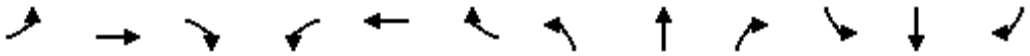
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	515	0	0	625	10	25
Future Volume (vph)	515	0	0	625	10	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			6.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.90	
Flt Protected	1.00			1.00	0.99	
Satd. Flow (prot)	1588			1588	1414	
Flt Permitted	1.00			1.00	0.99	
Satd. Flow (perm)	1588			1588	1414	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	536	0	0	651	10	26
RTOR Reduction (vph)	0	0	0	0	21	0
Lane Group Flow (vph)	536	0	0	651	15	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	53.6			34.1	14.8	
Effective Green, g (s)	48.0			34.1	14.8	
Actuated g/C Ratio	0.60			0.43	0.19	
Clearance Time (s)				6.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	952			676	261	
v/s Ratio Prot	c0.34			c0.41	c0.01	
v/s Ratio Perm						
v/c Ratio	0.56			0.96	0.06	
Uniform Delay, d1	9.7			22.3	26.9	
Progression Factor	0.29			1.04	1.83	
Incremental Delay, d2	0.4			20.9	0.0	
Delay (s)	3.3			44.0	49.1	
Level of Service	A			D	D	
Approach Delay (s)	3.3			44.0	49.1	
Approach LOS	A			D	D	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	485	0	0	285	15	20	20	20	0	0	0
Future Volume (vph)	0	485	0	0	285	15	20	20	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1573			1470				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1573			1470				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	505	0	0	297	16	21	21	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	505	0	0	311	0	0	45	0	0	0	0
Confl. Peds. (#/hr)	10		10			10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		58.2			43.0			9.8				
Effective Green, g (s)		58.2			43.0			9.8				
Actuated g/C Ratio		0.73			0.54			0.12				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1155			845			180				
v/s Ratio Prot		c0.32			0.20			c0.03				
v/s Ratio Perm												
v/c Ratio		0.44			0.37			0.25				
Uniform Delay, d1		4.4			10.7			31.8				
Progression Factor		0.09			0.51			1.01				
Incremental Delay, d2		0.1			1.2			0.2				
Delay (s)		0.5			6.6			32.2				
Level of Service		A			A			C				
Approach Delay (s)		0.5			6.6			32.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	370	0	0	425	50	20	5	20	0	0	0
Future Volume (vph)	0	370	0	0	425	50	20	5	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1537			1442				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1537			1442				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	385	0	0	443	52	21	5	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	5	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	385	0	0	490	0	0	29	0	0	0	0
Confl. Peds. (#/hr)	59		21			59			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		55.1			36.8			13.3				
Effective Green, g (s)		55.1			36.8			13.3				
Actuated g/C Ratio		0.69			0.46			0.17				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1093			707			239				
v/s Ratio Prot		c0.24			c0.32			c0.02				
v/s Ratio Perm												
v/c Ratio		0.35			0.69			0.12				
Uniform Delay, d1		5.1			17.1			28.4				
Progression Factor		0.21			0.78			1.00				
Incremental Delay, d2		0.2			5.0			0.2				
Delay (s)		1.3			18.4			28.7				
Level of Service		A			B			C				
Approach Delay (s)		1.3			18.4			28.7			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	28.9	47.0	0.07	5.2	F
C	IV	25	18.9	11.8	30.7	0.07	8.4	E
B	IV	25	17.9	45.6	63.5	0.07	3.8	F
A	IV	25	18.5	13.7	32.2	0.07	7.8	E
Lindaro	IV	25	25.3	22.5	47.8	0.14	10.6	D
Lincoln	IV	25	21.4	62.3	83.7	0.10	4.2	F
Francisco W.	IV	25	12.2	35.5	47.7	0.05	3.5	F
101 SBOn 2nd	IV	25	14.2	23.6	37.8	0.05	5.1	F
Total	IV		146.5	243.9	390.4	0.61	5.7	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	50.4	69.4	0.07	3.7	F
Tamalpais	IV	25	14.4	56.9	71.3	0.05	2.7	F
Lincoln	IV	25	13.2	20.4	33.6	0.05	5.4	F
Lindaro	IV	25	21.4	2.9	24.3	0.10	14.4	C
A	IV	25	25.3	14.7	40.0	0.14	12.6	D
B	IV	25	17.9	8.8	26.7	0.07	9.1	D
C	IV	25	19.0	4.5	23.5	0.07	11.0	D
D	IV	25	18.7	2.6	21.3	0.07	11.9	D
Total	IV		148.9	161.2	310.1	0.62	7.2	E

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	29	24.0	56.4	80.4	0.16	7.2	E
5th	IV	25	16.3	3.1	19.4	0.06	11.4	D
4th	IV	25	14.6	6.2	20.8	0.05	9.5	D
3rd	IV	25	17.7	9.6	27.3	0.07	8.8	E
2nd	IV	25	15.6	75.8	91.4	0.06	2.3	F
Total	IV		88.2	151.1	239.3	0.40	6.0	F

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	30	25.2	32.9	58.1	0.17	10.4	D
3rd St	IV	25	14.8	20.9	35.7	0.06	5.6	F
4th	IV	25	18.3	17.3	35.6	0.07	7.0	F
5th	IV	25	14.6	10.0	24.6	0.06	8.1	E
Mission	IV	25	15.7	5.9	21.6	0.06	9.9	D
Total	IV		88.6	87.0	175.6	0.41	8.3	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	14.6	43.1	0.16	13.2	C
Tamalpais	IV	25	16.0	49.8	65.8	0.06	3.3	F
Tamalpais	IV	25	3.1	5.7	8.8	0.01	4.8	F
Hetherton	IV	25	8.7	10.3	19.0	0.03	6.2	F
Irwin	IV	25	18.9	14.8	33.7	0.07	7.6	E
Total	IV		75.2	95.2	170.4	0.33	7.1	E

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	27.6	49.2	0.10	7.2	E
Hetherton	IV	25	18.9	23.3	42.2	0.07	6.1	F
Tamalpais	IV	25	8.7	115.6	124.3	0.03	1.0	F
Tamalpais	IV	25	3.1	4.7	7.8	0.01	5.4	F
Lincoln	IV	25	16.0	80.8	96.8	0.06	2.2	F
Total	IV		68.3	252.0	320.3	0.27	3.1	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	17.6	35.7	0.07	6.9	F
C	IV	25	18.9	13.8	32.7	0.07	7.9	E
B	IV	25	17.9	15.0	32.9	0.07	7.4	E
A	IV	25	18.5	12.1	30.6	0.07	8.2	E
Lindaro	IV	25	25.3	14.7	40.0	0.14	12.6	D
Lincoln	IV	25	21.4	66.3	87.7	0.10	4.0	F
Francisco W.	IV	25	12.2	38.3	50.5	0.05	3.3	F
101 SBOn Hetherton	IV	25	14.2	83.6	97.8	0.05	2.0	F
Total	IV		146.5	261.4	407.9	0.61	5.4	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	44.6	63.6	0.07	4.1	F
Tamalpais	IV	25	14.4	55.2	69.6	0.05	2.8	F
Lincoln	IV	25	13.2	18.4	31.6	0.05	5.7	F
Lindaro	IV	25	21.4	4.7	26.1	0.10	13.4	C
A	IV	25	25.3	6.3	31.6	0.14	16.0	C
B	IV	25	17.9	7.2	25.1	0.07	9.7	D
C	IV	25	19.0	4.3	23.3	0.07	11.1	D
D	IV	25	18.7	2.9	21.6	0.07	11.7	D
Total	IV		148.9	143.6	292.5	0.62	7.7	E

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	35	22.2	37.3	59.5	0.16	9.6	D
5th	IV	25	16.3	6.8	23.1	0.06	9.6	D
4th	IV	25	14.6	7.4	22.0	0.05	9.0	E
3rd	IV	25	17.7	22.8	40.5	0.07	5.9	F
2nd	IV	25	15.6	25.7	41.3	0.06	5.1	F
Total	IV		86.4	100.0	186.4	0.40	7.7	E

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	38	19.3	59.6	78.9	0.17	7.7	E
3rd St	IV	25	14.8	20.9	35.7	0.06	5.6	F
4th	IV	25	18.9	3.7	22.6	0.07	11.4	D
5th	IV	25	14.0	12.6	26.6	0.05	7.2	E
Mission	IV	25	15.7	3.0	18.7	0.06	11.4	D
Total	IV		82.7	99.8	182.5	0.41	8.0	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	12.1	40.6	0.16	14.0	C
Tamalpais	IV	25	16.1	25.9	42.0	0.06	5.2	F
Tamalpais	IV	25	4.3	3.1	7.4	0.02	7.9	E
Hetherton	IV	25	7.5	8.0	15.5	0.03	6.6	F
Irwin	IV	25	18.9	14.4	33.3	0.07	7.7	E
Total	IV		75.3	63.5	138.8	0.33	8.7	E

Arterial Level of Service: WB Mission

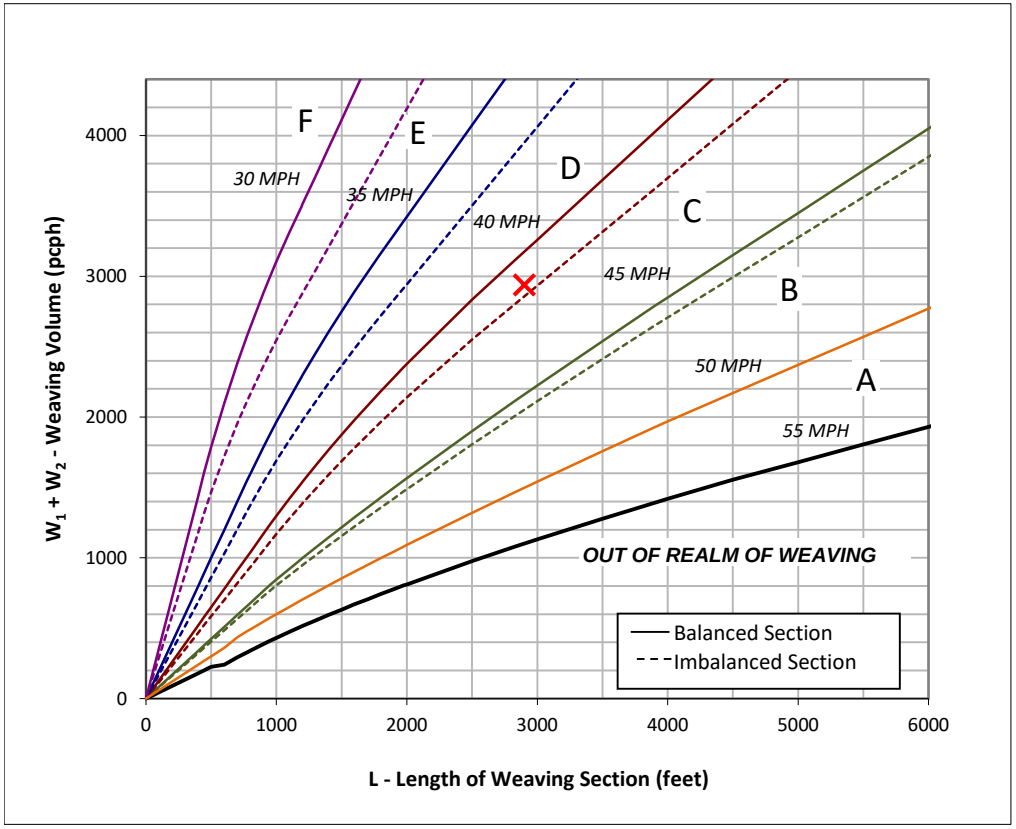
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	30.4	52.0	0.10	6.8	F
Hetherton	IV	25	18.9	8.1	27.0	0.07	9.5	D
Tamalpais	IV	25	7.5	46.6	54.1	0.03	1.9	F
Tamalpais	IV	25	4.3	2.7	7.0	0.02	8.4	E
Lincoln	IV	25	16.1	31.9	48.0	0.06	4.6	F
Total	IV		68.4	119.7	188.1	0.27	5.3	F

Leisch Method for Weaving Analysis

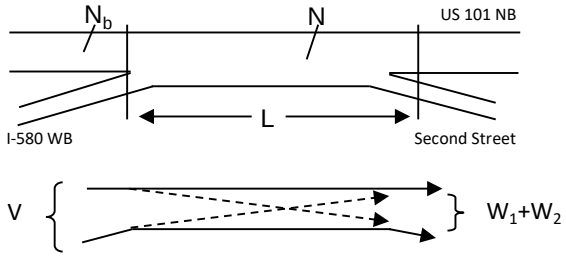
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Baseline + Project AM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,796	Volume (vph)*	1,754	Volume (vph)*	1,064
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	4%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	6,051	Volume (pcph)	1,831	Volume (pcph)	1,108



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.6
4. Weaving Intensity Factor (k)	2.55
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,553
6. Level of Service (LOS)	D

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline + Project Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3833	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1404
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.61
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	23.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	820
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.50
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.8
Speed 2 (S_2), mi/h	0.2	Density (D_{ML}), pc/mi/ln	13.7
Speed 2 (S_3), mi/h	1.4	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline + Project Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5621	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1597
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.69
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	26.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Baseline + Project Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5863	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	2119
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.92
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	55.1
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	38.5
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	3/17/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	Baseline + Project, AM Peak Hour
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5863	1508
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	4.40	3.72
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.958
Flow Rate (v_i), pc/h	6356	1711
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.92	0.81

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	65103.7	Density in Ramp Influence Area (D_R), pc/mi/ln	38.3
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.387
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2220
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	53.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.522	Outer Lanes Freeway Speed (S_O), mi/h	61.1
Flow in Lanes 1 and 2 (v_{12}), pc/h	4136	Ramp Junction Speed (S), mi/h	55.6
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	38.1
Level of Service (LOS)	E		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0

Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	Baseline + Project, AM Peak Hour
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4355	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1628
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.71
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	27.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

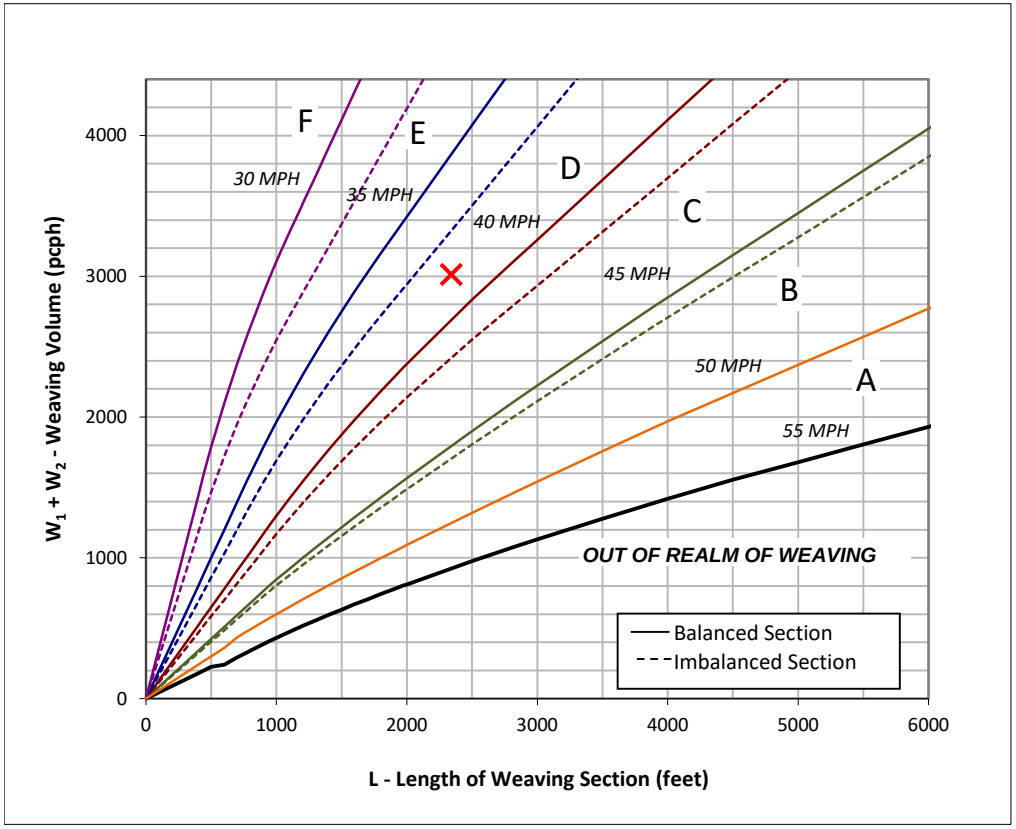
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	998	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1104
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.0
Speed 2 (S_2), mi/h	1.0	Density (D_{ML}), pc/mi/ln	18.7
Speed 2 (S_3), mi/h	5.0	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

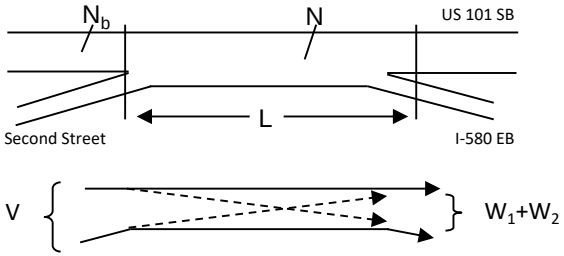
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Baseline + Project AM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,712	Volume (vph)*	1,719	Volume (vph)*	1,179
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	7,007	Volume (pcph)	1,765	Volume (pcph)	1,249



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.6
4. Weaving Intensity Factor (k)	2.61
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	2,255
6. Level of Service (LOS)	F

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

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

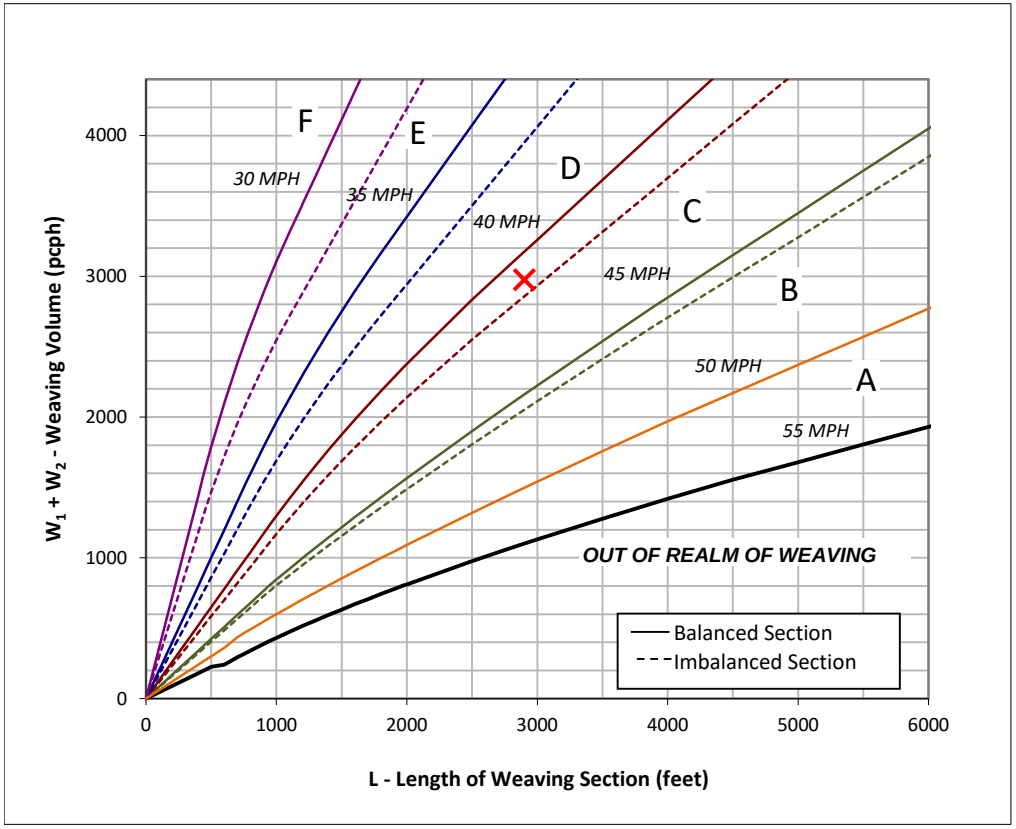
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Leisch Method for Weaving Analysis

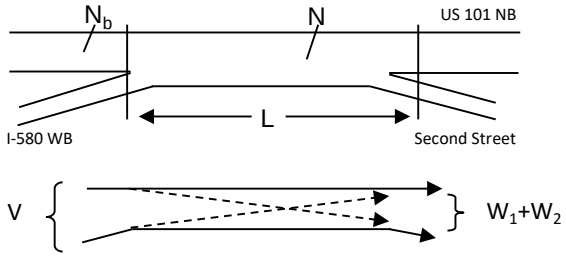
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Baseline + Project PM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,756	Volume (vph)*	1,548	Volume (vph)*	1,326
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	7,053	Volume (pcph)	1,616	Volume (pcph)	1,361



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.5
4. Weaving Intensity Factor (k)	2.55
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,834
6. Level of Service (LOS)	E

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4799	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1776
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.77
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	29.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	848	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	890
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.7
Speed 2 (S_2), mi/h	0.3	Density (D_{ML}), pc/mi/ln	14.9
Speed 2 (S_3), mi/h	2.1	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	7017	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	2014
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.88
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	56.9
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	35.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1217	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	1342
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.81
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	47.9
Speed 2 (S_2), mi/h	2.3	Density (D_{ML}), pc/mi/ln	28.0
Speed 2 (S_3), mi/h	9.8	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5084	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1837
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.80
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	31.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1377	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1555
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	56.0
Speed 2 (S_2), mi/h	4.0	Density (D_{ML}), pc/mi/ln	27.8
Speed 2 (S_3), mi/h	15.4	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

	Freeway	Ramp
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

	Freeway	Ramp
Volume (V_i), veh/h	5084	1749
Peak Hour Factor (PHF)	0.97	0.96
Total Trucks, %	4.40	2.00
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.973
Flow Rate (v_i), pc/h	5511	1872
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.80	0.89

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	102267.7	Density in Ramp Influence Area (D_R), pc/mi/ln	35.6
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	0.401
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1688
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	52.8
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.536	Outer Lanes Freeway Speed (S_O), mi/h	63.1
Flow in Lanes 1 and 2 (v_{12}), pc/h	3823	Ramp Junction Speed (S), mi/h	55.6
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	33.0
Level of Service (LOS)	E		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1380	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1559
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	55.9
Speed 2 (S_2), mi/h	4.1	Density (D_{ML}), pc/mi/ln	27.9
Speed 2 (S_3), mi/h	15.5	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline + Project Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3335	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1247
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	20.8
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

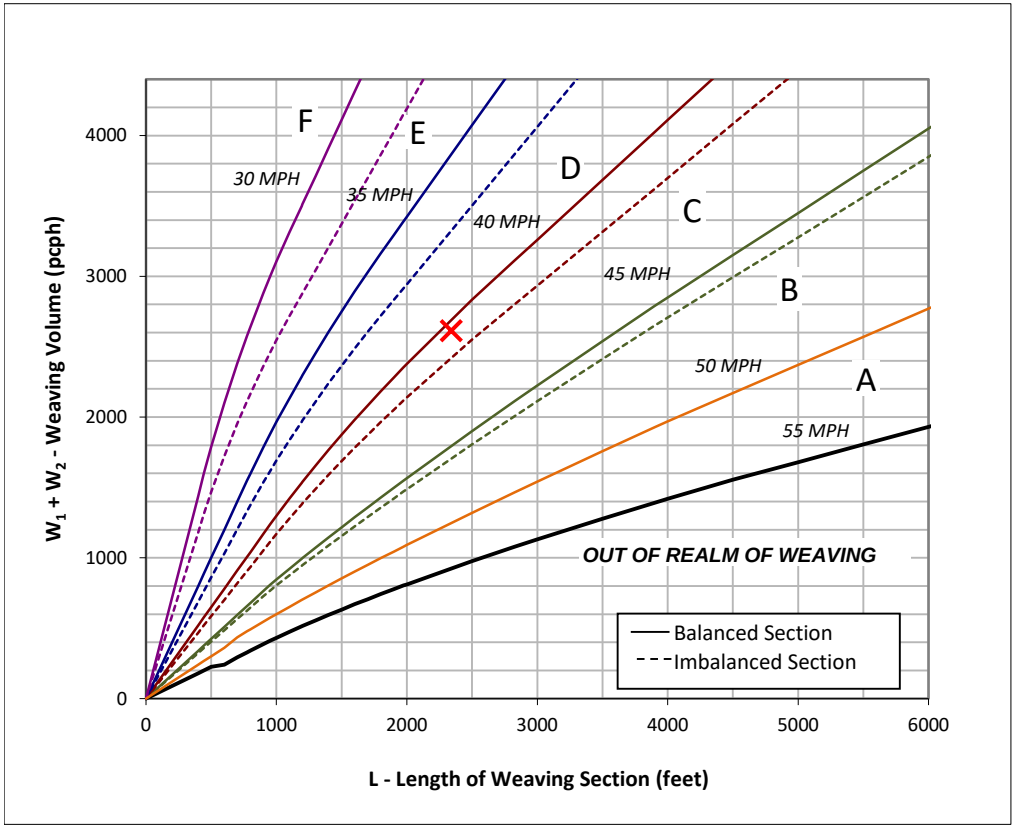
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	918	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1049
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.64
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.2
Speed 2 (S_2), mi/h	0.8	Density (D_{ML}), pc/mi/ln	17.7
Speed 2 (S_3), mi/h	4.2	Level of Service (LOS)	B

Leisch Method for Weaving Analysis

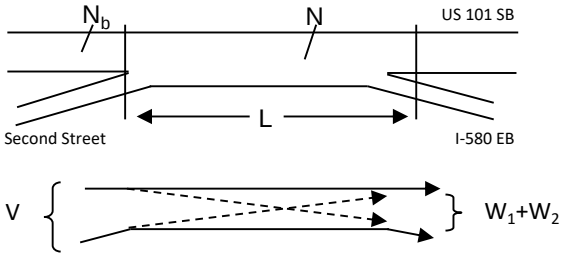
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Baseline + Project PM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	5,139	1,040	1,411
Truck Percentage	4%	3%	3%
PCE for Trucks	2.0	2.0	4.1
Volume (pcph)	5,365	1,066	1,548



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	40.4
4. Weaving Intensity Factor (k)	2.50
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,740
6. Level of Service (LOS)	E

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

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

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

Appendix E: Cumulative Conditions – Technical Calculations

Transportation Impact Study

for BioMarin 999 3rd Street

San Rafael Campus Expansion

April 5, 2019

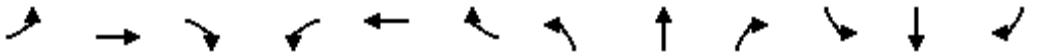
FEHR PEERS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	500	20	80	585	50	20	230	90	60	415	380
Future Volume (veh/h)	120	500	20	80	585	50	20	230	90	60	415	380
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1660	1660	1710	1660	1660	1710	1800	1678	1728	1800	1748	1728
Adj Flow Rate, veh/h	130	543	20	87	636	50	22	250	80	65	451	204
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	148	868	32	341	626	49	68	439	134	137	831	363
Arrive On Green	0.09	0.55	0.55	0.55	0.55	0.55	0.85	0.85	0.85	0.43	0.43	0.43
Sat Flow, veh/h	1581	1588	59	787	1515	119	39	1029	314	189	1947	851
Grp Volume(v), veh/h	130	0	563	87	0	686	352	0	0	390	0	330
Grp Sat Flow(s),veh/h/ln	1581	0	1647	787	0	1634	1382	0	0	1612	0	1376
Q Serve(g_s), s	6.1	0.0	17.7	5.7	0.0	31.0	0.0	0.0	0.0	4.2	0.0	13.6
Cycle Q Clear(g_c), s	6.1	0.0	17.7	13.4	0.0	31.0	5.3	0.0	0.0	12.9	0.0	13.6
Prop In Lane	1.00		0.04	1.00		0.07	0.06		0.23	0.17		0.62
Lane Grp Cap(c), veh/h	148	0	900	341	0	676	641	0	0	744	0	587
V/C Ratio(X)	0.88	0.00	0.63	0.26	0.00	1.02	0.55	0.00	0.00	0.52	0.00	0.56
Avail Cap(c_a), veh/h	148	0	900	341	0	676	641	0	0	744	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.64	0.00	0.64	0.84	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.6	0.0	11.7	15.5	0.0	16.9	3.5	0.0	0.0	15.9	0.0	16.2
Incr Delay (d2), s/veh	47.7	0.0	3.3	1.1	0.0	31.5	2.8	0.0	0.0	2.6	0.0	3.9
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	4.6	0.0	8.8	1.3	0.0	19.5	2.3	0.0	0.0	6.5	0.0	5.8
LnGrp Delay(d),s/veh	81.3	0.0	15.0	16.7	0.0	48.4	6.4	0.0	0.0	18.6	0.0	20.1
LnGrp LOS	F		B	B		F	A			B		C
Approach Vol, veh/h		693			773			352			720	
Approach Delay, s/veh		27.4			44.8			6.4			19.3	
Approach LOS		C			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.2		36.8	10.0	35.2		36.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 41		25.4	7.0	* 31		25.4
Max Q Clear Time (g_c+I1), s		19.7		7.3	8.1	33.0		15.6
Green Ext Time (p_c), s		5.5		3.1	0.0	0.0		4.4

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	515	90	40	230	0	0	0	0	245	1035	500
Future Volume (vph)	0	515	90	40	230	0	0	0	0	245	1035	500
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.97
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.98			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2711			1767						2960	1303
Flt Permitted		1.00			0.80						0.99	1.00
Satd. Flow (perm)		2711			1421						2960	1303
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	560	98	43	250	0	0	0	0	266	1125	543
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	639	0	0	293	0	0	0	0	0	1391	543
Confl. Peds. (#/hr)	15		22	22		15			16			1
Confl. Bikes (#/hr)			3			2			1			3
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		23.8			23.8						42.4	35.4
Effective Green, g (s)		23.8			23.8						42.4	35.4
Actuated g/C Ratio		0.32			0.32						0.57	0.47
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		860			450						1673	615
v/s Ratio Prot		c0.24									c0.47	
v/s Ratio Perm					0.21							0.42
v/c Ratio		0.74			0.65						0.83	0.88
Uniform Delay, d1		22.9			22.0						13.4	17.9
Progression Factor		0.74			1.33						1.00	1.00
Incremental Delay, d2		4.8			5.6						5.0	16.7
Delay (s)		21.8			34.9						18.3	34.7
Level of Service		C			C						B	C
Approach Delay (s)		21.8			34.9			0.0			22.9	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	400	30	330	170	340	10	110	1140	140	40
Future Volume (vph)	400	30	330	170	340	10	110	1140	140	40
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1494	1794	1615	1471			3430	1294	
Flt Permitted		0.58	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		919	1794	1615	1471			3430	1294	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	435	33	359	185	370	11	120	1239	152	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	468	359	185	381	0	0	1359	149	0
Confl. Peds. (#/hr)							13			6
Confl. Bikes (#/hr)					2	2				2
Parking (#/hr)				0				2		
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		34.8	34.8	19.8	19.8			31.8	31.8	
Effective Green, g (s)		34.8	34.8	19.8	19.8			31.8	31.8	
Actuated g/C Ratio		0.46	0.46	0.26	0.26			0.42	0.42	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		509	832	426	388			1454	548	
v/s Ratio Prot		c0.13	0.20	0.11	0.26					
v/s Ratio Perm		c0.29						0.40	0.12	
v/c Ratio		0.92	0.43	0.43	0.98			0.93	0.27	
Uniform Delay, d1		19.1	13.5	22.9	27.4			20.6	14.1	
Progression Factor		0.89	0.79	1.00	1.00			0.75	0.71	
Incremental Delay, d2		14.9	0.2	0.7	40.7			5.7	0.5	
Delay (s)		32.0	10.8	23.7	68.1			21.2	10.5	
Level of Service		C	B	C	E			C	B	
Approach Delay (s)			22.8	53.6				19.9		
Approach LOS			C	D				B		

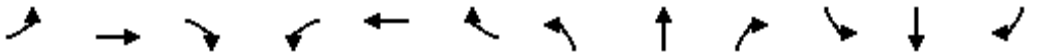
Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	320	40	70	290	70	20	240	70	50	415	50
Future Volume (veh/h)	40	320	40	70	290	70	20	240	70	50	415	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1398	1545	1530	1398	1485	1530	1440	1485	1469	1440	1485	1469
Adj Flow Rate, veh/h	43	348	36	76	315	63	22	261	62	54	451	49
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	409	42	143	356	71	72	563	128	97	610	64
Arrive On Green	0.30	0.30	0.30	0.10	0.10	0.10	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	792	1370	142	785	1193	239	37	973	221	77	1054	110
Grp Volume(v), veh/h	43	0	384	76	0	378	345	0	0	554	0	0
Grp Sat Flow(s),veh/h/ln	792	0	1512	785	0	1432	1231	0	0	1241	0	0
Q Serve(g_s), s	2.9	0.0	17.9	4.5	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.4	0.0	17.9	22.4	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.17	0.06		0.18	0.10		0.09
Lane Grp Cap(c), veh/h	126	0	452	143	0	428	764	0	0	771	0	0
V/C Ratio(X)	0.34	0.00	0.85	0.53	0.00	0.88	0.45	0.00	0.00	0.72	0.00	0.00
Avail Cap(c_a), veh/h	126	0	452	143	0	428	764	0	0	771	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	0.86	0.00	0.00	0.39	0.00	0.00
Uniform Delay (d), s/veh	36.5	0.0	24.7	43.6	0.0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	7.2	0.0	17.9	12.7	0.0	21.4	1.7	0.0	0.0	2.3	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	1.1	0.0	9.7	2.1	0.0	10.3	0.4	0.0	0.0	0.5	0.0	0.0
LnGrp Delay(d),s/veh	43.7	0.0	42.6	56.3	0.0	54.0	1.7	0.0	0.0	2.3	0.0	0.0
LnGrp LOS	D		D	E		D	A			A		
Approach Vol, veh/h		427			454			345			554	
Approach Delay, s/veh		42.7			54.3			1.7			2.3	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.0		48.0		27.0		48.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		22.4		43.4		22.4		43.4
Max Q Clear Time (g_c+I1), s		24.4		2.0		24.4		2.0
Green Ext Time (p_c), s		0.0		1.7		0.0		2.9

Intersection Summary	
HCM 2010 Ctrl Delay	25.2
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	260	180	40	245	0	0	0	0	50	990	125
Future Volume (vph)	0	260	180	40	245	0	0	0	0	50	990	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1665			1769						4118	1127
Flt Permitted		1.00			0.90						1.00	1.00
Satd. Flow (perm)		1665			1605						4118	1127
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	283	196	43	266	0	0	0	0	54	1076	136
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	466	0	0	309	0	0	0	0	0	1130	136
Confl. Peds. (#/hr)			15	15		14			22	22		10
Confl. Bikes (#/hr)			4			2			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		36.8			36.8						29.4	22.4
Effective Green, g (s)		36.8			36.8						29.4	22.4
Actuated g/C Ratio		0.49			0.49						0.39	0.30
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		816			787						1614	336
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.19						0.27	0.12
v/c Ratio		0.57			0.39						0.70	0.40
Uniform Delay, d1		13.5			12.0						19.1	21.0
Progression Factor		0.46			1.32						0.62	0.69
Incremental Delay, d2		2.8			0.8						1.4	2.0
Delay (s)		8.9			16.8						13.2	16.5
Level of Service		A			B						B	B
Approach Delay (s)		8.9			16.8			0.0			13.6	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	110	0	0	160	130	150	1180	20	0	0	0
Future Volume (veh/h)	150	110	0	0	160	130	150	1180	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1620	1573	1620			
Adj Flow Rate, veh/h	163	120	0	0	174	102	163	1283	21			
Adj No. of Lanes	1	1	0	0	1	0	0	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0			
Cap, veh/h	219	491	0	0	256	150	166	1380	24			
Arrive On Green	0.10	0.10	0.00	0.00	0.31	0.31	0.19	0.19	0.19			
Sat Flow, veh/h	977	1573	0	0	819	480	294	2441	42			
Grp Volume(v), veh/h	163	120	0	0	0	276	767	0	700			
Grp Sat Flow(s),veh/h/ln	977	1573	0	0	0	1299	1385	0	1392			
Q Serve(g_s), s	9.5	5.3	0.0	0.0	0.0	13.9	41.3	0.0	36.8			
Cycle Q Clear(g_c), s	23.4	5.3	0.0	0.0	0.0	13.9	41.3	0.0	36.8			
Prop In Lane	1.00		0.00	0.00		0.37	0.21		0.03			
Lane Grp Cap(c), veh/h	219	491	0	0	0	405	783	0	787			
V/C Ratio(X)	0.74	0.24	0.00	0.00	0.00	0.68	0.98	0.00	0.89			
Avail Cap(c_a), veh/h	219	491	0	0	0	405	783	0	787			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.79	0.79	0.00	0.00	0.00	1.00	0.09	0.00	0.09			
Uniform Delay (d), s/veh	41.7	25.5	0.0	0.0	0.0	22.5	30.1	0.0	28.2			
Incr Delay (d2), s/veh	10.3	0.2	0.0	0.0	0.0	4.6	5.9	0.0	1.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.0	2.3	0.0	0.0	0.0	5.5	17.1	0.0	14.6			
LnGrp Delay(d),s/veh	52.0	25.7	0.0	0.0	0.0	27.1	36.0	0.0	29.8			
LnGrp LOS	D	C				C	D		C			
Approach Vol, veh/h		283			276			1467				
Approach Delay, s/veh		40.9			27.1			33.1				
Approach LOS		D			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		23.4		42.4		23.4		
Max Q Clear Time (g_c+I1), s		25.4		43.3		15.9		
Green Ext Time (p_c), s		0.0		0.0		0.7		

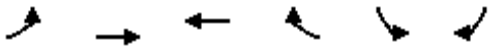
Intersection Summary	
HCM 2010 Ctrl Delay	33.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	265	20	80	340	60	20	240	70	85	365	80
Future Volume (veh/h)	40	265	20	80	340	60	20	240	70	85	365	80
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	0.97		0.91	0.97		0.92	0.99		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1573	1510	1620	1573	1573	1620	1620	1573	1555	1620	1573	1555
Adj Flow Rate, veh/h	43	288	19	87	370	56	22	261	62	92	397	77
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	117	423	28	209	400	60	74	598	136	145	540	99
Arrive On Green	0.30	0.30	0.30	0.10	0.10	0.10	0.19	0.19	0.19	1.00	1.00	1.00
Sat Flow, veh/h	853	1390	92	925	1314	199	39	1024	233	153	924	170
Grp Volume(v), veh/h	43	0	307	87	0	426	345	0	0	566	0	0
Grp Sat Flow(s),veh/h/ln	853	0	1482	925	0	1513	1296	0	0	1247	0	0
Q Serve(g_s), s	1.9	0.0	13.6	7.0	0.0	20.9	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.8	0.0	13.6	20.6	0.0	20.9	17.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.13	0.06		0.18	0.16		0.14
Lane Grp Cap(c), veh/h	117	0	450	209	0	460	808	0	0	784	0	0
V/C Ratio(X)	0.37	0.00	0.68	0.42	0.00	0.93	0.43	0.00	0.00	0.72	0.00	0.00
Avail Cap(c_a), veh/h	117	0	450	209	0	460	808	0	0	784	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.84	0.00	0.00	0.50	0.00	0.00
Uniform Delay (d), s/veh	37.0	0.0	22.9	39.5	0.0	32.9	19.5	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	8.7	0.0	8.1	5.5	0.0	25.5	1.4	0.0	0.0	2.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	6.6	2.1	0.0	12.1	6.6	0.0	0.0	0.6	0.0	0.0
LnGrp Delay(d),s/veh	45.7	0.0	31.0	45.1	0.0	58.4	20.9	0.0	0.0	2.9	0.0	0.0
LnGrp LOS	D		C	D		E	C			A		
Approach Vol, veh/h		350			513			345			566	
Approach Delay, s/veh		32.8			56.1			20.9			2.9	
Approach LOS		C			E			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.0		48.0		27.0		48.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 23		* 44		* 23		* 44
Max Q Clear Time (g_c+I1), s		24.8		19.1		22.9		2.0
Green Ext Time (p_c), s		0.0		3.3		0.0		7.2

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

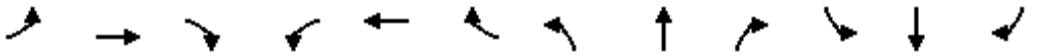
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Traffic Volume (vph)	0	500	430	0	0	55
Future Volume (vph)	0	500	430	0	0	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6	5.6			5.2
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00			0.87
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	1.00			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1573	1573			1188
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1573	1573			1188
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	467	0	0	60
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	0	543	467	0	0	11
Confl. Peds. (#/hr)				39		46
Confl. Bikes (#/hr)				4		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		50.3	50.4			13.8
Effective Green, g (s)		50.3	50.4			13.8
Actuated g/C Ratio		0.67	0.67			0.18
Clearance Time (s)						5.2
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1054	1057			218
v/s Ratio Prot		c0.35	c0.30			
v/s Ratio Perm						0.01
v/c Ratio		0.52	0.44			0.05
Uniform Delay, d1		6.2	5.7			25.2
Progression Factor		1.32	0.48			1.00
Incremental Delay, d2		0.3	0.2			0.1
Delay (s)		8.6	2.9			25.3
Level of Service		A	A			C
Approach Delay (s)		8.6	2.9		25.3	
Approach LOS		A	A		C	

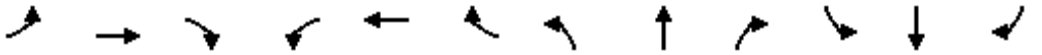
Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	305	200	200	305	0	0	0	0	110	910	190
Future Volume (vph)	0	305	200	200	305	0	0	0	0	110	910	190
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	0.89
Flpb, ped/bikes		1.00	1.00	0.98	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1625	1181	1607	1520						4263	1184
Flt Permitted		1.00	1.00	0.49	1.00						0.99	1.00
Satd. Flow (perm)		1625	1181	824	1520						4263	1184
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	332	217	217	332	0	0	0	0	120	989	207
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	332	190	217	332	0	0	0	0	0	1109	207
Confl. Peds. (#/hr)			40	40		22			9	9		30
Confl. Bikes (#/hr)			8			4						2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		35.8	35.8	35.8	35.8						30.4	23.4
Effective Green, g (s)		35.8	35.8	35.8	35.8						30.4	23.4
Actuated g/C Ratio		0.48	0.48	0.48	0.48						0.41	0.31
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		775	563	393	725						1727	369
v/s Ratio Prot		0.20			0.22							
v/s Ratio Perm			0.16	c0.26							0.26	0.17
v/c Ratio		0.43	0.34	0.55	0.46						0.64	0.56
Uniform Delay, d1		12.9	12.2	13.9	13.1						17.9	21.5
Progression Factor		0.49	0.42	1.04	1.07						0.34	0.45
Incremental Delay, d2		1.5	1.4	3.8	1.4						1.4	4.5
Delay (s)		7.9	6.6	18.2	15.4						7.5	14.1
Level of Service		A	A	B	B						A	B
Approach Delay (s)		7.4			16.5			0.0			8.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

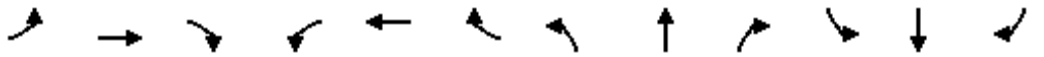


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	240	0	0	380	70	130	1140	50	0	0	0
Future Volume (veh/h)	170	240	0	0	380	70	130	1140	50	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1510	1573	1620			
Adj Flow Rate, veh/h	185	261	0	0	413	66	141	1239	50			
Adj No. of Lanes	1	1	0	0	1	0	1	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	137	625	0	0	465	74	706	1355	55			
Arrive On Green	0.79	0.79	0.00	0.00	0.13	0.13	0.16	0.16	0.16			
Sat Flow, veh/h	813	1573	0	0	1170	187	1438	2762	111			
Grp Volume(v), veh/h	185	261	0	0	0	479	141	670	619			
Grp Sat Flow(s),veh/h/ln	813	1573	0	0	0	1357	1438	1494	1379			
Q Serve(g_s), s	3.8	3.8	0.0	0.0	0.0	26.0	6.4	33.1	33.1			
Cycle Q Clear(g_c), s	29.8	3.8	0.0	0.0	0.0	26.0	6.4	33.1	33.1			
Prop In Lane	1.00		0.00	0.00		0.14	1.00		0.08			
Lane Grp Cap(c), veh/h	137	625	0	0	0	539	706	733	677			
V/C Ratio(X)	1.35	0.42	0.00	0.00	0.00	0.89	0.20	0.91	0.91			
Avail Cap(c_a), veh/h	137	625	0	0	0	539	706	733	677			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.91	0.91	0.00	0.00	0.00	1.00	0.24	0.24	0.24			
Uniform Delay (d), s/veh	22.0	5.0	0.0	0.0	0.0	31.0	18.7	29.9	29.9			
Incr Delay (d2), s/veh	196.0	1.9	0.0	0.0	0.0	19.3	0.1	5.4	5.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	10.2	1.8	0.0	0.0	0.0	12.7	2.6	14.8	13.8			
LnGrp Delay(d),s/veh	218.1	6.9	0.0	0.0	0.0	50.2	18.8	35.2	35.7			
LnGrp LOS	F	A				D	B	D	D			
Approach Vol, veh/h		446			479			1430				
Approach Delay, s/veh		94.5			50.2			33.8				
Approach LOS		F			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		34.0		41.0		34.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 30		* 37		* 30		
Max Q Clear Time (g_c+I1), s		31.8		35.1		28.0		
Green Ext Time (p_c), s		0.0		1.1		0.4		

Intersection Summary		
HCM 2010 Ctrl Delay		48.6
HCM 2010 LOS		D

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	320	1220	0	0	0	0	0	240	30
Future Volume (veh/h)	0	0	0	320	1220	0	0	0	0	0	240	30
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1530	1485	0				0	1485	1530
Adj Flow Rate, veh/h				348	1326	0				0	261	17
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				586	2028	0				0	525	34
Arrive On Green				0.22	0.22	0.00				0.00	0.21	0.21
Sat Flow, veh/h				755	3123	0				0	2611	164
Grp Volume(v), veh/h				598	1076	0				0	144	134
Grp Sat Flow(s),veh/h/ln				1297	1230	0				0	1411	1290
Q Serve(g_s), s				31.7	29.8	0.0				0.0	6.8	6.9
Cycle Q Clear(g_c), s				31.7	29.8	0.0				0.0	6.8	6.9
Prop In Lane				0.58		0.00				0.00		0.13
Lane Grp Cap(c), veh/h				952	1662	0				0	292	267
V/C Ratio(X)				0.63	0.65	0.00				0.00	0.49	0.50
Avail Cap(c_a), veh/h				952	1662	0				0	440	402
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.68	0.68	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				21.8	21.0	0.0				0.0	26.3	26.3
Incr Delay (d2), s/veh				2.1	1.3	0.0				0.0	1.3	1.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.9	10.5	0.0				0.0	2.8	2.6
LnGrp Delay(d),s/veh				23.9	22.4	0.0				0.0	27.6	27.8
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1674						278	
Approach Delay, s/veh					22.9						27.6	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.9		20.1				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 43		23.4				
Max Q Clear Time (g_c+I1), s		33.7		8.9				
Green Ext Time (p_c), s		5.6		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1415	120	110	250	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1415	120	110	250	0	0	0	0
Number				5	2	12	7	4	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				0	1398	1398	1440	1398	0			
Adj Flow Rate, veh/h				0	1538	97	120	272	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	2536	774	218	404	0			
Arrive On Green				0.00	0.22	0.22	0.07	0.07	0.00			
Sat Flow, veh/h				0	3943	1164	640	1870	0			
Grp Volume(v), veh/h				0	1538	97	216	176	0			
Grp Sat Flow(s),veh/h/ln				0	1272	1164	1238	1209	0			
Q Serve(g_s), s				0.0	27.2	5.0	11.7	10.7	0.0			
Cycle Q Clear(g_c), s				0.0	27.2	5.0	12.8	10.7	0.0			
Prop In Lane				0.00		1.00	0.56		0.00			
Lane Grp Cap(c), veh/h				0	2536	774	351	270	0			
V/C Ratio(X)				0.00	0.61	0.13	0.61	0.65	0.00			
Avail Cap(c_a), veh/h				0	2536	774	421	338	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	0.57	0.57	0.79	0.79	0.00			
Uniform Delay (d), s/veh				0.0	20.4	11.8	32.8	31.9	0.0			
Incr Delay (d2), s/veh				0.0	0.6	0.2	1.5	2.5	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	9.8	1.7	4.6	3.7	0.0			
LnGrp Delay(d),s/veh				0.0	21.1	12.0	34.3	34.4	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1635			392				
Approach Delay, s/veh					20.5			34.3				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.0		21.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 46		* 21				
Max Q Clear Time (g_c+I1), s		29.2		14.8				
Green Ext Time (p_c), s		8.4		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	23.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	1470	0	0	0	0	0	200	60
Future Volume (veh/h)	0	0	0	90	1470	0	0	0	0	0	200	60
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1398	0				0	1398	1440
Adj Flow Rate, veh/h				98	1598	0				0	217	45
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				165	2266	0				0	486	97
Arrive On Green				0.21	0.21	0.00				0.00	0.24	0.24
Sat Flow, veh/h				170	3616	0				0	2091	401
Grp Volume(v), veh/h				630	1066	0				0	139	123
Grp Sat Flow(s),veh/h/ln				1356	1158	0				0	1328	1094
Q Serve(g_s), s				23.1	32.0	0.0				0.0	6.7	7.2
Cycle Q Clear(g_c), s				32.3	32.0	0.0				0.0	6.7	7.2
Prop In Lane				0.16		0.00				0.00		0.37
Lane Grp Cap(c), veh/h				933	1499	0				0	320	263
V/C Ratio(X)				0.68	0.71	0.00				0.00	0.44	0.47
Avail Cap(c_a), veh/h				933	1499	0				0	411	338
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.69	0.69	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.0	23.0	0.0				0.0	24.2	24.3
Incr Delay (d2), s/veh				2.7	2.0	0.0				0.0	0.9	1.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.9	10.7	0.0				0.0	2.5	2.3
LnGrp Delay(d),s/veh				25.7	25.0	0.0				0.0	25.1	25.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1696						262	
Approach Delay, s/veh					25.3						25.3	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		52.7		22.3				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 43		* 23				
Max Q Clear Time (g_c+I1), s		34.3		9.2				
Green Ext Time (p_c), s		5.6		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	40	1310	80	210	135	0	0	140	30
Future Volume (veh/h)	0	0	0	40	1310	80	210	135	0	0	140	30
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				43	1424	78	228	147	0	0	152	21
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				73	2568	145	303	606	0	0	302	42
Arrive On Green				0.18	0.18	0.18	0.02	0.11	0.00	0.00	0.22	0.22
Sat Flow, veh/h				131	4617	262	1748	1835	0	0	1389	192
Grp Volume(v), veh/h				570	474	500	228	147	0	0	0	173
Grp Sat Flow(s),veh/h/ln				1741	1590	1678	1748	1835	0	0	0	1581
Q Serve(g_s), s				22.5	20.2	20.3	0.6	5.5	0.0	0.0	0.0	7.2
Cycle Q Clear(g_c), s				22.5	20.2	20.3	0.6	5.5	0.0	0.0	0.0	7.2
Prop In Lane				0.08		0.16	1.00		0.00	0.00		0.12
Lane Grp Cap(c), veh/h				968	885	934	303	606	0	0	0	344
V/C Ratio(X)				0.59	0.54	0.54	0.75	0.24	0.00	0.00	0.00	0.50
Avail Cap(c_a), veh/h				968	885	934	443	807	0	0	0	390
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.84	0.84	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				22.8	21.9	21.9	33.1	24.8	0.0	0.0	0.0	25.8
Incr Delay (d2), s/veh				2.6	2.3	2.2	6.8	0.4	0.0	0.0	0.0	2.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.5	9.5	10.0	5.2	2.9	0.0	0.0	0.0	3.4
LnGrp Delay(d),s/veh				25.4	24.2	24.1	40.0	25.2	0.0	0.0	0.0	28.2
LnGrp LOS				C	C	C	D	C				C
Approach Vol, veh/h					1545			375			173	
Approach Delay, s/veh					24.6			34.2			28.2	
Approach LOS					C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.0	20.8		46.2		28.8
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			10.0	18.5		33.5		33.0
Max Q Clear Time (g_c+I1), s			2.6	9.2		24.5		7.5
Green Ext Time (p_c), s			1.0	0.8		7.2		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	26.6
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	20	20	97.5%	13.5	7.9	B
	Through						
	Right Turn						
	Subtotal	20	20	97.5%	13.5	7.9	B
SB	Left Turn						
	Through						
	Right Turn	10	11	106.7%	13.4	6.9	B
	Subtotal	10	11	106.7%	13.4	6.9	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	30	26	87.1%	2.4	0.5	A
	Through	1,400	1,346	96.2%	1.6	0.2	A
	Right Turn	10	13	128.8%	1.1	0.1	A
	Subtotal	1,440	1,385	96.2%	1.6	0.2	A
Total		1,470	1,415	96.3%	1.8	0.1	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	80	80	99.8%	27.3	6.9	C
	Through	10	10	95.7%	26.2	15.1	C
	Right Turn						
	Subtotal	90	89	99.4%	27.6	7.2	C
SB	Left Turn						
	Through	40	42	104.0%	35.3	11.1	D
	Right Turn	10	10	99.4%	13.4	10.6	B
	Subtotal	50	52	103.0%	31.3	10.2	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	340	324	95.2%	9.0	2.8	A
	Through	1,365	1,312	96.1%	5.8	0.9	A
	Right Turn	30	30	99.4%	6.1	2.5	A
	Subtotal	1,735	1,666	96.0%	6.4	1.1	A
Total		1,875	1,807	96.3%	8.2	0.9	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	175	1615	75	40	195	0	0	290	160
Future Volume (veh/h)	0	0	0	175	1615	75	40	195	0	0	290	160
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	1.00		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1620	1573	1620	1620	1573	0	0	1510	1555
Adj Flow Rate, veh/h				190	1755	75	43	212	0	0	315	172
Adj No. of Lanes				0	3	0	0	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				178	1757	77	67	249	0	0	342	187
Arrive On Green				0.15	0.15	0.15	0.14	0.14	0.00	0.00	0.29	0.29
Sat Flow, veh/h				399	3934	173	24	574	0	0	788	431
Grp Volume(v), veh/h				740	619	661	255	0	0	0	0	487
Grp Sat Flow(s),veh/h/ln				1553	1431	1521	598	0	0	0	0	1219
Q Serve(g_s), s				33.5	32.3	32.5	3.2	0.0	0.0	0.0	0.0	29.0
Cycle Q Clear(g_c), s				33.5	32.3	32.5	32.3	0.0	0.0	0.0	0.0	29.0
Prop In Lane				0.26		0.11	0.17		0.00	0.00		0.35
Lane Grp Cap(c), veh/h				694	639	679	315	0	0	0	0	528
V/C Ratio(X)				1.07	0.97	0.97	0.81	0.00	0.00	0.00	0.00	0.92
Avail Cap(c_a), veh/h				694	639	679	315	0	0	0	0	528
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	0.67	0.67
Upstream Filter(I)				0.37	0.37	0.37	1.00	0.00	0.00	0.00	0.00	0.45
Uniform Delay (d), s/veh				32.0	31.4	31.5	26.5	0.0	0.0	0.0	0.0	25.4
Incr Delay (d2), s/veh				41.1	15.0	15.2	19.7	0.0	0.0	0.0	0.0	13.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				22.3	15.4	16.5	7.0	0.0	0.0	0.0	0.0	11.7
LnGrp Delay(d),s/veh				73.1	46.4	46.8	46.2	0.0	0.0	0.0	0.0	38.5
LnGrp LOS				F	D	D	D					D
Approach Vol, veh/h					2020			255			487	
Approach Delay, s/veh					56.3			46.2			38.5	
Approach LOS					E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				37.0		38.0		37.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				32.5		33.5		32.5
Max Q Clear Time (g_c+I1), s				34.3		35.5		31.0
Green Ext Time (p_c), s				0.0		0.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	52.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	295	1800	30	50	50	0	0	0	0
Future Volume (vph)	0	0	0	295	1800	30	50	50	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6				
Lane Util. Factor					0.91		1.00	1.00				
Frpb, ped/bikes					1.00		1.00	1.00				
Flpb, ped/bikes					0.98		0.93	1.00				
Frt					1.00		1.00	1.00				
Flt Protected					0.99		0.95	1.00				
Satd. Flow (prot)					3690		1057	1237				
Flt Permitted					0.99		0.95	1.00				
Satd. Flow (perm)					3690		1057	1237				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	321	1957	33	54	54	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2309	0	54	54	0	0	0	0
Confl. Peds. (#/hr)			73	73		38	49		63			49
Confl. Bikes (#/hr)						2			2			2
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA				
Protected Phases					6			4				
Permitted Phases				6			4					
Actuated Green, G (s)					51.8		19.0	19.0				
Effective Green, g (s)					51.8		19.0	19.0				
Actuated g/C Ratio					0.58		0.21	0.21				
Clearance Time (s)					11.6		7.6	7.6				
Vehicle Extension (s)					5.0		5.0	5.0				
Lane Grp Cap (vph)					2123		223	261				
v/s Ratio Prot								0.04				
v/s Ratio Perm					0.63		c0.05					
v/c Ratio					1.09		0.24	0.21				
Uniform Delay, d1					19.1		29.5	29.3				
Progression Factor					1.00		1.00	1.00				
Incremental Delay, d2					48.1		1.2	0.8				
Delay (s)					67.2		30.7	30.1				
Level of Service					E		C	C				
Approach Delay (s)		0.0			67.2			30.4			0.0	
Approach LOS		A			E			C			A	

Intersection Summary			
HCM 2000 Control Delay	65.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	145.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	455	1590	0	0	0	0	0	825	485
Future Volume (veh/h)	0	0	0	455	1590	0	0	0	0	0	825	485
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.84
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1545	1573	0				0	1573	1485
Adj Flow Rate, veh/h				495	1728	0				0	897	518
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				730	2033	0				0	1929	474
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1471	4718	0				0	4435	1055
Grp Volume(v), veh/h				495	1728	0				0	897	518
Grp Sat Flow(s),veh/h/ln				1471	1573	0				0	1431	1055
Q Serve(g_s), s				24.3	26.8	0.0				0.0	14.3	33.7
Cycle Q Clear(g_c), s				24.3	26.8	0.0				0.0	14.3	33.7
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				730	2033	0				0	1929	474
V/C Ratio(X)				0.68	0.85	0.00				0.00	0.47	1.09
Avail Cap(c_a), veh/h				743	2076	0				0	1929	474
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				0.24	0.24	0.00				0.00	0.78	0.78
Uniform Delay (d), s/veh				28.8	29.8	0.0				0.0	23.7	31.9
Incr Delay (d2), s/veh				0.6	0.9	0.0				0.0	0.6	64.6
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.0	11.8	0.0				0.0	5.8	18.3
LnGrp Delay(d),s/veh				29.3	30.7	0.0				0.0	24.3	96.5
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2223						1415	
Approach Delay, s/veh					30.4						50.7	
Approach LOS					C						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						36.3		38.7
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						33.0		33.0
Max Q Clear Time (g_c+I1), s						28.8		35.7
Green Ext Time (p_c), s						3.5		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		38.3
HCM 2010 LOS		D

Notes
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1095	120	960	1205	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1095	120	960	1205	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1485	1485	1398	1398	0			
Adj Flow Rate, veh/h				0	1190	104	1043	1310	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	1329	388	1470	1544	0			
Arrive On Green				0.00	0.33	0.33	0.18	0.18	0.00			
Sat Flow, veh/h				0	4189	1184	2663	2796	0			
Grp Volume(v), veh/h				0	1190	104	1043	1310	0			
Grp Sat Flow(s),veh/h/ln				0	1352	1184	1331	1398	0			
Q Serve(g_s), s				0.0	20.9	4.9	27.6	34.0	0.0			
Cycle Q Clear(g_c), s				0.0	20.9	4.9	27.6	34.0	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1329	388	1470	1544	0			
V/C Ratio(X)				0.00	0.90	0.27	0.71	0.85	0.00			
Avail Cap(c_a), veh/h				0	1379	403	1470	1544	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	0.09	0.09	0.00			
Uniform Delay (d), s/veh				0.0	24.0	18.6	25.0	27.6	0.0			
Incr Delay (d2), s/veh				0.0	7.8	0.4	0.3	0.6	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	8.8	1.6	10.3	13.3	0.0			
LnGrp Delay(d),s/veh				0.0	31.8	18.9	25.3	28.2	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1294			2353				
Approach Delay, s/veh					30.7			26.9				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				45.9		29.1		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				40.5		25.5		
Max Q Clear Time (g_c+I1), s				36.0		22.9		
Green Ext Time (p_c), s				3.9		1.6		

Intersection Summary	
HCM 2010 Ctrl Delay	28.3
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2050	90	0	0	0	0	0	270	80	475	0
Future Volume (veh/h)	0	2050	90	0	0	0	0	0	270	80	475	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97	0.99		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	0	1660	1710				0	1573	1620	1748	1748	0
Adj Flow Rate, veh/h	0	2228	91				0	0	277	87	516	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	420	246	565	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.32	0.11	0.11	0.00
Sat Flow, veh/h		0					0	0	1300	1072	1748	0
Grp Volume(v), veh/h		0.0					0	0	277	87	516	0
Grp Sat Flow(s),veh/h/ln							0	0	1300	1072	1748	0
Q Serve(g_s), s							0.0	0.0	13.7	6.0	21.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	13.7	19.7	21.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	420	246	565	0
V/C Ratio(X)							0.00	0.00	0.66	0.35	0.91	0.00
Avail Cap(c_a), veh/h							0	0	440	263	592	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.86	0.86	0.00
Uniform Delay (d), s/veh							0.0	0.0	21.8	38.2	32.5	0.0
Incr Delay (d2), s/veh							0.0	0.0	2.6	0.3	15.7	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							0.0	0.0	5.2	1.8	13.1	0.0
LnGrp Delay(d),s/veh							0.0	0.0	24.4	38.5	48.2	0.0
LnGrp LOS									C	D	D	
Approach Vol, veh/h								277			603	
Approach Delay, s/veh								24.4			46.8	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				28.8				28.8
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				25.4				25.4
Max Q Clear Time (g_c+I1), s				23.9				15.7
Green Ext Time (p_c), s				0.3				0.6

Intersection Summary	
HCM 2010 Ctrl Delay	39.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2290	0	0	0	0	0	225	100	0	0	0
Future Volume (veh/h)	110	2290	0	0	0	0	0	225	100	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1485	0				0	1485	1440			
Adj Flow Rate, veh/h	120	2489	0				0	245	107			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	166	2789	0				0	361	152			
Arrive On Green	0.23	0.23	0.00				0.00	0.18	0.18			
Sat Flow, veh/h	160	3989	0				0	1966	827			
Grp Volume(v), veh/h	923	1686	0				0	183	169			
Grp Sat Flow(s),veh/h/ln	1445	1352	0				0	1485	1308			
Q Serve(g_s), s	39.1	45.3	0.0				0.0	8.6	9.1			
Cycle Q Clear(g_c), s	46.6	45.3	0.0				0.0	8.6	9.1			
Prop In Lane	0.13		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	1065	1890	0				0	273	240			
V/C Ratio(X)	0.87	0.89	0.00				0.00	0.67	0.70			
Avail Cap(c_a), veh/h	1065	1890	0				0	412	363			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.17	0.17	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	26.5	26.1	0.0				0.0	28.5	28.7			
Incr Delay (d2), s/veh	1.8	1.3	0.0				0.0	6.0	7.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	19.3	17.3	0.0				0.0	4.0	3.8			
LnGrp Delay(d),s/veh	28.3	27.4	0.0				0.0	34.5	36.5			
LnGrp LOS	C	C						C	D			
Approach Vol, veh/h		2609						352				
Approach Delay, s/veh		27.7						35.5				
Approach LOS		C						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				18.0		57.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		45.4		
Max Q Clear Time (g_c+I1), s				11.1		48.6		
Green Ext Time (p_c), s				2.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2315	70	0	0	0	0	0	170	70	230	0
Future Volume (veh/h)	0	2315	70	0	0	0	0	0	170	70	230	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.93	0.97		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	0	1485	1382				0	1573	1591	1545	1485	0
Adj Flow Rate, veh/h	0	2516	72				0	0	165	76	250	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	291	216	346	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.23	0.08	0.08	0.00
Sat Flow, veh/h		0					0	0	1247	1036	1485	0
Grp Volume(v), veh/h		0.0					0	0	165	76	250	0
Grp Sat Flow(s),veh/h/ln							0	0	1247	1036	1485	0
Q Serve(g_s), s							0.0	0.0	8.8	5.4	12.3	0.0
Cycle Q Clear(g_c), s							0.0	0.0	8.8	14.2	12.3	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	291	216	346	0
V/C Ratio(X)							0.00	0.00	0.57	0.35	0.72	0.00
Avail Cap(c_a), veh/h							0	0	357	272	426	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh							0.0	0.0	25.4	37.4	32.2	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.7	0.3	2.8	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	3.1	1.6	5.3	0.0
LnGrp Delay(d),s/veh							0.0	0.0	26.1	37.7	35.1	0.0
LnGrp LOS									C	D	D	
Approach Vol, veh/h								165			326	
Approach Delay, s/veh								26.1			35.7	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				22.0				22.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				21.5				21.5
Max Q Clear Time (g_c+I1), s				16.2				10.8
Green Ext Time (p_c), s				0.4				0.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	2240	205	0	0	0	0	260	20	50	125	0
Future Volume (veh/h)	100	2240	205	0	0	0	0	260	20	50	125	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	109	2435	210				0	283	13	54	136	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	124	2928	255				0	448	20	156	366	0
Arrive On Green	0.22	0.22	0.22				0.00	0.15	0.15	0.01	0.07	0.00
Sat Flow, veh/h	188	4420	384				0	3147	140	1581	1660	0
Grp Volume(v), veh/h	1009	836	909				0	145	151	54	136	0
Grp Sat Flow(s),veh/h/ln	1738	1590	1664				0	1577	1627	1581	1660	0
Q Serve(g_s), s	42.1	37.3	39.1				0.0	6.5	6.6	0.0	5.9	0.0
Cycle Q Clear(g_c), s	42.1	37.3	39.1				0.0	6.5	6.6	0.0	5.9	0.0
Prop In Lane	0.11		0.23				0.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	1152	1054	1102				0	231	238	156	366	0
V/C Ratio(X)	0.88	0.79	0.82				0.00	0.63	0.64	0.35	0.37	0.00
Avail Cap(c_a), veh/h	1152	1054	1102				0	336	347	170	487	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	26.3	24.5	25.1				0.0	30.1	30.1	35.9	29.8	0.0
Incr Delay (d2), s/veh	1.0	0.6	0.7				0.0	5.9	5.9	2.3	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.6	16.6	18.3				0.0	3.2	3.3	1.2	2.8	0.0
LnGrp Delay(d),s/veh	27.3	25.0	25.8				0.0	36.0	36.0	38.2	30.9	0.0
LnGrp LOS	C	C	C					D	D	D	C	
Approach Vol, veh/h		2754						296			190	
Approach Delay, s/veh		26.1						36.0			33.0	
Approach LOS		C						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		54.3		20.7			5.6	15.2
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		44.2		* 22			* 2	* 16
Max Q Clear Time (g_c+I1), s		44.1		7.9			2.0	8.6
Green Ext Time (p_c), s		0.1		0.8			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.4
HCM 2010 LOS	C

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	30	26	85.9%	21.2	10.6	C
	Through						
	Right Turn						
	Subtotal	30	26	85.9%	21.2	10.6	C
EB	Left Turn	20	19	95.7%	3.0	0.8	A
	Through	2,295	2,253	98.1%	2.4	0.2	A
	Right Turn						
	Subtotal	2,315	2,272	98.1%	2.4	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,345	2,297	98.0%	2.6	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	50	53	106.7%	20.7	3.7	C
	Right Turn	270	272	100.6%	22.7	4.6	C
	Subtotal	320	325	101.5%	22.5	4.0	C
SB	Left Turn	70	69	98.3%	33.1	3.2	C
	Through	310	300	96.6%	29.9	4.2	C
	Right Turn						
	Subtotal	380	368	96.9%	30.6	3.4	C
EB	Left Turn	40	37	92.9%	12.3	3.7	B
	Through	2,275	2,222	97.7%	10.5	1.0	B
	Right Turn	50	52	104.5%	9.0	2.3	A
	Subtotal	2,365	2,311	97.7%	10.5	1.1	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,065	3,004	98.0%	14.3	1.4	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	2435	40	0	0	0	0	110	50	140	270	0
Future Volume (veh/h)	140	2435	40	0	0	0	0	110	50	140	270	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1398	1382	1342	0
Adj Flow Rate, veh/h	152	2647	26				0	120	41	152	293	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	147	2755	657				0	429	352	245	458	0
Arrive On Green	0.19	0.19	0.19				0.00	0.31	0.31	0.10	0.10	0.00
Sat Flow, veh/h	253	4739	1130				0	1398	1149	539	1556	0
Grp Volume(v), veh/h	832	1967	26				0	120	41	230	215	0
Grp Sat Flow(s),veh/h/ln	1385	1202	1130				0	1398	1149	874	1160	0
Q Serve(g_s), s	43.6	40.3	1.4				0.0	4.9	1.9	15.1	13.3	0.0
Cycle Q Clear(g_c), s	43.6	40.3	1.4				0.0	4.9	1.9	20.0	13.3	0.0
Prop In Lane	0.18		1.00				0.00		1.00	0.66		0.00
Lane Grp Cap(c), veh/h	805	2097	657				0	429	352	348	356	0
V/C Ratio(X)	1.03	0.94	0.04				0.00	0.28	0.12	0.66	0.61	0.00
Avail Cap(c_a), veh/h	805	2097	657				0	500	411	400	415	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.26	0.26	0.26				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	29.0	13.3				0.0	19.7	18.7	33.8	29.4	0.0
Incr Delay (d2), s/veh	25.4	3.0	0.0				0.0	0.4	0.1	3.3	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.4	14.0	0.4				0.0	1.9	0.6	5.0	4.5	0.0
LnGrp Delay(d),s/veh	55.7	32.0	13.3				0.0	20.1	18.8	37.1	31.3	0.0
LnGrp LOS	F	C	B					C	B	D	C	
Approach Vol, veh/h		2825						161			445	
Approach Delay, s/veh		38.8						19.8			34.3	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		47.8		27.2				27.2
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 40		* 27				* 27
Max Q Clear Time (g_c+I1), s		45.6		6.9				22.0
Green Ext Time (p_c), s		0.0		0.6				0.9

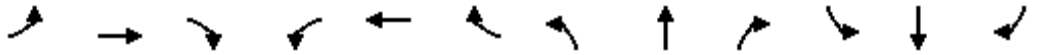
Intersection Summary	
HCM 2010 Ctrl Delay	37.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2490	70	0	0	0	0	50	270	100	200	0
Future Volume (veh/h)	50	2490	70	0	0	0	0	50	270	100	200	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1454	1398	1398	0
Adj Flow Rate, veh/h	54	2707	48				0	54	254	109	217	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	53	2866	633				0	339	292	275	339	0
Arrive On Green	0.19	0.19	0.19				0.00	0.24	0.24	0.08	0.08	0.00
Sat Flow, veh/h	91	4909	1084				0	1398	1204	845	1398	0
Grp Volume(v), veh/h	823	1938	48				0	54	254	109	217	0
Grp Sat Flow(s),veh/h/ln	1393	1202	1084				0	1398	1204	845	1398	0
Q Serve(g_s), s	43.8	39.5	2.7				0.0	2.3	15.2	9.4	11.3	0.0
Cycle Q Clear(g_c), s	43.8	39.5	2.7				0.0	2.3	15.2	11.7	11.3	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	814	2106	633				0	339	292	275	339	0
V/C Ratio(X)	1.01	0.92	0.08				0.00	0.16	0.87	0.40	0.64	0.00
Avail Cap(c_a), veh/h	814	2106	633				0	513	441	380	513	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	28.6	13.7				0.0	22.4	27.3	32.6	31.3	0.0
Incr Delay (d2), s/veh	12.5	0.9	0.0				0.0	0.2	11.5	0.9	2.0	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
%ile BackOfQ(50%),veh/ln	19.7	13.4	0.8				0.0	0.9	5.9	2.3	4.6	0.0
LnGrp Delay(d),s/veh	42.8	29.4	13.7				0.0	22.6	38.7	33.5	33.3	0.0
LnGrp LOS	F	C	B					C	D	C	C	
Approach Vol, veh/h		2809						308			326	
Approach Delay, s/veh		33.1						35.9			33.4	
Approach LOS		C						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.3		24.7				24.7
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		34.5		27.5				27.5
Max Q Clear Time (g_c+I1), s		45.8		17.2				13.7
Green Ext Time (p_c), s		0.0		1.0				1.4

Intersection Summary	
HCM 2010 Ctrl Delay	33.4
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1260	1440	0	0	0	0	0	0	220	1060	0
Future Volume (veh/h)	0	1260	1440	0	0	0	0	0	0	220	1060	0
Number	5	2	12							7	4	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	0	1485	1485							1485	1485	0
Adj Flow Rate, veh/h	0	1370	1552							239	1152	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.92	0.92	0.92							0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3							3	3	0
Cap, veh/h	0	2406	1364							406	852	0
Arrive On Green	0.00	0.18	0.18							0.09	0.09	0.00
Sat Flow, veh/h	0	4456	2525							1415	2971	0
Grp Volume(v), veh/h	0	1370	1552							239	1152	0
Grp Sat Flow(s),veh/h/ln	0	1485	1263							1415	1485	0
Q Serve(g_s), s	0.0	21.1	40.5							12.1	21.5	0.0
Cycle Q Clear(g_c), s	0.0	21.1	40.5							12.1	21.5	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2406	1364							406	852	0
V/C Ratio(X)	0.00	0.57	1.14							0.59	1.35	0.00
Avail Cap(c_a), veh/h	0	2406	1364							406	852	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.76	0.76	0.00
Uniform Delay (d), s/veh	0.0	22.8	30.8							29.7	34.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	63.1							1.7	164.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.7	26.1							5.0	28.3	0.0
LnGrp Delay(d),s/veh	0.0	22.9	93.9							31.4	198.6	0.0
LnGrp LOS		C	F							C	F	
Approach Vol, veh/h		2922									1391	
Approach Delay, s/veh		60.6									169.8	
Approach LOS		E									F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		49.0		26.0				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		40.5		21.5				
Max Q Clear Time (g_c+I1), s		42.5		23.5				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	95.9
HCM 2010 LOS	F

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	770	880	0	0	0	0	0	1405	500	0	0	0
Future Volume (veh/h)	770	880	0	0	0	0	0	1405	500	0	0	0
Number	5	2	12				7	4	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	1454	1485	0				0	1398	1398			
Adj Flow Rate, veh/h	837	957	0				0	1527	509			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	1334	1225	0				0	1939	549			
Arrive On Green	0.14	0.14	0.00				0.00	0.46	0.46			
Sat Flow, veh/h	2769	2971	0				0	4194	1188			
Grp Volume(v), veh/h	837	957	0				0	1527	509			
Grp Sat Flow(s),veh/h/ln	1385	1485	0				0	1398	1188			
Q Serve(g_s), s	21.8	23.4	0.0				0.0	23.1	30.2			
Cycle Q Clear(g_c), s	21.8	23.4	0.0				0.0	23.1	30.2			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1334	1225	0				0	1939	549			
V/C Ratio(X)	0.63	0.78	0.00				0.00	0.79	0.93			
Avail Cap(c_a), veh/h	1334	1225	0				0	1946	551			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.36	0.36	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	28.4	29.1	0.0				0.0	17.1	19.0			
Incr Delay (d2), s/veh	0.8	1.8	0.0				0.0	2.6	22.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.5	9.9	0.0				0.0	9.2	13.2			
LnGrp Delay(d),s/veh	29.2	31.0	0.0				0.0	19.6	41.5			
LnGrp LOS	C	C						B	D			
Approach Vol, veh/h		1794						2036				
Approach Delay, s/veh		30.2						25.1				
Approach LOS		C						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		35.1		39.9				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 31		* 35				
Max Q Clear Time (g_c+I1), s		25.4		32.2				
Green Ext Time (p_c), s		4.9		2.5				

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
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.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	330	50	10	80	220	50	60	290	160	70	220
Future Volume (veh/h)	20	330	50	10	80	220	50	60	290	160	70	220
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94		1.00		0.97	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2019	2019	2000		1942	1942	2000	1845	1845	1900	1845	1845
Adj Flow Rate, veh/h	22	359	46		87	239	44	65	315	149	76	239
Adj No. of Lanes	1	1	0		1	1	0	1	1	0	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
Percent Heavy Veh, %	3	3	3		3	3	3	3	3	3	3	3
Cap, veh/h	58	434	56		154	480	88	165	368	174	177	541
Arrive On Green	0.03	0.25	0.25		0.08	0.30	0.30	0.09	0.31	0.31	0.10	0.32
Sat Flow, veh/h	1923	1741	223		1849	1588	292	1757	1172	554	1757	1682
Grp Volume(v), veh/h	22	0	405		87	0	283	65	0	464	76	0
Grp Sat Flow(s),veh/h/ln	1923	0	1965		1849	0	1880	1757	0	1726	1757	0
Q Serve(g_s), s	0.8	0.0	13.2		3.1	0.0	8.4	2.4	0.0	17.1	2.8	0.0
Cycle Q Clear(g_c), s	0.8	0.0	13.2		3.1	0.0	8.4	2.4	0.0	17.1	2.8	0.0
Prop In Lane	1.00		0.11		1.00		0.16	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	58	0	490		154	0	569	165	0	542	177	0
V/C Ratio(X)	0.38	0.00	0.83		0.57	0.00	0.50	0.39	0.00	0.86	0.43	0.00
Avail Cap(c_a), veh/h	227	0	640		273	0	668	233	0	682	233	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
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.3	0.0	24.1		29.9	0.0	19.4	28.9	0.0	21.8	28.7	0.0
Incr Delay (d2), s/veh	1.5	0.0	6.8		1.2	0.0	0.7	0.6	0.0	8.6	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	8.0		1.6	0.0	4.4	1.2	0.0	9.4	1.4	0.0
LnGrp Delay(d),s/veh	33.8	0.0	30.9		31.1	0.0	20.1	29.5	0.0	30.5	29.3	0.0
LnGrp LOS	C		C		C		C	C		C	C	
Approach Vol, veh/h		427				370			529			333
Approach Delay, s/veh		31.0				22.7			30.3			21.1
Approach LOS		C				C			C			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	21.8	10.4	26.0	6.0	25.4	10.9	25.5
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	22.1	9.0	* 27	8.0	24.1	9.0	* 27
Max Q Clear Time (g_c+I1), s	5.1	15.2	4.4	9.6	2.8	10.4	4.8	19.1
Green Ext Time (p_c), s	0.1	1.0	0.0	0.9	0.0	0.9	0.0	1.4

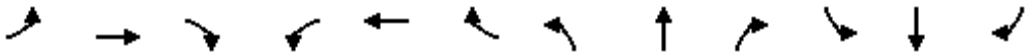
Intersection Summary	
HCM 2010 Ctrl Delay	27.0
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	20
Future Volume (veh/h)	20
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.91
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	18
Adj No. of Lanes	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	3
Cap, veh/h	41
Arrive On Green	0.32
Sat Flow, veh/h	127
Grp Volume(v), veh/h	257
Grp Sat Flow(s),veh/h/ln	1808
Q Serve(g_s), s	7.6
Cycle Q Clear(g_c), s	7.6
Prop In Lane	0.07
Lane Grp Cap(c), veh/h	582
V/C Ratio(X)	0.44
Avail Cap(c_a), veh/h	714
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	18.2
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.9
LnGrp Delay(d),s/veh	18.7
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	585	75	0	740	0	0
Future Volume (vph)	585	75	0	740	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			3.0		
Lane Util. Factor	1.00			1.00		
Frpb, ped/bikes	0.99			1.00		
Flpb, ped/bikes	1.00			1.00		
Frt	0.98			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	1540			1573		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	1540			1573		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	82	0	804	0	0
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	712	0	0	804	0	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA		
Protected Phases	2			3 4 6		
Permitted Phases						
Actuated Green, G (s)	34.4			51.8		
Effective Green, g (s)	34.4			46.2		
Actuated g/C Ratio	0.46			0.62		
Clearance Time (s)	5.6					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	706			968		
v/s Ratio Prot	c0.46			c0.51		
v/s Ratio Perm						
v/c Ratio	1.01			0.83		
Uniform Delay, d1	20.3			11.3		
Progression Factor	0.97			0.51		
Incremental Delay, d2	30.7			0.6		
Delay (s)	50.4			6.3		
Level of Service	D			A		
Approach Delay (s)	50.4			6.3	0.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

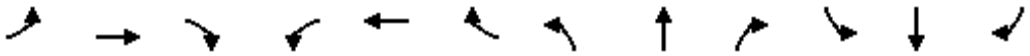


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	390	50	0	380	0	0	0	0	20	20	30
Future Volume (vph)	0	390	50	0	380	0	0	0	0	20	20	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6						5.6	
Lane Util. Factor		1.00			1.00						1.00	
Frpb, ped/bikes		0.99			1.00						0.98	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.98			1.00						0.94	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		1541			1573						1432	
Flt Permitted		1.00			1.00						0.99	
Satd. Flow (perm)		1541			1573						1432	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	424	54	0	413	0	0	0	0	22	22	33
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	473	0	0	413	0	0	0	0	0	48	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA					Perm	NA	
Protected Phases		2			4 6						8	
Permitted Phases										8		
Actuated Green, G (s)		39.3			55.7						8.1	
Effective Green, g (s)		39.3			55.7						8.1	
Actuated g/C Ratio		0.52			0.74						0.11	
Clearance Time (s)		5.6									5.6	
Vehicle Extension (s)		3.0									1.5	
Lane Grp Cap (vph)		807			1168						154	
v/s Ratio Prot		c0.31			c0.26							
v/s Ratio Perm											0.03	
v/c Ratio		0.59			0.35						0.31	
Uniform Delay, d1		12.3			3.4						30.9	
Progression Factor		0.57			0.09						0.85	
Incremental Delay, d2		1.8			0.1						0.0	
Delay (s)		8.8			0.4						26.2	
Level of Service		A			A						C	
Approach Delay (s)		8.8			0.4			0.0			26.2	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

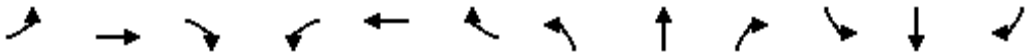
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	585	0	0	730	10	20
Future Volume (vph)	585	0	0	730	10	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			5.6	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1573			1573	1408	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1573			1573	1408	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	0	0	793	11	22
RTOR Reduction (vph)	0	0	0	0	19	0
Lane Group Flow (vph)	636	0	0	793	14	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	52.4			34.4	11.8	
Effective Green, g (s)	47.2			34.4	11.8	
Actuated g/C Ratio	0.63			0.46	0.16	
Clearance Time (s)				5.6		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	989			721	221	
v/s Ratio Prot	c0.40			c0.50	c0.01	
v/s Ratio Perm						
v/c Ratio	0.64			1.10	0.07	
Uniform Delay, d1	8.7			20.3	26.9	
Progression Factor	0.44			1.16	1.06	
Incremental Delay, d2	0.1			57.1	0.0	
Delay (s)	4.0			80.6	28.5	
Level of Service	A			F	C	
Approach Delay (s)	4.0			80.6	28.5	
Approach LOS	A			F	C	

Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	410	0	0	350	20	30	10	30	0	0	0
Future Volume (vph)	0	410	0	0	350	20	30	10	30	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.98				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1557			1422				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1557			1422				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	0	0	380	22	33	11	33	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	446	0	0	400	0	0	49	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		53.0			39.3			10.8				
Effective Green, g (s)		53.0			39.3			10.8				
Actuated g/C Ratio		0.71			0.52			0.14				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1111			815			204				
v/s Ratio Prot		c0.28			c0.26			c0.03				
v/s Ratio Perm												
v/c Ratio		0.40			0.49			0.24				
Uniform Delay, d1		4.5			11.4			28.5				
Progression Factor		0.02			0.68			1.26				
Incremental Delay, d2		0.1			2.0			0.1				
Delay (s)		0.1			9.7			36.1				
Level of Service		A			A			D				
Approach Delay (s)		0.1			9.7			36.1			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	500	0	0	420	70	10	10	10	0	0	0
Future Volume (vph)	0	500	0	0	420	70	10	10	10	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1517			1464				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1517			1464				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	0	0	457	76	11	11	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	543	0	0	525	0	0	24	0	0	0	0
Confl. Peds. (#/hr)	39		22			39			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		50.3			30.9			13.9				
Effective Green, g (s)		50.3			30.9			13.9				
Actuated g/C Ratio		0.67			0.41			0.19				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1054			625			271				
v/s Ratio Prot		c0.35			c0.35			c0.02				
v/s Ratio Perm												
v/c Ratio		0.52			0.84			0.09				
Uniform Delay, d1		6.2			19.8			25.3				
Progression Factor		0.07			0.98			1.02				
Incremental Delay, d2		0.4			11.5			0.1				
Delay (s)		0.8			31.0			25.9				
Level of Service		A			C			C				
Approach Delay (s)		0.8			31.0			25.9			0.0	
Approach LOS		A			C			C			A	

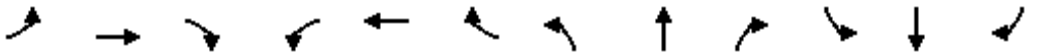
Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	495	20	70	550	70	40	520	60	0	400	320
Future Volume (veh/h)	280	495	20	70	550	70	40	520	60	0	400	320
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.99		0.93	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1800	1694	1728	0	1765	1728
Adj Flow Rate, veh/h	292	516	19	73	573	67	42	542	52	0	417	144
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	279	943	35	397	551	64	97	1034	97	0	937	319
Arrive On Green	0.17	0.59	0.59	0.75	0.75	0.75	0.77	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1597	1606	59	819	1469	172	120	2668	250	0	2506	823
Grp Volume(v), veh/h	292	0	535	73	0	640	329	0	307	0	287	274
Grp Sat Flow(s),veh/h/ln	1597	0	1665	819	0	1641	1562	0	1477	0	1676	1565
Q Serve(g_s), s	14.0	0.0	15.6	2.2	0.0	30.0	0.0	0.0	6.4	0.0	10.1	10.4
Cycle Q Clear(g_c), s	14.0	0.0	15.6	2.2	0.0	30.0	5.7	0.0	6.4	0.0	10.1	10.4
Prop In Lane	1.00		0.04	1.00		0.10	0.13		0.17	0.00		0.53
Lane Grp Cap(c), veh/h	279	0	978	397	0	615	656	0	572	0	650	606
V/C Ratio(X)	1.05	0.00	0.55	0.18	0.00	1.04	0.50	0.00	0.54	0.00	0.44	0.45
Avail Cap(c_a), veh/h	279	0	978	397	0	615	656	0	572	0	650	606
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.76	0.00	0.76	0.74	0.00	0.74	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	10.0	6.5	0.0	10.0	6.2	0.0	6.2	0.0	18.1	18.2
Incr Delay (d2), s/veh	66.1	0.0	2.2	0.8	0.0	42.5	2.0	0.0	2.6	0.0	2.2	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	11.3	0.0	7.7	0.6	0.0	19.9	2.9	0.0	2.8	0.0	5.1	4.9
LnGrp Delay(d),s/veh	99.1	0.0	12.2	7.3	0.0	52.5	8.2	0.0	8.9	0.0	20.3	20.6
LnGrp LOS	F		B	A		F	A		A		C	C
Approach Vol, veh/h		827			713			636			561	
Approach Delay, s/veh		42.9			47.9			8.5			20.4	
Approach LOS		D			D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.2		35.8	17.0	34.2		35.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 47		24.4	14.0	* 30		24.4
Max Q Clear Time (g_c+I1), s		17.6		8.4	16.0	32.0		12.4
Green Ext Time (p_c), s		5.8		5.2	0.0	0.0		3.8

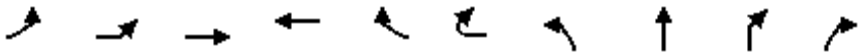
Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	50	40	180	0	0	0	0	250	1220	495
Future Volume (vph)	0	490	50	40	180	0	0	0	0	250	1220	495
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		1.00			1.00						1.00	0.98
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.99			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2769			1781						2992	1321
Flt Permitted		1.00			0.82						0.99	1.00
Satd. Flow (perm)		2769			1474						2992	1321
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	510	52	42	188	0	0	0	0	260	1271	516
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	230	0	0	0	0	0	1531	516
Confl. Peds. (#/hr)			15	15		4			11			
Confl. Bikes (#/hr)			3			3			3			2
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		23.8			23.8						47.4	40.4
Effective Green, g (s)		23.8			23.8						47.4	40.4
Actuated g/C Ratio		0.30			0.30						0.59	0.50
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		823			438						1772	667
v/s Ratio Prot		c0.20									c0.51	
v/s Ratio Perm					0.16							0.39
v/c Ratio		0.67			0.53						0.86	0.77
Uniform Delay, d1		24.7			23.4						13.6	16.1
Progression Factor		0.46			0.42						1.00	1.00
Incremental Delay, d2		3.8			3.8						5.9	8.5
Delay (s)		15.2			13.6						19.5	24.6
Level of Service		B			B						B	C
Approach Delay (s)		15.2			13.6			0.0			20.8	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



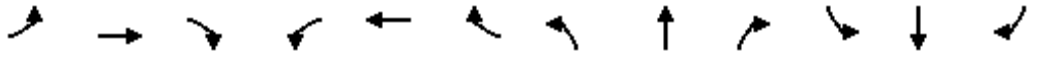
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	400	20	320	145	320	20	70	1570	200	60
Future Volume (vph)	400	20	320	145	320	20	70	1570	200	60
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1509	1812	1812	1485			3678	1316	
Flt Permitted		0.62	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		986	1812	1812	1485			3678	1316	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	417	21	333	151	333	21	73	1635	208	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	39	0
Lane Group Flow (vph)	0	438	333	151	354	0	0	1708	232	0
Confl. Peds. (#/hr)							8			3
Confl. Bikes (#/hr)					4	4				
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		33.8	33.8	18.8	18.8			37.8	37.8	
Effective Green, g (s)		33.8	33.8	18.8	18.8			37.8	37.8	
Actuated g/C Ratio		0.42	0.42	0.24	0.24			0.47	0.47	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		487	765	425	348			1737	621	
v/s Ratio Prot		c0.12	0.18	0.08	c0.24					
v/s Ratio Perm		0.26						0.46	0.18	
v/c Ratio		0.90	0.44	0.36	1.02			0.98	0.37	
Uniform Delay, d1		21.5	16.3	25.5	30.6			20.8	13.5	
Progression Factor		0.68	0.77	1.00	1.00			0.54	0.27	
Incremental Delay, d2		13.7	0.3	0.5	52.7			12.4	0.9	
Delay (s)		28.4	12.9	26.1	83.3			23.5	4.6	
Level of Service		C	B	C	F			C	A	
Approach Delay (s)			21.7	66.2				20.9		
Approach LOS			C	E				C		

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	400	40	30	245	65	60	465	90	90	360	40
Future Volume (veh/h)	90	400	40	30	245	65	60	465	90	90	360	40
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)	0.99		0.97	1.00		0.97	0.98		0.93	0.98		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1412	1560	1530	1412	1500	1530	1440	1500	1469	1440	1500	1469
Adj Flow Rate, veh/h	94	417	38	31	255	56	62	484	76	94	375	33
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	448	641	58	259	541	119	135	902	139	213	783	71
Arrive On Green	0.46	0.46	0.46	0.91	0.91	0.91	0.86	0.86	0.86	0.86	0.86	0.86
Sat Flow, veh/h	846	1405	128	745	1186	260	189	2105	324	351	1826	165
Grp Volume(v), veh/h	94	0	455	31	0	311	322	0	300	238	0	264
Grp Sat Flow(s),veh/h/ln	846	0	1533	745	0	1446	1339	0	1279	1020	0	1321
Q Serve(g_s), s	5.8	0.0	18.4	2.0	0.0	2.6	0.0	0.0	5.0	1.7	0.0	3.8
Cycle Q Clear(g_c), s	8.4	0.0	18.4	20.3	0.0	2.6	4.3	0.0	5.0	6.7	0.0	3.8
Prop In Lane	1.00		0.08	1.00		0.18	0.19		0.25	0.40		0.12
Lane Grp Cap(c), veh/h	448	0	700	259	0	660	628	0	548	500	0	567
V/C Ratio(X)	0.21	0.00	0.65	0.12	0.00	0.47	0.51	0.00	0.55	0.48	0.00	0.47
Avail Cap(c_a), veh/h	448	0	700	259	0	660	628	0	548	500	0	567
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.83	0.00	0.83	0.68	0.00	0.68
Uniform Delay (d), s/veh	15.0	0.0	16.8	8.3	0.0	2.0	3.6	0.0	3.6	3.5	0.0	3.5
Incr Delay (d2), s/veh	1.1	0.0	4.6	0.9	0.0	2.3	2.5	0.0	3.2	2.2	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	8.6	0.5	0.0	1.3	2.0	0.0	2.0	1.2	0.0	1.5
LnGrp Delay(d),s/veh	16.0	0.0	21.5	9.2	0.0	4.3	6.0	0.0	6.9	5.7	0.0	5.4
LnGrp LOS	B		C	A		A	A		A	A		A
Approach Vol, veh/h		549			342			622			502	
Approach Delay, s/veh		20.5			4.8			6.4			5.6	
Approach LOS		C			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		41.1		38.9		41.1		38.9
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		36.5		34.3		36.5		34.3
Max Q Clear Time (g_c+I1), s		20.4		7.0		22.3		8.7
Green Ext Time (p_c), s		2.5		3.0		1.3		2.5

Intersection Summary	
HCM 2010 Ctrl Delay	9.8
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	160	0	0	140	120	100	1495	20	0	0	0
Future Volume (veh/h)	270	160	0	0	140	120	100	1495	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1620	1588	1620			
Adj Flow Rate, veh/h	281	167	0	0	146	120	104	1557	19			
Adj No. of Lanes	1	1	0	0	1	0	0	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	381	703	0	0	306	251	118	1892	24			
Arrive On Green	0.74	0.74	0.00	0.00	0.44	0.44	0.15	0.15	0.15			
Sat Flow, veh/h	994	1588	0	0	691	568	268	4275	54			
Grp Volume(v), veh/h	281	167	0	0	0	266	612	511	557			
Grp Sat Flow(s),veh/h/ln	994	1588	0	0	0	1259	1575	1445	1576			
Q Serve(g_s), s	21.9	2.7	0.0	0.0	0.0	11.9	30.4	27.3	27.3			
Cycle Q Clear(g_c), s	33.8	2.7	0.0	0.0	0.0	11.9	30.4	27.3	27.3			
Prop In Lane	1.00		0.00	0.00		0.45	0.17		0.03			
Lane Grp Cap(c), veh/h	381	703	0	0	0	557	697	640	698			
V/C Ratio(X)	0.74	0.24	0.00	0.00	0.00	0.48	0.88	0.80	0.80			
Avail Cap(c_a), veh/h	381	703	0	0	0	557	697	640	698			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.69	0.69	0.00	0.00	0.00	1.00	0.51	0.51	0.51			
Uniform Delay (d), s/veh	16.0	6.2	0.0	0.0	0.0	15.8	32.0	30.7	30.7			
Incr Delay (d2), s/veh	5.1	0.1	0.0	0.0	0.0	0.6	8.2	5.3	4.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.4	1.2	0.0	0.0	0.0	4.2	14.8	11.9	12.9			
LnGrp Delay(d),s/veh	21.1	6.3	0.0	0.0	0.0	16.4	40.2	36.0	35.6			
LnGrp LOS	C	A				B	D	D	D			
Approach Vol, veh/h		448			266			1680				
Approach Delay, s/veh		15.6			16.4			37.4				
Approach LOS		B			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		40.0		40.0		40.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		35.4		35.4		35.4		
Max Q Clear Time (g_c+I1), s		35.8		32.4		13.9		
Green Ext Time (p_c), s		0.0		2.1		1.1		

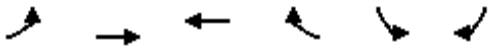
Intersection Summary		
HCM 2010 Ctrl Delay		31.0
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	245	40	115	280	155	30	425	90	50	310	70
Future Volume (veh/h)	50	245	40	115	280	155	30	425	90	50	310	70
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	0.97		0.90	0.93		0.83	0.97		0.83
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	1588	1525	1620	1588	1588	1620	1620	1588	1555	1620	1588	1555
Adj Flow Rate, veh/h	52	255	34	120	292	135	31	443	73	52	323	52
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	647	86	446	493	228	83	931	148	123	721	125
Arrive On Green	0.50	0.50	0.50	0.16	0.16	0.16	0.13	0.13	0.13	0.80	0.80	0.80
Sat Flow, veh/h	861	1300	173	949	991	458	85	2343	373	169	1814	316
Grp Volume(v), veh/h	52	0	289	120	0	427	295	0	252	210	0	217
Grp Sat Flow(s),veh/h/ln	861	0	1473	949	0	1450	1512	0	1289	982	0	1316
Q Serve(g_s), s	4.0	0.0	9.8	9.3	0.0	21.8	0.0	0.0	14.5	4.3	0.0	4.0
Cycle Q Clear(g_c), s	25.8	0.0	9.8	19.1	0.0	21.8	13.7	0.0	14.5	18.8	0.0	4.0
Prop In Lane	1.00		0.12	1.00		0.32	0.11		0.29	0.25		0.24
Lane Grp Cap(c), veh/h	284	0	733	446	0	721	651	0	513	447	0	523
V/C Ratio(X)	0.18	0.00	0.39	0.27	0.00	0.59	0.45	0.00	0.49	0.47	0.00	0.41
Avail Cap(c_a), veh/h	284	0	733	446	0	721	651	0	513	447	0	523
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.93	0.00	0.93	0.81	0.00	0.81	0.78	0.00	0.78
Uniform Delay (d), s/veh	25.6	0.0	12.6	29.3	0.0	25.9	26.9	0.0	27.3	6.6	0.0	5.4
Incr Delay (d2), s/veh	1.4	0.0	1.6	1.4	0.0	3.3	1.8	0.0	2.7	2.8	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	4.3	2.6	0.0	9.4	6.4	0.0	5.6	1.6	0.0	1.6
LnGrp Delay(d),s/veh	27.0	0.0	14.2	30.6	0.0	29.2	28.7	0.0	30.0	9.4	0.0	7.2
LnGrp LOS	C		B	C		C	C		C	A		A
Approach Vol, veh/h		341			547			547			427	
Approach Delay, s/veh		16.1			29.5			29.3			8.3	
Approach LOS		B			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		44.0		36.0		44.0		36.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 40		* 32		* 40		* 32
Max Q Clear Time (g_c+I1), s		27.8		16.5		23.8		20.8
Green Ext Time (p_c), s		2.3		4.3		4.8		2.8

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

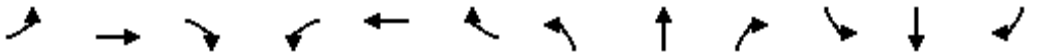
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Traffic Volume (vph)	0	465	440	0	0	120
Future Volume (vph)	0	465	440	0	0	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0			5.6
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00			0.78
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	1.00			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1588	1588			1074
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1588	1588			1074
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	484	458	0	0	125
RTOR Reduction (vph)	0	0	0	0	0	104
Lane Group Flow (vph)	0	484	458	0	0	21
Confl. Peds. (#/hr)				59		78
Confl. Bikes (#/hr)				14		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		54.9	55.1			13.3
Effective Green, g (s)		54.9	55.1			13.3
Actuated g/C Ratio		0.69	0.69			0.17
Clearance Time (s)						5.6
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1089	1093			178
v/s Ratio Prot		c0.30	c0.29			
v/s Ratio Perm						0.02
v/c Ratio		0.44	0.42			0.12
Uniform Delay, d1		5.7	5.4			28.4
Progression Factor		0.95	0.15			1.00
Incremental Delay, d2		0.3	0.2			0.3
Delay (s)		5.6	1.0			28.6
Level of Service		A	A			C
Approach Delay (s)		5.6	1.0		28.6	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	285	190	80	260	0	0	0	0	135	1040	205
Future Volume (vph)	0	285	190	80	260	0	0	0	0	135	1040	205
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.93	1.00	1.00						1.00	0.92
Flpb, ped/bikes		1.00	1.00	0.97	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1641	1172	1609	1535						4142	1102
Flt Permitted		1.00	1.00	0.47	1.00						0.99	1.00
Satd. Flow (perm)		1641	1172	792	1535						4142	1102
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	297	198	83	271	0	0	0	0	141	1083	214
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	297	160	83	271	0	0	0	0	0	1224	214
Confl. Peds. (#/hr)			51	51		28			11	11		19
Confl. Bikes (#/hr)			10			16			1			1
Parking (#/hr)											2	2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		29.8	29.8	29.8	29.8						41.4	34.4
Effective Green, g (s)		29.8	29.8	29.8	29.8						41.4	34.4
Actuated g/C Ratio		0.37	0.37	0.37	0.37						0.52	0.43
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		611	436	295	571						2143	473
v/s Ratio Prot		c0.18			0.18							
v/s Ratio Perm			0.14	0.10							0.30	0.19
v/c Ratio		0.49	0.37	0.28	0.47						0.57	0.45
Uniform Delay, d1		19.2	18.3	17.6	19.1						13.2	16.1
Progression Factor		0.56	0.39	0.94	0.95						0.36	0.50
Incremental Delay, d2		2.5	2.2	2.2	2.6						0.8	2.1
Delay (s)		13.2	9.4	18.7	20.9						5.5	10.2
Level of Service		B	A	B	C						A	B
Approach Delay (s)		11.7			20.4			0.0			6.2	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	230	0	0	210	90	120	1350	170	0	0	0
Future Volume (veh/h)	180	230	0	0	210	90	120	1350	170	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1525	1588	1620			
Adj Flow Rate, veh/h	188	240	0	0	219	82	125	1406	156			
Adj No. of Lanes	1	1	0	0	1	0	1	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	276	651	0	0	387	145	704	1919	213			
Arrive On Green	0.14	0.14	0.00	0.00	0.14	0.14	0.16	0.16	0.16			
Sat Flow, veh/h	964	1588	0	0	944	354	1452	3956	439			
Grp Volume(v), veh/h	188	240	0	0	0	301	125	1027	535			
Grp Sat Flow(s),veh/h/ln	964	1588	0	0	0	1298	1452	1445	1504			
Q Serve(g_s), s	15.4	11.0	0.0	0.0	0.0	17.4	6.0	27.1	27.1			
Cycle Q Clear(g_c), s	32.8	11.0	0.0	0.0	0.0	17.4	6.0	27.1	27.1			
Prop In Lane	1.00		0.00	0.00		0.27	1.00		0.29			
Lane Grp Cap(c), veh/h	276	651	0	0	0	532	704	1402	730			
V/C Ratio(X)	0.68	0.37	0.00	0.00	0.00	0.57	0.18	0.73	0.73			
Avail Cap(c_a), veh/h	276	651	0	0	0	532	704	1402	730			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.00	1.00	0.41	0.41	0.41			
Uniform Delay (d), s/veh	43.4	25.2	0.0	0.0	0.0	27.9	19.8	28.7	28.7			
Incr Delay (d2), s/veh	11.2	1.4	0.0	0.0	0.0	4.3	0.2	1.4	2.7			
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	5.0	5.1	0.0	0.0	0.0	6.9	2.4	11.1	11.8			
LnGrp Delay(d),s/veh	54.6	26.6	0.0	0.0	0.0	32.2	20.0	30.1	31.4			
LnGrp LOS	D	C				C	C	C	C			
Approach Vol, veh/h		428			301			1687				
Approach Delay, s/veh		38.9			32.2			29.7				
Approach LOS		D			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		37.0		43.0		37.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 33		* 39		* 33		
Max Q Clear Time (g_c+I1), s		34.8		29.1		19.4		
Green Ext Time (p_c), s		0.0		5.8		1.1		

Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	335	1580	0	0	0	0	0	300	60
Future Volume (veh/h)	0	0	0	335	1580	0	0	0	0	0	300	60
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.94
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.82
Adj Sat Flow, veh/h/ln				1530	1500	0				0	1500	1530
Adj Flow Rate, veh/h				349	1646	0				0	312	42
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				512	2181	0				0	464	61
Arrive On Green				0.23	0.23	0.00				0.00	0.20	0.20
Sat Flow, veh/h				648	3297	0				0	2359	303
Grp Volume(v), veh/h				721	1274	0				0	193	161
Grp Sat Flow(s),veh/h/ln				1338	1242	0				0	1425	1162
Q Serve(g_s), s				40.5	38.2	0.0				0.0	10.0	10.3
Cycle Q Clear(g_c), s				40.5	38.2	0.0				0.0	10.0	10.3
Prop In Lane				0.48		0.00				0.00		0.26
Lane Grp Cap(c), veh/h				986	1707	0				0	289	236
V/C Ratio(X)				0.73	0.75	0.00				0.00	0.67	0.68
Avail Cap(c_a), veh/h				986	1707	0				0	417	340
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.46	0.46	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				25.4	24.5	0.0				0.0	29.4	29.5
Incr Delay (d2), s/veh				2.2	1.4	0.0				0.0	2.6	3.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.7	13.5	0.0				0.0	4.1	3.5
LnGrp Delay(d),s/veh				27.6	25.9	0.0				0.0	32.0	33.0
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1995						354	
Approach Delay, s/veh					26.5						32.4	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		59.2		20.8				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 48		23.4				
Max Q Clear Time (g_c+I1), s		42.5		12.3				
Green Ext Time (p_c), s		4.1		1.1				

Intersection Summary	
HCM 2010 Ctrl Delay	27.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1775	160	150	330	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1775	160	150	330	0	0	0	0
Number				5	2	12	7	4	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				0	1412	1412	1440	1412	0			
Adj Flow Rate, veh/h				0	1849	133	156	344	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2481	757	247	442	0			
Arrive On Green				0.00	0.21	0.21	0.08	0.08	0.00			
Sat Flow, veh/h				0	3981	1175	700	1822	0			
Grp Volume(v), veh/h				0	1849	133	270	230	0			
Grp Sat Flow(s),veh/h/ln				0	1285	1175	1237	1220	0			
Q Serve(g_s), s				0.0	35.9	7.4	16.9	14.7	0.0			
Cycle Q Clear(g_c), s				0.0	35.9	7.4	17.3	14.7	0.0			
Prop In Lane				0.00		1.00	0.58		0.00			
Lane Grp Cap(c), veh/h				0	2481	757	382	307	0			
V/C Ratio(X)				0.00	0.75	0.18	0.71	0.75	0.00			
Avail Cap(c_a), veh/h				0	2481	757	408	333	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	0.28	0.28	0.74	0.74	0.00			
Uniform Delay (d), s/veh				0.0	25.4	14.1	35.4	34.2	0.0			
Incr Delay (d2), s/veh				0.0	0.6	0.1	3.9	6.3	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	13.0	2.4	6.3	5.5	0.0			
LnGrp Delay(d),s/veh				0.0	26.0	14.3	39.3	40.6	0.0			
LnGrp LOS					C	B	D	D				
Approach Vol, veh/h					1982			500				
Approach Delay, s/veh					25.2			39.9				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		55.7		24.3				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 50		* 22				
Max Q Clear Time (g_c+I1), s		37.9		19.3				
Green Ext Time (p_c), s		8.1		0.6				

Intersection Summary	
HCM 2010 Ctrl Delay	28.1
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	1840	0	0	0	0	0	290	100
Future Volume (veh/h)	0	0	0	195	1840	0	0	0	0	0	290	100
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.85
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1412	0				0	1412	1440
Adj Flow Rate, veh/h				203	1917	0				0	302	94
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				273	2175	0				0	446	133
Arrive On Green				0.22	0.22	0.00				0.00	0.24	0.24
Sat Flow, veh/h				332	3451	0				0	1909	548
Grp Volume(v), veh/h				782	1338	0				0	217	179
Grp Sat Flow(s),veh/h/ln				1329	1169	0				0	1341	1045
Q Serve(g_s), s				44.0	44.3	0.0				0.0	11.7	12.6
Cycle Q Clear(g_c), s				45.9	44.3	0.0				0.0	11.7	12.6
Prop In Lane				0.26		0.00				0.00		0.52
Lane Grp Cap(c), veh/h				923	1525	0				0	326	254
V/C Ratio(X)				0.85	0.88	0.00				0.00	0.67	0.71
Avail Cap(c_a), veh/h				923	1525	0				0	389	303
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.47	0.47	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				28.9	28.3	0.0				0.0	27.4	27.7
Incr Delay (d2), s/veh				4.7	3.7	0.0				0.0	3.3	5.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				18.1	15.2	0.0				0.0	4.6	4.0
LnGrp Delay(d),s/veh				33.6	32.0	0.0				0.0	30.6	33.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					2120						396	
Approach Delay, s/veh					32.6						32.0	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		56.4		23.6				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 48		* 23				
Max Q Clear Time (g_c+I1), s		47.9		14.6				
Green Ext Time (p_c), s		0.5		1.1				

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	80	1685	100	260	175	0	0	180	50
Future Volume (veh/h)	0	0	0	80	1685	100	260	175	0	0	180	50
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				83	1755	96	271	182	0	0	188	38
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				109	2451	138	315	666	0	0	275	56
Arrive On Green				0.18	0.18	0.18	0.03	0.12	0.00	0.00	0.21	0.21
Sat Flow, veh/h				204	4587	259	1765	1853	0	0	1308	264
Grp Volume(v), veh/h				713	594	627	271	182	0	0	0	226
Grp Sat Flow(s),veh/h/ln				1754	1606	1690	1765	1853	0	0	0	1572
Q Serve(g_s), s				30.9	27.7	27.9	5.3	7.2	0.0	0.0	0.0	10.6
Cycle Q Clear(g_c), s				30.9	27.7	27.9	5.3	7.2	0.0	0.0	0.0	10.6
Prop In Lane				0.12		0.15	1.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				937	858	903	315	666	0	0	0	330
V/C Ratio(X)				0.76	0.69	0.70	0.86	0.27	0.00	0.00	0.00	0.68
Avail Cap(c_a), veh/h				937	858	903	327	718	0	0	0	364
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.73	0.73	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				28.1	26.8	26.8	35.8	25.7	0.0	0.0	0.0	29.2
Incr Delay (d2), s/veh				5.8	4.6	4.4	16.4	0.3	0.0	0.0	0.0	6.7
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				16.6	13.4	14.2	7.4	3.7	0.0	0.0	0.0	5.2
LnGrp Delay(d),s/veh				33.9	31.3	31.2	52.2	26.1	0.0	0.0	0.0	35.9
LnGrp LOS				C	C	C	D	C				D
Approach Vol, veh/h					1934			453			226	
Approach Delay, s/veh					32.2			41.7			35.9	
Approach LOS					C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			11.5	21.3		47.2		32.8
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			8.0	18.5		40.5		31.0
Max Q Clear Time (g_c+I1), s			7.3	12.6		32.9		9.2
Green Ext Time (p_c), s			0.1	0.8		6.8		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	34.2
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	40	36	90.2%	12.4	4.5	B
	Through	5	4	76.8%	19.2	17.7	C
	Right Turn						
	Subtotal	45	40	88.7%	13.9	6.8	B
SB	Left Turn						
	Through	15	13	89.6%	29.5	12.0	D
	Right Turn	10	8	84.5%	18.7	18.1	C
	Subtotal	25	22	87.6%	24.7	13.3	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	65	65	99.8%	3.3	0.5	A
	Through	1,820	1,787	98.2%	2.8	0.8	A
	Right Turn	10	10	96.0%	2.0	0.5	A
	Subtotal	1,895	1,861	98.2%	2.9	0.8	A
Total		1,965	1,923	97.9%	3.3	0.8	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	120	122	101.4%	33.1	3.6	C
	Through	20	25	122.9%	28.7	5.0	C
	Right Turn						
	Subtotal	140	146	104.5%	32.5	2.7	C
SB	Left Turn						
	Through	50	51	102.1%	27.7	6.2	C
	Right Turn	10	13	126.7%	15.0	10.3	B
	Subtotal	60	64	106.2%	26.2	5.1	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	230	253	110.2%	8.0	1.4	A
	Through	1,850	1,787	96.6%	7.1	1.9	A
	Right Turn	40	41	101.8%	6.1	3.4	A
	Subtotal	2,120	2,081	98.2%	7.2	1.7	A
Total		2,320	2,291	98.7%	9.4	1.5	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	110	1800	150	50	340	0	0	285	160
Future Volume (veh/h)	0	0	0	110	1800	150	50	340	0	0	285	160
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.98		1.00	1.00		0.83
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				1620	1588	1620	1620	1588	0	0	1525	1555
Adj Flow Rate, veh/h				115	1875	145	52	354	0	0	297	160
Adj No. of Lanes				0	3	0	0	2	0	0	2	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				132	2285	181	103	670	0	0	541	274
Arrive On Green				0.19	0.19	0.19	0.63	0.63	0.00	0.00	0.10	0.10
Sat Flow, veh/h				230	3979	316	148	2209	0	0	1801	876
Grp Volume(v), veh/h				788	656	690	198	208	0	0	246	211
Grp Sat Flow(s),veh/h/ln				1577	1445	1503	912	1373	0	0	1448	1152
Q Serve(g_s), s				38.8	34.6	35.1	3.8	6.5	0.0	0.0	12.9	13.9
Cycle Q Clear(g_c), s				38.8	34.6	35.1	17.8	6.5	0.0	0.0	12.9	13.9
Prop In Lane				0.15		0.21	0.26		0.00	0.00		0.76
Lane Grp Cap(c), veh/h				905	830	863	343	430	0	0	454	361
V/C Ratio(X)				0.87	0.79	0.80	0.58	0.48	0.00	0.00	0.54	0.58
Avail Cap(c_a), veh/h				936	858	892	343	430	0	0	454	361
HCM Platoon Ratio				0.33	0.33	0.33	2.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				0.30	0.30	0.30	1.00	1.00	0.00	0.00	0.88	0.88
Uniform Delay (d), s/veh				29.5	27.8	28.0	12.5	11.5	0.0	0.0	30.4	30.9
Incr Delay (d2), s/veh				2.9	1.5	1.6	6.9	3.9	0.0	0.0	4.1	6.0
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				17.7	14.2	15.0	2.7	2.9	0.0	0.0	5.7	5.0
LnGrp Delay(d),s/veh				32.4	29.4	29.6	19.4	15.3	0.0	0.0	34.5	36.8
LnGrp LOS				C	C	C	B	B			C	D
Approach Vol, veh/h					2135			406			457	
Approach Delay, s/veh					30.6			17.3			35.6	
Approach LOS					C			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.6		50.4		29.6
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				23.5		47.5		23.5
Max Q Clear Time (g_c+I1), s				19.8		40.8		15.9
Green Ext Time (p_c), s				0.7		5.1		1.3

Intersection Summary		
HCM 2010 Ctrl Delay		29.6
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	350	1920	50	125	55	0	0	0	0
Future Volume (vph)	0	0	0	350	1920	50	125	55	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6				
Lane Util. Factor					0.91		1.00	1.00				
Frpb, ped/bikes					1.00		1.00	1.00				
Flpb, ped/bikes					0.96		0.96	1.00				
Frt					1.00		1.00	1.00				
Flt Protected					0.99		0.95	1.00				
Satd. Flow (prot)					3666		1098	1249				
Flt Permitted					0.99		0.95	1.00				
Satd. Flow (perm)					3666		1098	1249				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	365	2000	52	130	57	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2414	0	130	57	0	0	0	0
Confl. Peds. (#/hr)			106	106		44	30		69			30
Confl. Bikes (#/hr)						2			3			8
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA				
Protected Phases					6			4				
Permitted Phases				6			4					
Actuated Green, G (s)					51.8		19.0	19.0				
Effective Green, g (s)					51.8		19.0	19.0				
Actuated g/C Ratio					0.58		0.21	0.21				
Clearance Time (s)					11.6		7.6	7.6				
Vehicle Extension (s)					5.0		5.0	5.0				
Lane Grp Cap (vph)					2109		231	263				
v/s Ratio Prot								0.05				
v/s Ratio Perm					0.66		c0.12					
v/c Ratio					1.14		0.56	0.22				
Uniform Delay, d1					19.1		31.8	29.3				
Progression Factor					1.00		1.00	1.00				
Incremental Delay, d2					71.3		5.1	0.9				
Delay (s)					90.4		36.9	30.2				
Level of Service					F		D	C				
Approach Delay (s)		0.0			90.4			34.8			0.0	
Approach LOS		A			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	86.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	160.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	510	1720	0	0	0	0	0	725	585
Future Volume (veh/h)	0	0	0	510	1720	0	0	0	0	0	725	585
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1560	1588	0				0	1588	1500
Adj Flow Rate, veh/h				531	1792	0				0	755	601
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				716	2008	0				0	2021	510
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1486	4765	0				0	4479	1093
Grp Volume(v), veh/h				531	1792	0				0	755	601
Grp Sat Flow(s),veh/h/ln				1486	1588	0				0	1445	1093
Q Serve(g_s), s				27.9	29.6	0.0				0.0	12.5	37.3
Cycle Q Clear(g_c), s				27.9	29.6	0.0				0.0	12.5	37.3
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				716	2008	0				0	2021	510
V/C Ratio(X)				0.74	0.89	0.00				0.00	0.37	1.18
Avail Cap(c_a), veh/h				721	2025	0				0	2021	510
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				0.09	0.09	0.00				0.00	0.83	0.83
Uniform Delay (d), s/veh				31.9	32.7	0.0				0.0	23.4	33.8
Incr Delay (d2), s/veh				0.4	0.5	0.0				0.0	0.4	96.8
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	13.1	0.0				0.0	5.1	25.0
LnGrp Delay(d),s/veh				32.3	33.2	0.0				0.0	23.8	130.7
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2323						1356	
Approach Delay, s/veh					33.0						71.2	
Approach LOS					C						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						37.7		42.3
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						34.0		37.0
Max Q Clear Time (g_c+I1), s						31.6		39.3
Green Ext Time (p_c), s						2.1		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		47.1
HCM 2010 LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1235	210	990	1430	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1235	210	990	1430	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.93	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				0	1500	1500	1398	1398	0			
Adj Flow Rate, veh/h				0	1286	197	1100	1394	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	3	3	0			
Cap, veh/h				0	1254	363	1548	1625	0			
Arrive On Green				0.00	0.31	0.31	0.19	0.19	0.00			
Sat Flow, veh/h				0	4230	1184	2663	2796	0			
Grp Volume(v), veh/h				0	1286	197	1100	1394	0			
Grp Sat Flow(s),veh/h/ln				0	1365	1184	1331	1398	0			
Q Serve(g_s), s				0.0	24.5	11.1	30.9	38.6	0.0			
Cycle Q Clear(g_c), s				0.0	24.5	11.1	30.9	38.6	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1254	363	1548	1625	0			
V/C Ratio(X)				0.00	1.03	0.54	0.71	0.86	0.00			
Avail Cap(c_a), veh/h				0	1254	363	1548	1625	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	0.09	0.09	0.00			
Uniform Delay (d), s/veh				0.0	27.8	23.1	26.0	29.1	0.0			
Incr Delay (d2), s/veh				0.0	32.1	1.7	0.3	0.6	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	12.9	3.8	11.5	15.0	0.0			
LnGrp Delay(d),s/veh				0.0	59.8	24.8	26.3	29.7	0.0			
LnGrp LOS					F	C	C	C				
Approach Vol, veh/h					1483			2494				
Approach Delay, s/veh					55.2			28.2				
Approach LOS					E			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				51.0		29.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				46.5		24.5		
Max Q Clear Time (g_c+I1), s				40.6		26.5		
Green Ext Time (p_c), s				5.1		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	38.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1625	110	0	0	0	0	0	435	185	470	0
Future Volume (veh/h)	0	1625	110	0	0	0	0	0	435	185	470	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.96	0.99		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	0	1676	1710				0	1588	1620	1765	1765	0
Adj Flow Rate, veh/h	0	1693	106				0	0	439	193	490	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	575	238	781	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.44	0.15	0.15	0.00
Sat Flow, veh/h		0					0	0	1300	933	1765	0
Grp Volume(v), veh/h		0.0					0	0	439	193	490	0
Grp Sat Flow(s),veh/h/ln							0	0	1300	933	1765	0
Q Serve(g_s), s							0.0	0.0	22.7	12.7	20.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	22.7	35.4	20.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	575	238	781	0
V/C Ratio(X)							0.00	0.00	0.76	0.81	0.63	0.00
Avail Cap(c_a), veh/h							0	0	575	238	781	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.74	0.74	0.00
Uniform Delay (d), s/veh							0.0	0.0	18.8	47.0	28.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	5.4	13.7	0.9	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							0.0	0.0	8.9	5.2	10.4	0.0
LnGrp Delay(d),s/veh							0.0	0.0	24.2	60.7	28.9	0.0
LnGrp LOS									C	E	C	
Approach Vol, veh/h								439			683	
Approach Delay, s/veh								24.2			37.9	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				40.0				40.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				35.4				35.4
Max Q Clear Time (g_c+I1), s				37.4				24.7
Green Ext Time (p_c), s				0.0				1.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	2050	0	0	0	0	0	260	120	0	0	0
Future Volume (veh/h)	200	2050	0	0	0	0	0	260	120	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1500	0				0	1500	1440			
Adj Flow Rate, veh/h	208	2135	0				0	271	117			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	299	2663	0				0	376	157			
Arrive On Green	0.23	0.23	0.00				0.00	0.19	0.19			
Sat Flow, veh/h	346	3798	0				0	1992	833			
Grp Volume(v), veh/h	818	1525	0				0	202	186			
Grp Sat Flow(s),veh/h/ln	1414	1365	0				0	1500	1325			
Q Serve(g_s), s	42.0	42.1	0.0				0.0	10.1	10.6			
Cycle Q Clear(g_c), s	43.9	42.1	0.0				0.0	10.1	10.6			
Prop In Lane	0.25		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	1048	1914	0				0	283	250			
V/C Ratio(X)	0.78	0.80	0.00				0.00	0.71	0.74			
Avail Cap(c_a), veh/h	1048	1914	0				0	390	344			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.37	0.37	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	26.0	25.4	0.0				0.0	30.4	30.6			
Incr Delay (d2), s/veh	2.2	1.3	0.0				0.0	7.2	9.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	17.8	16.3	0.0				0.0	4.7	4.6			
LnGrp Delay(d),s/veh	28.2	26.7	0.0				0.0	37.6	40.4			
LnGrp LOS	C	C						D	D			
Approach Vol, veh/h		2343						388				
Approach Delay, s/veh		27.2						39.0				
Approach LOS		C						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				19.3		60.7		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		50.4		
Max Q Clear Time (g_c+I1), s				12.6		45.9		
Green Ext Time (p_c), s				2.0		4.3		

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2085	90	0	0	0	0	0	250	210	290	0
Future Volume (veh/h)	0	2085	90	0	0	0	0	0	250	210	290	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.90	0.97		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	0	1500	1382				0	1588	1591	1560	1500	0
Adj Flow Rate, veh/h	0	2172	88				0	0	243	219	302	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	359	205	441	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.29	0.10	0.10	0.00
Sat Flow, veh/h		0					0	0	1221	974	1500	0
Grp Volume(v), veh/h		0.0					0	0	243	219	302	0
Grp Sat Flow(s),veh/h/ln							0	0	1221	974	1500	0
Q Serve(g_s), s							0.0	0.0	14.0	9.5	15.6	0.0
Cycle Q Clear(g_c), s							0.0	0.0	14.0	23.5	15.6	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	359	205	441	0
V/C Ratio(X)							0.00	0.00	0.68	1.07	0.69	0.00
Avail Cap(c_a), veh/h							0	0	359	205	441	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.68	0.68	0.00
Uniform Delay (d), s/veh							0.0	0.0	24.9	45.2	32.5	0.0
Incr Delay (d2), s/veh							0.0	0.0	4.2	71.0	2.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	5.1	8.6	6.8	0.0
LnGrp Delay(d),s/veh							0.0	0.0	29.1	116.2	35.1	0.0
LnGrp LOS									C	F	D	
Approach Vol, veh/h								243			521	
Approach Delay, s/veh								29.1			69.2	
Approach LOS								C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				28.0				28.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				23.5				23.5
Max Q Clear Time (g_c+I1), s				25.5				16.0
Green Ext Time (p_c), s				0.0				0.4

Intersection Summary	
HCM 2010 Ctrl Delay	56.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2250	185	0	0	0	0	335	30	120	140	0
Future Volume (veh/h)	110	2250	185	0	0	0	0	335	30	120	140	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.90	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	115	2344	182				0	349	23	125	146	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	134	2881	227				0	516	34	161	431	0
Arrive On Green	0.21	0.21	0.21				0.00	0.17	0.17	0.01	0.08	0.00
Sat Flow, veh/h	208	4483	353				0	3096	197	1597	1744	0
Grp Volume(v), veh/h	969	804	869				0	183	189	125	146	0
Grp Sat Flow(s),veh/h/ln	1754	1606	1684				0	1593	1616	1597	1744	0
Q Serve(g_s), s	42.6	37.8	39.2				0.0	8.6	8.8	0.0	6.3	0.0
Cycle Q Clear(g_c), s	42.6	37.8	39.2				0.0	8.6	8.8	0.0	6.3	0.0
Prop In Lane	0.12		0.21				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	1127	1032	1082				0	273	277	161	431	0
V/C Ratio(X)	0.86	0.78	0.80				0.00	0.67	0.68	0.77	0.34	0.00
Avail Cap(c_a), veh/h	1127	1032	1082				0	321	325	164	482	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.16	0.16	0.16				0.00	1.00	1.00	0.63	0.63	0.00
Uniform Delay (d), s/veh	28.0	26.1	26.7				0.0	31.0	31.1	38.4	30.6	0.0
Incr Delay (d2), s/veh	1.5	1.0	1.1				0.0	7.0	7.3	15.6	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.1	17.1	18.6				0.0	4.3	4.4	3.5	3.1	0.0
LnGrp Delay(d),s/veh	29.5	27.1	27.8				0.0	38.0	38.4	54.0	31.2	0.0
LnGrp LOS	C	C	C					D	D	D	C	
Approach Vol, veh/h		2641						372			271	
Approach Delay, s/veh		28.2						38.2			41.7	
Approach LOS		C						D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		56.0		24.0			6.1	17.9
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		49.1		* 22			* 2	* 16
Max Q Clear Time (g_c+I1), s		44.6		8.3			2.0	10.8
Green Ext Time (p_c), s		4.5		0.8			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	80	73	91.7%	27.5	4.6	D
	Through						
	Right Turn						
	Subtotal	80	73	91.7%	27.5	4.6	D
EB	Left Turn	45	41	92.2%	3.0	0.3	A
	Through	2,390	2,380	99.6%	2.7	0.2	A
	Right Turn						
	Subtotal	2,435	2,422	99.4%	2.7	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,515	2,495	99.2%	3.4	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	80	75	93.6%	20.9	4.8	C
	Right Turn	310	312	100.6%	19.7	1.7	B
	Subtotal	390	387	99.2%	20.1	1.7	C
SB	Left Turn	110	129	117.3%	30.5	6.1	C
	Through	170	170	100.1%	24.3	3.6	C
	Right Turn						
	Subtotal	280	299	106.8%	26.8	3.6	C
EB	Left Turn	60	62	103.0%	13.8	2.3	B
	Through	2,340	2,301	98.3%	12.6	1.0	B
	Right Turn	40	35	86.4%	8.4	3.3	A
	Subtotal	2,440	2,397	98.2%	12.6	0.9	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,110	3,083	99.1%	14.9	1.0	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	2410	60	0	0	0	0	210	140	150	190	0
Future Volume (veh/h)	230	2410	60	0	0	0	0	210	140	150	190	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1412	1382	1355	0
Adj Flow Rate, veh/h	240	2510	40				0	219	134	156	198	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	230	2589	657				0	473	389	246	409	0
Arrive On Green	0.18	0.18	0.18				0.00	0.34	0.34	0.67	0.67	0.00
Sat Flow, veh/h	410	4624	1172				0	1412	1161	477	1281	0
Grp Volume(v), veh/h	815	1935	40				0	219	134	169	185	0
Grp Sat Flow(s),veh/h/ln	1391	1214	1172				0	1412	1161	525	1172	0
Q Serve(g_s), s	44.8	42.0	2.3				0.0	9.8	6.9	15.9	6.1	0.0
Cycle Q Clear(g_c), s	44.8	42.0	2.3				0.0	9.8	6.9	25.6	6.1	0.0
Prop In Lane	0.29		1.00				0.00		1.00	0.92		0.00
Lane Grp Cap(c), veh/h	779	2040	657				0	473	389	262	393	0
V/C Ratio(X)	1.05	0.95	0.06				0.00	0.46	0.34	0.64	0.47	0.00
Avail Cap(c_a), veh/h	779	2040	657				0	473	389	262	393	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.28	0.28	0.28				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	31.5	15.3				0.0	20.9	20.0	17.5	9.8	0.0
Incr Delay (d2), s/veh	30.6	4.0	0.1				0.0	0.7	0.5	5.3	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.9	14.9	0.7				0.0	3.9	2.3	4.0	1.9	0.0
LnGrp Delay(d),s/veh	63.2	35.4	15.3				0.0	21.6	20.5	22.8	10.7	0.0
LnGrp LOS	F	D	B					C	C	C	B	
Approach Vol, veh/h		2790						353			354	
Approach Delay, s/veh		43.3						21.2			16.4	
Approach LOS		D						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		49.0		31.0				31.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 45		* 27				* 27
Max Q Clear Time (g_c+I1), s		46.8		11.8				27.6
Green Ext Time (p_c), s		0.0		1.3				0.0

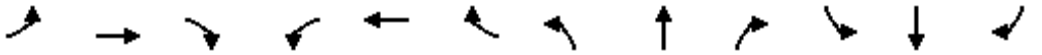
Intersection Summary	
HCM 2010 Ctrl Delay	38.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	2540	120	0	0	0	0	150	370	85	255	0
Future Volume (veh/h)	40	2540	120	0	0	0	0	150	370	85	255	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1468	1412	1412	0
Adj Flow Rate, veh/h	42	2646	77				0	156	351	89	266	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	39	2619	587				0	439	379	250	439	0
Arrive On Green	0.17	0.17	0.17				0.00	0.31	0.31	0.62	0.62	0.00
Sat Flow, veh/h	74	4977	1116				0	1412	1217	710	1412	0
Grp Volume(v), veh/h	802	1886	77				0	156	351	89	266	0
Grp Sat Flow(s),veh/h/ln	1408	1214	1116				0	1412	1217	710	1412	0
Q Serve(g_s), s	42.1	41.3	4.7				0.0	6.8	22.3	7.3	9.1	0.0
Cycle Q Clear(g_c), s	42.1	41.3	4.7				0.0	6.8	22.3	14.2	9.1	0.0
Prop In Lane	0.05		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	741	1917	587				0	439	379	250	439	0
V/C Ratio(X)	1.08	0.98	0.13				0.00	0.35	0.93	0.36	0.61	0.00
Avail Cap(c_a), veh/h	741	1917	587				0	468	403	265	468	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.21	0.21	0.21				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.1	32.7	17.6				0.0	21.3	26.7	15.6	12.1	0.0
Incr Delay (d2), s/veh	42.8	6.5	0.1				0.0	0.5	26.6	0.9	2.0	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
%ile BackOfQ(50%),veh/ln	25.2	15.1	1.5				0.0	2.7	10.3	1.5	3.6	0.0
LnGrp Delay(d),s/veh	75.9	39.2	17.7				0.0	21.8	53.2	16.4	14.1	0.0
LnGrp LOS	F	D	B					C	D	B	B	
Approach Vol, veh/h		2765						507			355	
Approach Delay, s/veh		49.3						43.6			14.7	
Approach LOS		D						D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.6		31.4				31.4
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		40.5		26.5				26.5
Max Q Clear Time (g_c+I1), s		44.1		24.3				16.2
Green Ext Time (p_c), s		0.0		0.6				1.3

Intersection Summary	
HCM 2010 Ctrl Delay	45.1
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1910	1080	0	0	0	0	0	0	390	845	0
Future Volume (veh/h)	0	1910	1080	0	0	0	0	0	0	390	845	0
Number	5	2	12							7	4	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	0	1500	1500							1500	1500	0
Adj Flow Rate, veh/h	0	1966	1105							406	880	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.96	0.96	0.96							0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2							2	2	0
Cap, veh/h	0	2271	1287							475	998	0
Arrive On Green	0.00	0.17	0.17							0.11	0.11	0.00
Sat Flow, veh/h	0	4500	2550							1429	3000	0
Grp Volume(v), veh/h	0	1966	1105							406	880	0
Grp Sat Flow(s),veh/h/ln	0	1500	1275							1429	1500	0
Q Serve(g_s), s	0.0	34.0	33.7							22.3	23.1	0.0
Cycle Q Clear(g_c), s	0.0	34.0	33.7							22.3	23.1	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2271	1287							475	998	0
V/C Ratio(X)	0.00	0.87	0.86							0.85	0.88	0.00
Avail Cap(c_a), veh/h	0	2271	1287							491	1031	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.88	0.88	0.00
Uniform Delay (d), s/veh	0.0	30.7	30.6							33.7	34.1	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.8							12.0	7.9	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	0.0	14.3	12.1							10.4	10.7	0.0
LnGrp Delay(d),s/veh	0.0	31.1	31.3							45.7	42.0	0.0
LnGrp LOS		C	C							D	D	
Approach Vol, veh/h		3071									1286	
Approach Delay, s/veh		31.2									43.1	
Approach LOS		C									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		48.9		31.1				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		39.5		27.5				
Max Q Clear Time (g_c+I1), s		36.0		25.1				
Green Ext Time (p_c), s		3.3		1.5				

Intersection Summary	
HCM 2010 Ctrl Delay	34.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	960	1390	0	0	0	0	0	1480	600	0	0	0
Future Volume (veh/h)	960	1390	0	0	0	0	0	1480	600	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1468	1500	0				0	1412	1412			
Adj Flow Rate, veh/h	1068	1353	0				0	1648	538			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	1466	1380	0				0	1789	495			
Arrive On Green	0.15	0.15	0.00				0.00	0.42	0.42			
Sat Flow, veh/h	2797	3000	0				0	4235	1172			
Grp Volume(v), veh/h	1068	1353	0				0	1648	538			
Grp Sat Flow(s),veh/h/ln	1398	1500	0				0	1412	1172			
Q Serve(g_s), s	29.6	36.0	0.0				0.0	29.4	33.8			
Cycle Q Clear(g_c), s	29.6	36.0	0.0				0.0	29.4	33.8			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1466	1380	0				0	1789	495			
V/C Ratio(X)	0.73	0.98	0.00				0.00	0.92	1.09			
Avail Cap(c_a), veh/h	1466	1380	0				0	1789	495			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	30.9	33.6	0.0				0.0	21.8	23.1			
Incr Delay (d2), s/veh	0.3	4.0	0.0				0.0	8.6	66.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	11.5	15.7	0.0				0.0	12.7	19.9			
LnGrp Delay(d),s/veh	31.2	37.6	0.0				0.0	30.5	89.1			
LnGrp LOS	C	D						C	F			
Approach Vol, veh/h		2421						2186				
Approach Delay, s/veh		34.8						44.9				
Approach LOS		C						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		41.0		39.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 37		* 34				
Max Q Clear Time (g_c+I1), s		38.0		35.8				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	300	40	80	300	50	70	235	180	90	130	30
Future Volume (veh/h)	20	300	40	80	300	50	70	235	180	90	130	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		0.96	1.00		0.96	1.00		0.96	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2039	2039	2000	1961	1961	2000	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	21	312	36	83	312	45	73	245	155	94	135	21
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	402	46	161	469	68	258	310	196	207	416	65
Arrive On Green	0.03	0.22	0.22	0.09	0.28	0.28	0.15	0.30	0.30	0.12	0.27	0.27
Sat Flow, veh/h	1942	1786	206	1867	1667	240	1774	1048	663	1774	1556	242
Grp Volume(v), veh/h	21	0	348	83	0	357	73	0	400	94	0	156
Grp Sat Flow(s),veh/h/ln	1942	0	1992	1867	0	1907	1774	0	1711	1774	0	1798
Q Serve(g_s), s	0.7	0.0	10.1	2.6	0.0	10.2	2.3	0.0	13.3	3.1	0.0	4.3
Cycle Q Clear(g_c), s	0.7	0.0	10.1	2.6	0.0	10.2	2.3	0.0	13.3	3.1	0.0	4.3
Prop In Lane	1.00		0.10	1.00		0.13	1.00		0.39	1.00		0.13
Lane Grp Cap(c), veh/h	57	0	448	161	0	537	258	0	507	207	0	480
V/C Ratio(X)	0.37	0.00	0.78	0.52	0.00	0.66	0.28	0.00	0.79	0.45	0.00	0.32
Avail Cap(c_a), veh/h	251	0	744	302	0	774	287	0	686	287	0	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.5	0.0	22.5	27.0	0.0	19.6	23.6	0.0	20.0	25.5	0.0	18.2
Incr Delay (d2), s/veh	1.5	0.0	2.9	1.0	0.0	1.4	0.2	0.0	4.4	0.6	0.0	0.4
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	0.4	0.0	5.9	1.4	0.0	5.6	1.1	0.0	6.8	1.5	0.0	2.2
LnGrp Delay(d),s/veh	30.9	0.0	25.4	28.0	0.0	21.1	23.8	0.0	24.4	26.1	0.0	18.6
LnGrp LOS	C		C	C		C	C		C	C		B
Approach Vol, veh/h		369			440			473			250	
Approach Delay, s/veh		25.8			22.4			24.3			21.4	
Approach LOS		C			C			C			C	

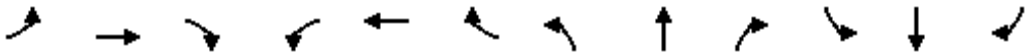
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	18.8	13.0	20.7	5.8	22.3	11.2	22.5
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	23.1	10.0	* 25	8.0	25.1	10.0	* 25
Max Q Clear Time (g_c+I1), s	4.6	12.1	4.3	6.3	2.7	12.2	5.1	15.3
Green Ext Time (p_c), s	0.1	1.1	0.0	0.5	0.0	1.2	0.1	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	520	60	0	685	0	0
Future Volume (vph)	520	60	0	685	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			3.0		
Lane Util. Factor	1.00			1.00		
Frpb, ped/bikes	0.99			1.00		
Flpb, ped/bikes	1.00			1.00		
Frt	0.99			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	1557			1588		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	1557			1588		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	542	62	0	714	0	0
RTOR Reduction (vph)	5	0	0	0	0	0
Lane Group Flow (vph)	600	0	0	714	0	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA		
Protected Phases	2			3 4 6		
Permitted Phases						
Actuated Green, G (s)	36.4			56.5		
Effective Green, g (s)	36.4			50.5		
Actuated g/C Ratio	0.45			0.63		
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	708			1002		
v/s Ratio Prot	c0.38			c0.45		
v/s Ratio Perm						
v/c Ratio	0.85			0.71		
Uniform Delay, d1	19.3			9.9		
Progression Factor	0.62			0.37		
Incremental Delay, d2	10.2			0.6		
Delay (s)	22.2			4.3		
Level of Service	C			A		
Approach Delay (s)	22.2			4.3	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

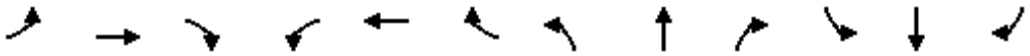


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	500	60	0	330	0	0	0	0	30	20	20
Future Volume (vph)	0	500	60	0	330	0	0	0	0	30	20	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0						6.0	
Lane Util. Factor		1.00			1.00						1.00	
Frpb, ped/bikes		0.99			1.00						0.99	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.99			1.00						0.96	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		1557			1588						1476	
Flt Permitted		1.00			1.00						0.98	
Satd. Flow (perm)		1557			1588						1476	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	521	62	0	344	0	0	0	0	31	21	21
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	580	0	0	344	0	0	0	0	0	54	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA					Perm	NA	
Protected Phases		2			4 6						8	
Permitted Phases										8		
Actuated Green, G (s)		42.7			58.9						9.1	
Effective Green, g (s)		42.7			58.9						9.1	
Actuated g/C Ratio		0.53			0.74						0.11	
Clearance Time (s)		6.0									6.0	
Vehicle Extension (s)		3.0									1.5	
Lane Grp Cap (vph)		831			1169						167	
v/s Ratio Prot		c0.37			c0.22							
v/s Ratio Perm											0.04	
v/c Ratio		0.70			0.29						0.33	
Uniform Delay, d1		13.9			3.6						32.6	
Progression Factor		0.65			0.06						0.64	
Incremental Delay, d2		3.7			0.0						0.3	
Delay (s)		12.6			0.3						21.2	
Level of Service		B			A						C	
Approach Delay (s)		12.6			0.3			0.0			21.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

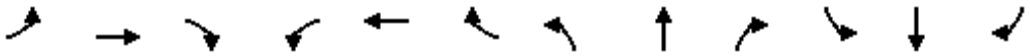
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	520	0	0	675	10	20
Future Volume (vph)	520	0	0	675	10	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			6.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1588			1588	1420	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1588			1588	1420	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	542	0	0	703	10	21
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	542	0	0	703	14	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	54.3			36.4	14.1	
Effective Green, g (s)	48.7			36.4	14.1	
Actuated g/C Ratio	0.61			0.45	0.18	
Clearance Time (s)				6.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	966			722	250	
v/s Ratio Prot	c0.34			c0.44	c0.01	
v/s Ratio Perm						
v/c Ratio	0.56			0.97	0.05	
Uniform Delay, d1	9.3			21.3	27.4	
Progression Factor	0.22			1.07	1.93	
Incremental Delay, d2	0.4			22.2	0.0	
Delay (s)	2.4			45.0	52.9	
Level of Service	A			D	D	
Approach Delay (s)	2.4			45.0	52.9	
Approach LOS	A			D	D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	530	0	0	310	10	20	20	20	0	0	0
Future Volume (vph)	0	530	0	0	310	10	20	20	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			1.00			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1580			1470				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1580			1470				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	552	0	0	323	10	21	21	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	332	0	0	45	0	0	0	0
Confl. Peds. (#/hr)	10		10			10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		57.8			42.7			10.2				
Effective Green, g (s)		57.8			42.7			10.2				
Actuated g/C Ratio		0.72			0.53			0.13				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1147			843			187				
v/s Ratio Prot		c0.35			0.21			c0.03				
v/s Ratio Perm												
v/c Ratio		0.48			0.39			0.24				
Uniform Delay, d1		4.7			11.0			31.4				
Progression Factor		0.15			0.61			1.16				
Incremental Delay, d2		0.1			1.3			0.2				
Delay (s)		0.8			8.0			36.7				
Level of Service		A			A			D				
Approach Delay (s)		0.8			8.0			36.7			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	465	0	0	420	40	20	15	20	0	0	0
Future Volume (vph)	0	465	0	0	420	40	20	15	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1546			1469				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1546			1469				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	484	0	0	438	42	21	16	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	484	0	0	476	0	0	41	0	0	0	0
Confl. Peds. (#/hr)	59		21			59			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		54.9			35.6			13.5				
Effective Green, g (s)		54.9			35.6			13.5				
Actuated g/C Ratio		0.69			0.45			0.17				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1089			687			247				
v/s Ratio Prot		c0.30			c0.31			c0.03				
v/s Ratio Perm												
v/c Ratio		0.44			0.69			0.16				
Uniform Delay, d1		5.7			17.8			28.4				
Progression Factor		0.18			0.63			1.02				
Incremental Delay, d2		0.3			5.1			0.2				
Delay (s)		1.3			16.3			29.3				
Level of Service		A			B			C				
Approach Delay (s)		1.3			16.3			29.3			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	34.8	52.9	0.07	4.6	F
C	IV	25	18.9	8.7	27.6	0.07	9.3	D
B	IV	25	17.9	29.1	47.0	0.07	5.2	F
A	IV	25	18.5	9.4	27.9	0.07	9.0	E
Lindaro	IV	25	25.3	10.9	36.2	0.14	14.0	C
Lincoln	IV	25	21.4	46.3	67.7	0.10	5.2	F
Francisco W.	IV	25	12.2	66.4	78.6	0.05	2.1	F
101 SBOn 2nd	IV	25	14.2	12.1	26.3	0.05	7.3	E
Total	IV		146.5	217.7	364.2	0.61	6.1	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	59.7	78.7	0.07	3.3	F
Tamalpais	IV	25	14.4	68.7	83.1	0.05	2.3	F
Lincoln	IV	25	13.2	68.5	81.7	0.05	2.2	F
Lindaro	IV	25	21.4	1.0	22.4	0.10	15.6	C
A	IV	25	25.3	9.1	34.4	0.14	14.7	C
B	IV	25	17.9	9.1	27.0	0.07	9.0	E
C	IV	25	19.0	3.6	22.6	0.07	11.4	D
D	IV	25	18.7	1.7	20.4	0.07	12.4	D
Total	IV		148.9	221.4	370.3	0.62	6.1	F

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	29	24.0	19.1	43.1	0.16	13.4	C
5th	IV	25	16.3	13.4	29.7	0.06	7.5	E
4th	IV	25	14.6	7.5	22.1	0.05	8.9	E
3rd	IV	25	17.7	7.9	25.6	0.07	9.4	D
2nd	IV	25	15.6	261.1	276.7	0.06	0.8	F
Total	IV		88.2	309.0	397.2	0.40	3.6	F

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	30	25.2	35.9	61.1	0.17	9.9	D
3rd St	IV	25	14.8	24.1	38.9	0.06	5.2	F
4th	IV	25	18.3	29.4	47.7	0.07	5.2	F
5th	IV	25	14.6	8.3	22.9	0.06	8.7	E
Mission	IV	25	15.7	6.8	22.5	0.06	9.5	D
Total	IV		88.6	104.5	193.1	0.41	7.6	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	15.7	44.2	0.16	12.9	D
Tamalpais	IV	25	16.0	52.8	68.8	0.06	3.2	F
Tamalpais	IV	25	3.1	2.9	6.0	0.01	7.0	E
Hetherton	IV	25	8.7	21.6	30.3	0.03	3.9	F
Irwin	IV	25	18.9	11.9	30.8	0.07	8.3	E
Total	IV		75.2	104.9	180.1	0.33	6.7	F

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	26.8	48.4	0.10	7.3	E
Hetherton	IV	25	18.9	36.1	55.0	0.07	4.7	F
Tamalpais	IV	25	8.7	82.6	91.3	0.03	1.3	F
Tamalpais	IV	25	3.1	3.7	6.8	0.01	6.2	F
Lincoln	IV	25	16.0	88.7	104.7	0.06	2.1	F
Total	IV		68.3	237.9	306.2	0.27	3.2	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	24.8	42.9	0.07	5.7	F
C	IV	25	18.9	8.4	27.3	0.07	9.4	D
B	IV	25	17.9	18.9	36.8	0.07	6.6	F
A	IV	25	18.5	9.7	28.2	0.07	8.9	E
Lindaro	IV	25	25.3	11.1	36.4	0.14	13.9	C
Lincoln	IV	25	21.4	14.6	36.0	0.10	9.7	D
Francisco W.	IV	25	12.2	61.4	73.6	0.05	2.3	F
101 SBOn Hetherton	IV	25	14.2	72.4	86.6	0.05	2.2	F
Total	IV		146.5	221.3	367.8	0.61	6.0	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	91.2	110.2	0.07	2.3	F
Tamalpais	IV	25	14.4	92.0	106.4	0.05	1.8	F
Lincoln	IV	25	13.2	18.2	31.4	0.05	5.7	F
Lindaro	IV	25	21.4	3.5	24.9	0.10	14.1	C
A	IV	25	25.3	10.8	36.1	0.14	14.0	C
B	IV	25	17.9	9.9	27.8	0.07	8.7	E
C	IV	25	19.0	4.3	23.3	0.07	11.1	D
D	IV	25	18.7	3.8	22.5	0.07	11.3	D
Total	IV		148.9	233.7	382.6	0.62	5.9	F

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	35	22.2	20.3	42.5	0.16	13.5	C
5th	IV	25	16.3	15.7	32.0	0.06	6.9	F
4th	IV	25	14.6	5.6	20.2	0.05	9.8	D
3rd	IV	25	17.7	21.9	39.6	0.07	6.1	F
2nd	IV	25	15.6	45.1	60.7	0.06	3.5	F
Total	IV		86.4	108.6	195.0	0.40	7.4	E

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	38	19.3	82.4	101.7	0.17	5.9	F
3rd St	IV	25	14.8	12.8	27.6	0.06	7.3	E
4th	IV	25	18.9	12.7	31.6	0.07	8.1	E
5th	IV	25	14.0	13.3	27.3	0.05	7.0	F
Mission	IV	25	15.7	3.8	19.5	0.06	10.9	D
Total	IV		82.7	125.0	207.7	0.41	7.1	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	12.8	41.3	0.16	13.8	C
Tamalpais	IV	25	16.1	24.0	40.1	0.06	5.5	F
Tamalpais	IV	25	4.3	2.3	6.6	0.02	8.9	E
Hetherton	IV	25	7.5	15.1	22.6	0.03	4.5	F
Irwin	IV	25	18.9	14.1	33.0	0.07	7.8	E
Total	IV		75.3	68.3	143.6	0.33	8.4	E

Arterial Level of Service: WB Mission

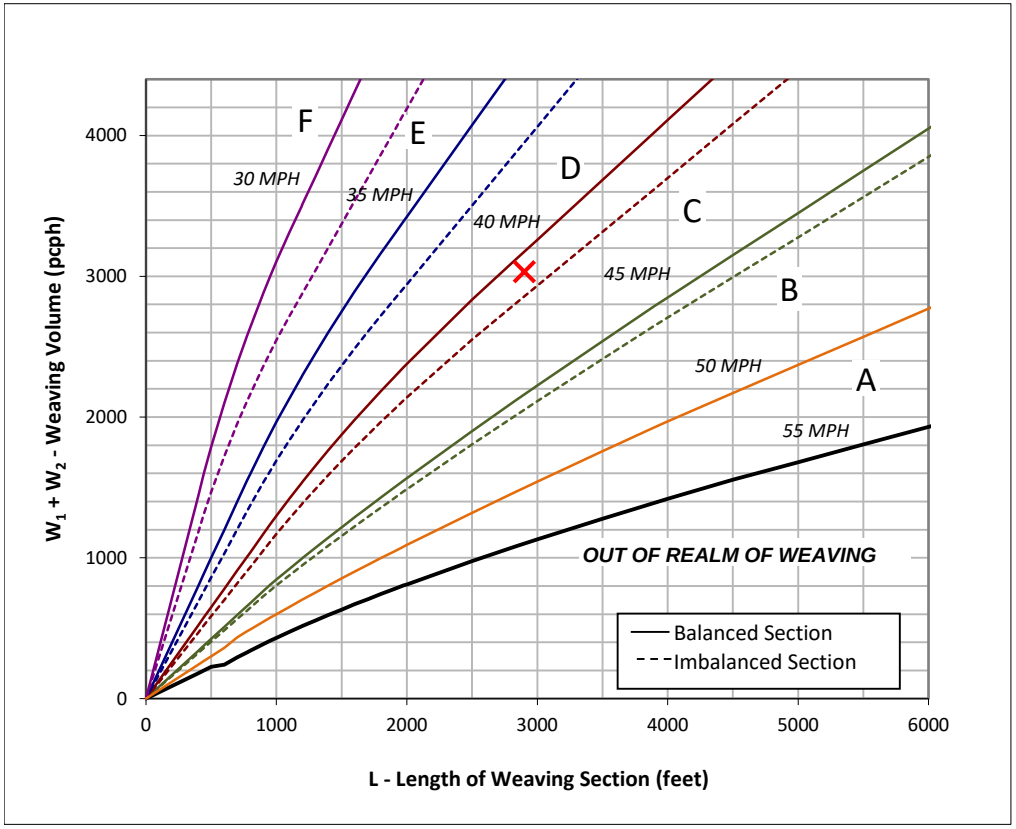
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	28.4	50.0	0.10	7.1	E
Hetherton	IV	25	18.9	13.9	32.8	0.07	7.8	E
Tamalpais	IV	25	7.5	47.5	55.0	0.03	1.8	F
Tamalpais	IV	25	4.3	2.7	7.0	0.02	8.4	E
Lincoln	IV	25	16.1	88.2	104.3	0.06	2.1	F
Total	IV		68.4	180.7	249.1	0.27	4.0	F

Leisch Method for Weaving Analysis

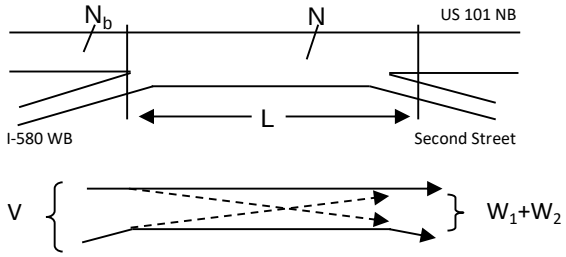
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Cumulative No Project AM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,956	Volume (vph)*	1,951	Volume (vph)*	957
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	4%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	6,218	Volume (pcph)	2,037	Volume (pcph)	996



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.9
4. Weaving Intensity Factor (k)	2.59
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,561
6. Level of Service (LOS)	D

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4150	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1520
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.66
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	25.3
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	820
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.50
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.8
Speed 2 (S_2), mi/h	0.2	Density (D_{ML}), pc/mi/ln	13.7
Speed 2 (S_3), mi/h	1.4	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6016	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1709
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.74
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.8
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	28.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6221	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	2248
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.98
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	52.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	42.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	3/17/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	6221	1987
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	4.40	3.72
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.958
Flow Rate (v_i), pc/h	6744	2254
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.98	1.07

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	103523.5	Density in Ramp Influence Area (D_R), pc/mi/ln	-
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2299
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.488	Outer Lanes Freeway Speed (S_O), mi/h	60.8
Flow in Lanes 1 and 2 (v_{12}), pc/h	4445	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4234	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1583
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.69
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	26.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

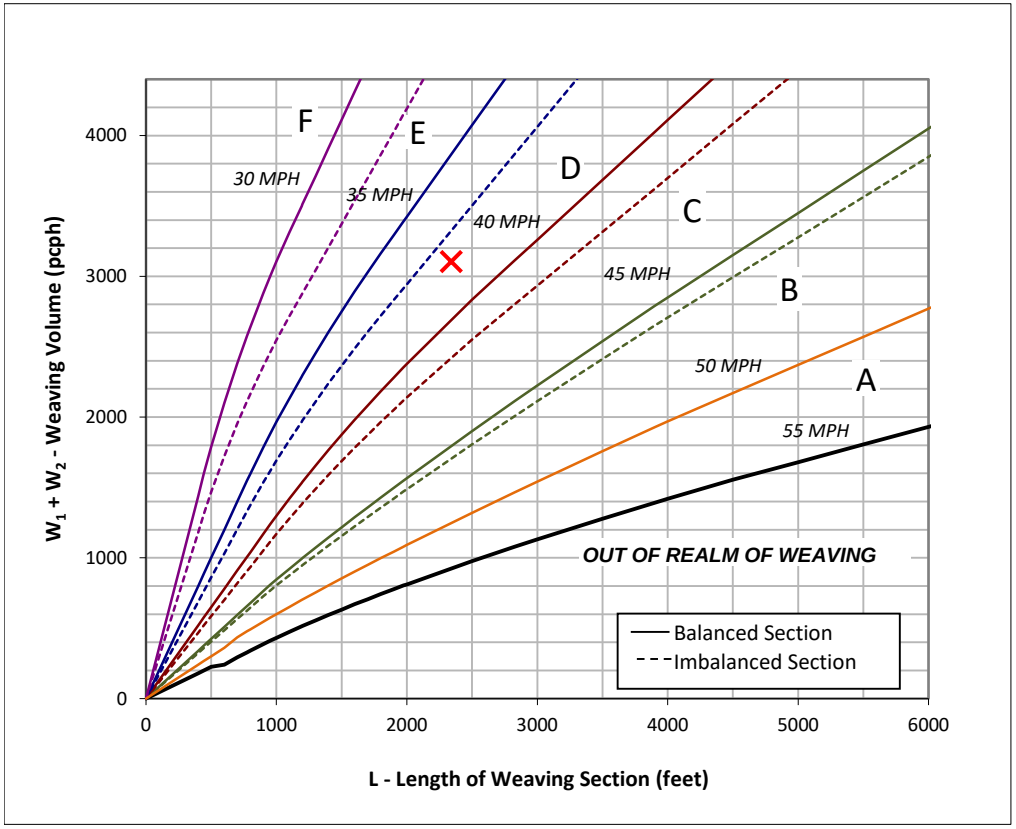
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	998	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1104
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.0
Speed 2 (S_2), mi/h	1.0	Density (D_{ML}), pc/mi/ln	18.7
Speed 2 (S_3), mi/h	5.0	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

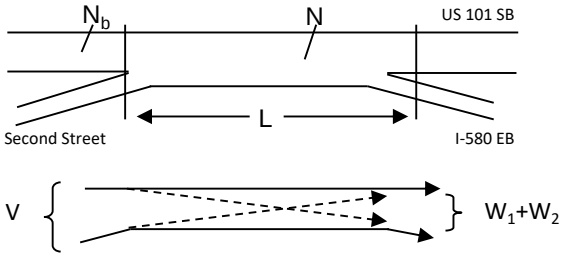
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Cumulative No Project AM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,712	Volume (vph)*	1,762	Volume (vph)*	1,224
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	7,007	Volume (pcph)	1,809	Volume (pcph)	1,297



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.2
4. Weaving Intensity Factor (k)	2.63
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	2,281
6. Level of Service (LOS)	F

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

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

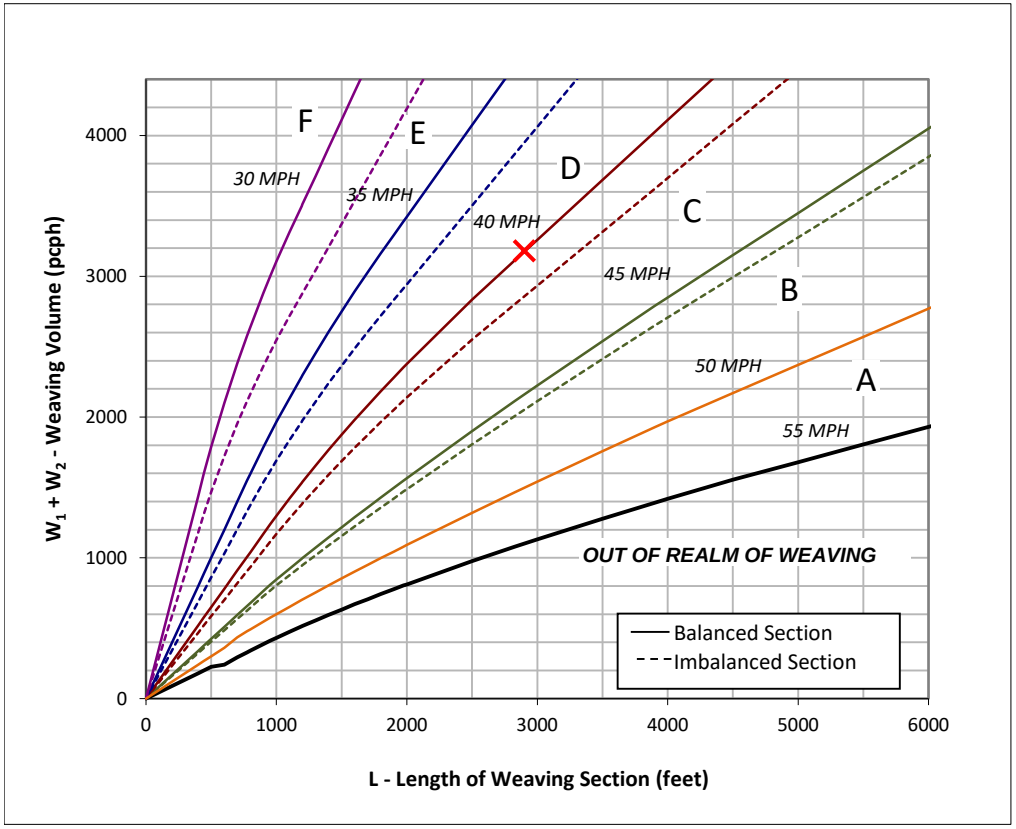
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Leisch Method for Weaving Analysis

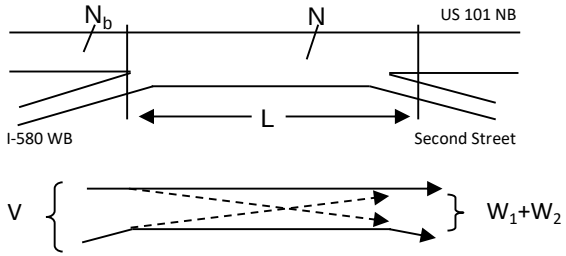
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Cumulative No Project PM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	7,250	1,660	1,412
Truck Percentage	4%	4%	3%
PCE for Trucks	2.0	2.0	2.0
Volume (pcph)	7,569	1,733	1,449



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.5
4. Weaving Intensity Factor (k)	2.62
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,982
6. Level of Service (LOS)	F

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Baseline Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5170	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1913
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.83
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	58.2
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	32.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	848	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	890
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.7
Speed 2 (S_2), mi/h	0.3	Density (D_{ML}), pc/mi/ln	14.9
Speed 2 (S_3), mi/h	2.1	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	7460	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	2141
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.93
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	54.7
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	39.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1217	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	1342
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.81
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	47.9
Speed 2 (S_2), mi/h	2.3	Density (D_{ML}), pc/mi/ln	28.0
Speed 2 (S_3), mi/h	9.8	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5437	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1965
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.85
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	57.6
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	34.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1377	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1555
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	56.0
Speed 2 (S_2), mi/h	4.0	Density (D_{ML}), pc/mi/ln	27.8
Speed 2 (S_3), mi/h	15.4	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5437	2068
Peak Hour Factor (PHF)	0.97	0.96
Total Trucks, %	4.40	2.00
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.973
Flow Rate (v_i), pc/h	5894	2214
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.85	1.05

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	148151.7	Density in Ramp Influence Area (D_R), pc/mi/ln	-
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1800
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.511	Outer Lanes Freeway Speed (S_O), mi/h	62.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	4094	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1380	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1559
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	40.4
Speed 2 (S_2), mi/h	4.1	Density (D_{ML}), pc/mi/ln	38.6
Speed 2 (S_3), mi/h	15.5	Level of Service (LOS)	E

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative No Project Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3369	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1260
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.55
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	21.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

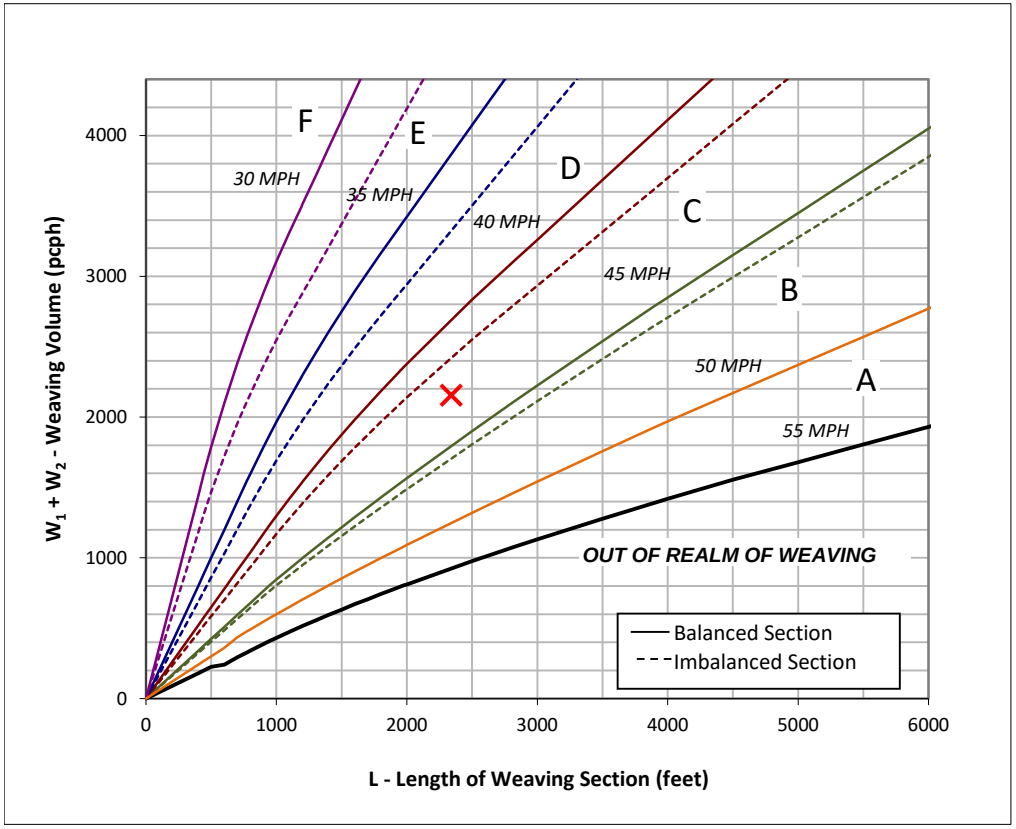
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	918	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1049
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.64
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.2
Speed 2 (S_2), mi/h	0.8	Density (D_{ML}), pc/mi/ln	17.7
Speed 2 (S_3), mi/h	4.2	Level of Service (LOS)	B

Leisch Method for Weaving Analysis

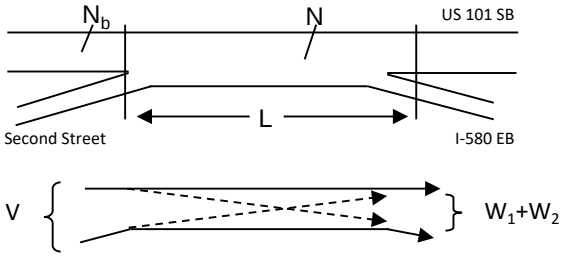
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Cumulative No Project PM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,358	Volume (vph)*	1,139	Volume (vph)*	901
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	5,594	Volume (pcph)	1,168	Volume (pcph)	989



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	43.0
4. Weaving Intensity Factor (k)	2.22
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,701
6. Level of Service (LOS)	E

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

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

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

Appendix F:
Cumulative Plus Project Conditions (R&D Only) –
Technical Calculations

Transportation Impact Study

for BioMarin 999 3rd Street

San Rafael Campus Expansion

April 5, 2019

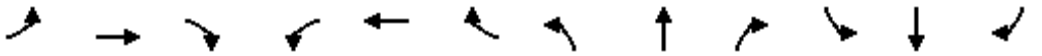
FEHR PEERS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	500	20	80	585	50	20	230	90	60	420	380
Future Volume (veh/h)	120	500	20	80	585	50	20	230	90	60	420	380
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1660	1660	1710	1660	1660	1710	1800	1678	1728	1800	1748	1728
Adj Flow Rate, veh/h	130	543	20	87	636	50	22	250	80	65	457	206
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	148	868	32	341	626	49	68	439	134	136	833	363
Arrive On Green	0.09	0.55	0.55	0.55	0.55	0.55	0.85	0.85	0.85	0.43	0.43	0.43
Sat Flow, veh/h	1581	1588	59	787	1515	119	39	1028	314	188	1952	850
Grp Volume(v), veh/h	130	0	563	87	0	686	352	0	0	395	0	333
Grp Sat Flow(s),veh/h/ln	1581	0	1647	787	0	1634	1381	0	0	1613	0	1376
Q Serve(g_s), s	6.1	0.0	17.7	5.7	0.0	31.0	0.0	0.0	0.0	4.5	0.0	13.8
Cycle Q Clear(g_c), s	6.1	0.0	17.7	13.4	0.0	31.0	5.3	0.0	0.0	13.1	0.0	13.8
Prop In Lane	1.00		0.04	1.00		0.07	0.06		0.23	0.16		0.62
Lane Grp Cap(c), veh/h	148	0	900	341	0	676	640	0	0	744	0	587
V/C Ratio(X)	0.88	0.00	0.63	0.26	0.00	1.02	0.55	0.00	0.00	0.53	0.00	0.57
Avail Cap(c_a), veh/h	148	0	900	341	0	676	640	0	0	744	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.64	0.00	0.64	0.84	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.6	0.0	11.7	15.5	0.0	16.9	3.5	0.0	0.0	16.0	0.0	16.3
Incr Delay (d2), s/veh	47.7	0.0	3.3	1.1	0.0	31.5	2.8	0.0	0.0	2.7	0.0	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	8.8	1.3	0.0	19.5	2.3	0.0	0.0	6.6	0.0	5.8
LnGrp Delay(d),s/veh	81.3	0.0	15.0	16.7	0.0	48.4	6.4	0.0	0.0	18.7	0.0	20.2
LnGrp LOS	F		B	B		F	A			B		C
Approach Vol, veh/h		693			773			352			728	
Approach Delay, s/veh		27.4			44.8			6.4			19.4	
Approach LOS		C			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.2		36.8	10.0	35.2		36.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 41		25.4	7.0	* 31		25.4
Max Q Clear Time (g_c+I1), s		19.7		7.3	8.1	33.0		15.8
Green Ext Time (p_c), s		5.5		3.1	0.0	0.0		4.4

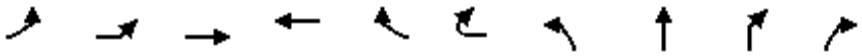
Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	515	90	40	230	0	0	0	0	245	1091	500
Future Volume (vph)	0	515	90	40	230	0	0	0	0	245	1091	500
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.97
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.98			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2711			1767						2961	1303
Flt Permitted		1.00			0.80						0.99	1.00
Satd. Flow (perm)		2711			1421						2961	1303
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	560	98	43	250	0	0	0	0	266	1186	543
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	639	0	0	293	0	0	0	0	0	1452	543
Confl. Peds. (#/hr)	15		22	22		15			16			1
Confl. Bikes (#/hr)			3			2			1			3
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		23.8			23.8						42.4	35.4
Effective Green, g (s)		23.8			23.8						42.4	35.4
Actuated g/C Ratio		0.32			0.32						0.57	0.47
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		860			450						1673	615
v/s Ratio Prot		c0.24									c0.49	
v/s Ratio Perm					0.21							0.42
v/c Ratio		0.74			0.65						0.87	0.88
Uniform Delay, d1		22.9			22.0						13.9	17.9
Progression Factor		0.74			1.33						1.00	1.00
Incremental Delay, d2		4.8			5.6						6.4	16.7
Delay (s)		21.8			34.9						20.3	34.7
Level of Service		C			C						C	C
Approach Delay (s)		21.8			34.9			0.0			24.2	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	400	30	330	170	340	10	110	1146	140	40
Future Volume (vph)	400	30	330	170	340	10	110	1146	140	40
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1494	1794	1615	1471			3430	1294	
Flt Permitted		0.58	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		919	1794	1615	1471			3430	1294	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	435	33	359	185	370	11	120	1246	152	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	468	359	185	381	0	0	1366	149	0
Confl. Peds. (#/hr)							13			6
Confl. Bikes (#/hr)					2	2				2
Parking (#/hr)				0				2		
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		34.8	34.8	19.8	19.8			31.8	31.8	
Effective Green, g (s)		34.8	34.8	19.8	19.8			31.8	31.8	
Actuated g/C Ratio		0.46	0.46	0.26	0.26			0.42	0.42	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		509	832	426	388			1454	548	
v/s Ratio Prot		c0.13	0.20	0.11	0.26					
v/s Ratio Perm		c0.29						0.40	0.12	
v/c Ratio		0.92	0.43	0.43	0.98			0.94	0.27	
Uniform Delay, d1		19.1	13.5	22.9	27.4			20.7	14.1	
Progression Factor		0.91	0.80	1.00	1.00			0.75	0.71	
Incremental Delay, d2		14.6	0.2	0.7	40.7			6.0	0.5	
Delay (s)		32.0	11.0	23.7	68.1			21.5	10.5	
Level of Service		C	B	C	E			C	B	
Approach Delay (s)			22.9	53.6				20.1		
Approach LOS			C	D				C		

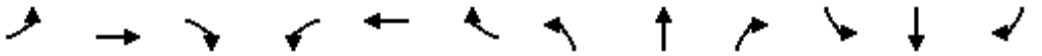
Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	320	40	70	290	70	20	240	70	50	420	50
Future Volume (veh/h)	40	320	40	70	290	70	20	240	70	50	420	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1398	1545	1530	1398	1485	1530	1440	1485	1469	1440	1485	1469
Adj Flow Rate, veh/h	43	348	36	76	315	63	22	261	62	54	457	49
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	409	42	143	356	71	72	563	128	97	612	63
Arrive On Green	0.30	0.30	0.30	0.10	0.10	0.10	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	792	1370	142	785	1193	239	37	973	221	76	1057	109
Grp Volume(v), veh/h	43	0	384	76	0	378	345	0	0	560	0	0
Grp Sat Flow(s),veh/h/ln	792	0	1512	785	0	1432	1231	0	0	1242	0	0
Q Serve(g_s), s	2.9	0.0	17.9	4.5	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.4	0.0	17.9	22.4	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.17	0.06		0.18	0.10		0.09
Lane Grp Cap(c), veh/h	126	0	452	143	0	428	763	0	0	771	0	0
V/C Ratio(X)	0.34	0.00	0.85	0.53	0.00	0.88	0.45	0.00	0.00	0.73	0.00	0.00
Avail Cap(c_a), veh/h	126	0	452	143	0	428	763	0	0	771	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	0.86	0.00	0.00	0.38	0.00	0.00
Uniform Delay (d), s/veh	36.5	0.0	24.7	43.6	0.0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	7.2	0.0	17.9	12.7	0.0	21.4	1.7	0.0	0.0	2.3	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	1.1	0.0	9.7	2.1	0.0	10.3	0.4	0.0	0.0	0.5	0.0	0.0
LnGrp Delay(d),s/veh	43.7	0.0	42.6	56.3	0.0	54.0	1.7	0.0	0.0	2.3	0.0	0.0
LnGrp LOS	D		D	E		D	A			A		
Approach Vol, veh/h		427			454			345			560	
Approach Delay, s/veh		42.7			54.3			1.7			2.3	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.0		48.0		27.0		48.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		22.4		43.4		22.4		43.4
Max Q Clear Time (g_c+I1), s		24.4		2.0		24.4		2.0
Green Ext Time (p_c), s		0.0		1.7		0.0		3.0

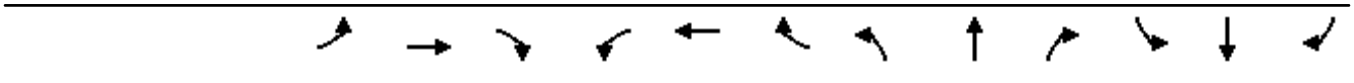
Intersection Summary	
HCM 2010 Ctrl Delay	25.1
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	260	180	40	245	0	0	0	0	50	1046	125
Future Volume (vph)	0	260	180	40	245	0	0	0	0	50	1046	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1665			1769						4119	1127
Flt Permitted		1.00			0.90						1.00	1.00
Satd. Flow (perm)		1665			1604						4119	1127
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	283	196	43	266	0	0	0	0	54	1137	136
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	468	0	0	309	0	0	0	0	0	1191	136
Confl. Peds. (#/hr)			15	15		14			22	22		10
Confl. Bikes (#/hr)			4			2			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		35.8			35.8						30.4	23.4
Effective Green, g (s)		35.8			35.8						30.4	23.4
Actuated g/C Ratio		0.48			0.48						0.41	0.31
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		794			765						1669	351
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.19						0.29	0.12
v/c Ratio		0.59			0.40						0.71	0.39
Uniform Delay, d1		14.2			12.7						18.7	20.2
Progression Factor		0.45			1.32						0.61	0.69
Incremental Delay, d2		3.0			0.9						1.3	1.6
Delay (s)		9.5			17.6						12.6	15.4
Level of Service		A			B						B	B
Approach Delay (s)		9.5			17.6			0.0			12.9	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	110	0	0	160	130	150	1186	20	0	0	0
Future Volume (veh/h)	150	110	0	0	160	130	150	1186	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1620	1573	1620			
Adj Flow Rate, veh/h	163	120	0	0	174	103	163	1289	21			
Adj No. of Lanes	1	1	0	0	1	0	0	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0			
Cap, veh/h	218	491	0	0	254	151	166	1381	24			
Arrive On Green	0.10	0.10	0.00	0.00	0.31	0.31	0.19	0.19	0.19			
Sat Flow, veh/h	976	1573	0	0	816	483	293	2442	42			
Grp Volume(v), veh/h	163	120	0	0	0	277	770	0	703			
Grp Sat Flow(s),veh/h/ln	976	1573	0	0	0	1299	1385	0	1392			
Q Serve(g_s), s	9.4	5.3	0.0	0.0	0.0	14.0	41.5	0.0	37.0			
Cycle Q Clear(g_c), s	23.4	5.3	0.0	0.0	0.0	14.0	41.5	0.0	37.0			
Prop In Lane	1.00		0.00	0.00		0.37	0.21		0.03			
Lane Grp Cap(c), veh/h	218	491	0	0	0	405	783	0	787			
V/C Ratio(X)	0.75	0.24	0.00	0.00	0.00	0.68	0.98	0.00	0.89			
Avail Cap(c_a), veh/h	218	491	0	0	0	405	783	0	787			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.77	0.77	0.00	0.00	0.00	1.00	0.09	0.00	0.09			
Uniform Delay (d), s/veh	41.8	25.5	0.0	0.0	0.0	22.6	30.1	0.0	28.3			
Incr Delay (d2), s/veh	10.4	0.2	0.0	0.0	0.0	4.7	6.5	0.0	1.7			
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	4.0	2.3	0.0	0.0	0.0	5.5	17.3	0.0	14.6			
LnGrp Delay(d),s/veh	52.2	25.7	0.0	0.0	0.0	27.3	36.6	0.0	30.0			
LnGrp LOS	D	C				C	D		C			
Approach Vol, veh/h		283			277			1473				
Approach Delay, s/veh		41.0			27.3			33.5				
Approach LOS		D			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		23.4		42.4		23.4		
Max Q Clear Time (g_c+I1), s		25.4		43.5		16.0		
Green Ext Time (p_c), s		0.0		0.0		0.7		

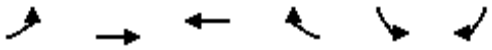
Intersection Summary	
HCM 2010 Ctrl Delay	33.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	265	20	80	340	60	20	240	70	85	370	80
Future Volume (veh/h)	40	265	20	80	340	60	20	240	70	85	370	80
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	0.97		0.91	0.97		0.92	0.99		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1573	1510	1620	1573	1573	1620	1620	1573	1555	1620	1573	1555
Adj Flow Rate, veh/h	43	288	19	87	370	56	22	261	62	92	402	78
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	117	423	28	209	400	60	74	598	136	144	541	99
Arrive On Green	0.30	0.30	0.30	0.10	0.10	0.10	0.19	0.19	0.19	1.00	1.00	1.00
Sat Flow, veh/h	853	1390	92	925	1314	199	39	1024	233	151	926	170
Grp Volume(v), veh/h	43	0	307	87	0	426	345	0	0	572	0	0
Grp Sat Flow(s),veh/h/ln	853	0	1482	925	0	1513	1296	0	0	1248	0	0
Q Serve(g_s), s	1.9	0.0	13.6	7.0	0.0	20.9	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.8	0.0	13.6	20.6	0.0	20.9	17.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.13	0.06		0.18	0.16		0.14
Lane Grp Cap(c), veh/h	117	0	450	209	0	460	808	0	0	784	0	0
V/C Ratio(X)	0.37	0.00	0.68	0.42	0.00	0.93	0.43	0.00	0.00	0.73	0.00	0.00
Avail Cap(c_a), veh/h	117	0	450	209	0	460	808	0	0	784	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.76	0.00	0.00	0.48	0.00	0.00
Uniform Delay (d), s/veh	37.0	0.0	22.9	39.5	0.0	32.9	19.5	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	8.7	0.0	8.1	5.5	0.0	25.5	1.3	0.0	0.0	2.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	6.6	2.1	0.0	12.1	6.6	0.0	0.0	0.6	0.0	0.0
LnGrp Delay(d),s/veh	45.7	0.0	31.0	45.1	0.0	58.4	20.8	0.0	0.0	2.9	0.0	0.0
LnGrp LOS	D		C	D		E	C			A		
Approach Vol, veh/h		350			513			345			572	
Approach Delay, s/veh		32.8			56.1			20.8			2.9	
Approach LOS		C			E			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.0		48.0		27.0		48.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 23		* 44		* 23		* 44
Max Q Clear Time (g_c+I1), s		24.8		19.1		22.9		2.0
Green Ext Time (p_c), s		0.0		3.3		0.0		7.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.6
HCM 2010 LOS	C

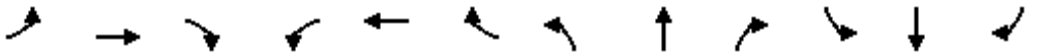
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Traffic Volume (vph)	0	500	430	0	0	55
Future Volume (vph)	0	500	430	0	0	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6	5.6			5.2
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00			0.87
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	1.00			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1573	1573			1188
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1573	1573			1188
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	467	0	0	60
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	0	543	467	0	0	11
Confl. Peds. (#/hr)				39		46
Confl. Bikes (#/hr)				4		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		50.3	50.4			13.8
Effective Green, g (s)		50.3	50.4			13.8
Actuated g/C Ratio		0.67	0.67			0.18
Clearance Time (s)						5.2
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1054	1057			218
v/s Ratio Prot		c0.35	c0.30			
v/s Ratio Perm						0.01
v/c Ratio		0.52	0.44			0.05
Uniform Delay, d1		6.2	5.7			25.2
Progression Factor		1.32	0.48			1.00
Incremental Delay, d2		0.3	0.2			0.1
Delay (s)		8.6	2.9			25.3
Level of Service		A	A			C
Approach Delay (s)		8.6	2.9		25.3	
Approach LOS		A	A		C	

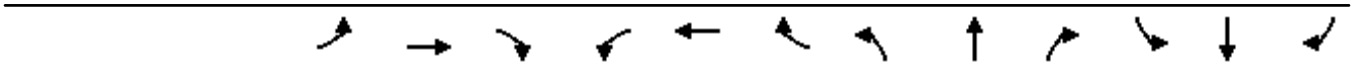
Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	305	200	200	305	0	0	0	0	110	966	190
Future Volume (vph)	0	305	200	200	305	0	0	0	0	110	966	190
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	0.89
Flpb, ped/bikes		1.00	1.00	0.98	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1625	1181	1607	1520						4264	1184
Flt Permitted		1.00	1.00	0.49	1.00						0.99	1.00
Satd. Flow (perm)		1625	1181	824	1520						4264	1184
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	332	217	217	332	0	0	0	0	120	1050	207
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	332	190	217	332	0	0	0	0	0	1170	207
Confl. Peds. (#/hr)			40	40		22			9	9		30
Confl. Bikes (#/hr)			8			4						2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		35.8	35.8	35.8	35.8						30.4	23.4
Effective Green, g (s)		35.8	35.8	35.8	35.8						30.4	23.4
Actuated g/C Ratio		0.48	0.48	0.48	0.48						0.41	0.31
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		775	563	393	725						1728	369
v/s Ratio Prot		0.20			0.22							
v/s Ratio Perm			0.16	c0.26							0.27	0.17
v/c Ratio		0.43	0.34	0.55	0.46						0.68	0.56
Uniform Delay, d1		12.9	12.2	13.9	13.1						18.3	21.5
Progression Factor		0.49	0.42	1.03	1.07						0.32	0.42
Incremental Delay, d2		1.5	1.4	3.8	1.4						1.5	4.4
Delay (s)		7.8	6.6	18.2	15.4						7.4	13.4
Level of Service		A	A	B	B						A	B
Approach Delay (s)		7.3			16.5			0.0			8.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	240	0	0	380	70	130	1146	50	0	0	0
Future Volume (veh/h)	170	240	0	0	380	70	130	1146	50	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1510	1573	1620			
Adj Flow Rate, veh/h	185	261	0	0	413	66	141	1246	50			
Adj No. of Lanes	1	1	0	0	1	0	1	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	137	625	0	0	465	74	706	1356	54			
Arrive On Green	0.79	0.79	0.00	0.00	0.13	0.13	0.16	0.16	0.16			
Sat Flow, veh/h	813	1573	0	0	1170	187	1438	2763	111			
Grp Volume(v), veh/h	185	261	0	0	0	479	141	673	623			
Grp Sat Flow(s),veh/h/ln	813	1573	0	0	0	1357	1438	1494	1379			
Q Serve(g_s), s	3.8	3.8	0.0	0.0	0.0	26.0	6.4	33.3	33.3			
Cycle Q Clear(g_c), s	29.8	3.8	0.0	0.0	0.0	26.0	6.4	33.3	33.3			
Prop In Lane	1.00		0.00	0.00		0.14	1.00		0.08			
Lane Grp Cap(c), veh/h	137	625	0	0	0	539	706	733	677			
V/C Ratio(X)	1.35	0.42	0.00	0.00	0.00	0.89	0.20	0.92	0.92			
Avail Cap(c_a), veh/h	137	625	0	0	0	539	706	733	677			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.91	0.91	0.00	0.00	0.00	1.00	0.17	0.17	0.17			
Uniform Delay (d), s/veh	22.0	5.0	0.0	0.0	0.0	31.0	18.7	30.0	30.0			
Incr Delay (d2), s/veh	196.0	1.9	0.0	0.0	0.0	19.3	0.1	4.3	4.7			
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	10.2	1.8	0.0	0.0	0.0	12.7	2.6	14.7	13.6			
LnGrp Delay(d),s/veh	218.1	6.9	0.0	0.0	0.0	50.2	18.8	34.2	34.7			
LnGrp LOS	F	A				D	B	C	C			
Approach Vol, veh/h		446			479			1437				
Approach Delay, s/veh		94.5			50.2			32.9				
Approach LOS		F			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		34.0		41.0		34.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 30		* 37		* 30		
Max Q Clear Time (g_c+I1), s		31.8		35.3		28.0		
Green Ext Time (p_c), s		0.0		1.0		0.4		

Intersection Summary	
HCM 2010 Ctrl Delay	48.0
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	320	1221	0	0	0	0	0	240	30
Future Volume (veh/h)	0	0	0	320	1221	0	0	0	0	0	240	30
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1530	1485	0				0	1485	1530
Adj Flow Rate, veh/h				348	1327	0				0	261	17
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				586	2028	0				0	525	34
Arrive On Green				0.22	0.22	0.00				0.00	0.21	0.21
Sat Flow, veh/h				755	3124	0				0	2611	164
Grp Volume(v), veh/h				598	1077	0				0	144	134
Grp Sat Flow(s),veh/h/ln				1297	1230	0				0	1411	1290
Q Serve(g_s), s				31.7	29.8	0.0				0.0	6.8	6.9
Cycle Q Clear(g_c), s				31.7	29.8	0.0				0.0	6.8	6.9
Prop In Lane				0.58		0.00				0.00		0.13
Lane Grp Cap(c), veh/h				952	1662	0				0	292	267
V/C Ratio(X)				0.63	0.65	0.00				0.00	0.49	0.50
Avail Cap(c_a), veh/h				952	1662	0				0	440	402
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.68	0.68	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				21.8	21.0	0.0				0.0	26.3	26.3
Incr Delay (d2), s/veh				2.1	1.3	0.0				0.0	1.3	1.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.0	10.5	0.0				0.0	2.8	2.6
LnGrp Delay(d),s/veh				23.9	22.4	0.0				0.0	27.6	27.8
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1675						278	
Approach Delay, s/veh					22.9						27.6	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.9		20.1				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 43		23.4				
Max Q Clear Time (g_c+I1), s		33.7		8.9				
Green Ext Time (p_c), s		5.6		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1416	120	110	250	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1416	120	110	250	0	0	0	0
Number				5	2	12	7	4	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				0	1398	1398	1440	1398	0			
Adj Flow Rate, veh/h				0	1539	97	120	272	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	2536	774	218	404	0			
Arrive On Green				0.00	0.22	0.22	0.07	0.07	0.00			
Sat Flow, veh/h				0	3943	1164	640	1870	0			
Grp Volume(v), veh/h				0	1539	97	216	176	0			
Grp Sat Flow(s),veh/h/ln				0	1272	1164	1238	1209	0			
Q Serve(g_s), s				0.0	27.2	5.0	11.7	10.7	0.0			
Cycle Q Clear(g_c), s				0.0	27.2	5.0	12.8	10.7	0.0			
Prop In Lane				0.00		1.00	0.56		0.00			
Lane Grp Cap(c), veh/h				0	2536	774	351	270	0			
V/C Ratio(X)				0.00	0.61	0.13	0.61	0.65	0.00			
Avail Cap(c_a), veh/h				0	2536	774	421	338	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	0.57	0.57	0.79	0.79	0.00			
Uniform Delay (d), s/veh				0.0	20.5	11.8	32.8	31.9	0.0			
Incr Delay (d2), s/veh				0.0	0.6	0.2	1.5	2.5	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	9.8	1.7	4.6	3.7	0.0			
LnGrp Delay(d),s/veh				0.0	21.1	12.0	34.3	34.4	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1636			392				
Approach Delay, s/veh					20.5			34.3				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.0		21.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 46		* 21				
Max Q Clear Time (g_c+I1), s		29.2		14.8				
Green Ext Time (p_c), s		8.4		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	23.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	1471	0	0	0	0	0	200	60
Future Volume (veh/h)	0	0	0	90	1471	0	0	0	0	0	200	60
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1398	0				0	1398	1440
Adj Flow Rate, veh/h				98	1599	0				0	217	45
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				165	2266	0				0	486	97
Arrive On Green				0.21	0.21	0.00				0.00	0.24	0.24
Sat Flow, veh/h				170	3616	0				0	2091	401
Grp Volume(v), veh/h				631	1066	0				0	139	123
Grp Sat Flow(s),veh/h/ln				1356	1158	0				0	1328	1094
Q Serve(g_s), s				23.1	32.0	0.0				0.0	6.7	7.2
Cycle Q Clear(g_c), s				32.3	32.0	0.0				0.0	6.7	7.2
Prop In Lane				0.16		0.00				0.00		0.37
Lane Grp Cap(c), veh/h				933	1499	0				0	320	263
V/C Ratio(X)				0.68	0.71	0.00				0.00	0.44	0.47
Avail Cap(c_a), veh/h				933	1499	0				0	411	338
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.69	0.69	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.0	23.0	0.0				0.0	24.2	24.3
Incr Delay (d2), s/veh				2.7	2.0	0.0				0.0	0.9	1.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.9	10.7	0.0				0.0	2.5	2.3
LnGrp Delay(d),s/veh				25.7	25.0	0.0				0.0	25.1	25.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1697						262	
Approach Delay, s/veh					25.3						25.3	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		52.7		22.3				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 43		* 23				
Max Q Clear Time (g_c+I1), s		34.3		9.2				
Green Ext Time (p_c), s		5.6		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	40	1311	80	210	135	0	0	140	30
Future Volume (veh/h)	0	0	0	40	1311	80	210	135	0	0	140	30
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				43	1425	78	228	147	0	0	152	21
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				73	2568	145	303	606	0	0	302	42
Arrive On Green				0.56	0.56	0.56	0.02	0.11	0.00	0.00	0.22	0.22
Sat Flow, veh/h				131	4617	261	1748	1835	0	0	1389	192
Grp Volume(v), veh/h				571	474	501	228	147	0	0	0	173
Grp Sat Flow(s),veh/h/ln				1741	1590	1679	1748	1835	0	0	0	1581
Q Serve(g_s), s				16.2	14.2	14.2	0.6	5.5	0.0	0.0	0.0	7.2
Cycle Q Clear(g_c), s				16.2	14.2	14.2	0.6	5.5	0.0	0.0	0.0	7.2
Prop In Lane				0.08		0.16	1.00		0.00	0.00		0.12
Lane Grp Cap(c), veh/h				968	885	934	303	606	0	0	0	344
V/C Ratio(X)				0.59	0.54	0.54	0.75	0.24	0.00	0.00	0.00	0.50
Avail Cap(c_a), veh/h				968	885	934	443	807	0	0	0	390
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.84	0.84	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				11.0	10.5	10.5	33.1	24.8	0.0	0.0	0.0	25.8
Incr Delay (d2), s/veh				2.6	2.3	2.2	6.8	0.4	0.0	0.0	0.0	2.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.5	6.8	7.1	5.2	2.9	0.0	0.0	0.0	3.4
LnGrp Delay(d),s/veh				13.6	12.9	12.7	40.0	25.2	0.0	0.0	0.0	28.2
LnGrp LOS				B	B	B	D	C				C
Approach Vol, veh/h					1546			375			173	
Approach Delay, s/veh					13.1			34.2			28.2	
Approach LOS					B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.0	20.8		46.2		28.8
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			10.0	18.5		33.5		33.0
Max Q Clear Time (g_c+I1), s			2.6	9.2		18.2		7.5
Green Ext Time (p_c), s			1.0	0.8		11.2		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.1
HCM 2010 LOS	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	20	22	108.6%	6.4	2.1	A
	Through	5	4	81.0%	13.4	11.6	B
	Right Turn						
	Subtotal	25	26	103.0%	8.3	3.3	A
SB	Left Turn						
	Through	5	5	103.0%	27.0	18.0	D
	Right Turn	10	12	117.8%	14.0	9.6	B
	Subtotal	15	17	112.9%	20.4	7.4	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	30	24	78.5%	2.4	0.3	A
	Through	1,401	1,328	94.8%	1.8	0.3	A
	Right Turn	10	11	114.1%	1.3	0.4	A
	Subtotal	1,441	1,363	94.6%	1.8	0.3	A
Total		1,481	1,406	94.9%	2.1	0.3	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	83	79	95.3%	25.7	7.2	C
	Through	10	9	88.3%	19.8	18.6	B
	Right Turn						
	Subtotal	93	88	94.6%	24.9	6.2	C
SB	Left Turn						
	Through	40	39	98.4%	45.4	12.1	D
	Right Turn	10	8	84.6%	15.9	10.2	B
	Subtotal	50	48	95.7%	40.9	10.4	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	432	90.6%	22.0	6.2	C
	Through	1,378	1,305	94.7%	7.1	1.4	A
	Right Turn	30	26	87.1%	5.8	2.0	A
	Subtotal	1,885	1,763	93.6%	10.8	2.6	B
Total		2,028	1,899	93.7%	12.2	2.7	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	175	1759	75	41	195	0	0	290	165
Future Volume (veh/h)	0	0	0	175	1759	75	41	195	0	0	290	165
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	1.00		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1620	1573	1620	1620	1573	0	0	1510	1555
Adj Flow Rate, veh/h				190	1912	77	45	212	0	0	315	177
Adj No. of Lanes				0	3	0	0	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				175	1882	78	57	189	0	0	316	178
Arrive On Green				0.16	0.16	0.16	0.13	0.13	0.00	0.00	0.13	0.13
Sat Flow, veh/h				370	3976	164	1	466	0	0	778	437
Grp Volume(v), veh/h				797	666	715	257	0	0	0	0	492
Grp Sat Flow(s),veh/h/ln				1554	1431	1525	467	0	0	0	0	1215
Q Serve(g_s), s				35.5	34.8	35.1	0.2	0.0	0.0	0.0	0.0	30.3
Cycle Q Clear(g_c), s				35.5	34.8	35.1	30.5	0.0	0.0	0.0	0.0	30.3
Prop In Lane				0.24		0.11	0.18		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				736	677	722	246	0	0	0	0	494
V/C Ratio(X)				1.08	0.98	0.99	1.04	0.00	0.00	0.00	0.00	1.00
Avail Cap(c_a), veh/h				736	677	722	246	0	0	0	0	494
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	0.33	0.33
Upstream Filter(I)				0.26	0.26	0.26	1.00	0.00	0.00	0.00	0.00	0.44
Uniform Delay (d), s/veh				31.6	31.4	31.5	27.9	0.0	0.0	0.0	0.0	32.4
Incr Delay (d2), s/veh				44.7	13.9	14.9	69.3	0.0	0.0	0.0	0.0	25.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				24.4	16.4	17.8	9.8	0.0	0.0	0.0	0.0	13.7
LnGrp Delay(d),s/veh				76.3	45.2	46.4	97.2	0.0	0.0	0.0	0.0	58.2
LnGrp LOS				F	D	D	F					E
Approach Vol, veh/h					2179			257			492	
Approach Delay, s/veh					57.0			97.2			58.2	
Approach LOS					E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				35.0		40.0		35.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				30.5		35.5		30.5
Max Q Clear Time (g_c+I1), s				32.5		37.5		32.3
Green Ext Time (p_c), s				0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	295	1944	30	50	50	0	0	0	0
Future Volume (vph)	0	0	0	295	1944	30	50	50	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6				
Lane Util. Factor					0.91		1.00	1.00				
Frpb, ped/bikes					1.00		1.00	1.00				
Flpb, ped/bikes					0.98		0.93	1.00				
Frt					1.00		1.00	1.00				
Flt Protected					0.99		0.95	1.00				
Satd. Flow (prot)					3698		1057	1237				
Flt Permitted					0.99		0.95	1.00				
Satd. Flow (perm)					3698		1057	1237				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	321	2113	33	54	54	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2465	0	54	54	0	0	0	0
Confl. Peds. (#/hr)			73	73		38	49		63			49
Confl. Bikes (#/hr)						2			2			2
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA				
Protected Phases					6			4				
Permitted Phases				6			4					
Actuated Green, G (s)					51.8		19.0	19.0				
Effective Green, g (s)					51.8		19.0	19.0				
Actuated g/C Ratio					0.58		0.21	0.21				
Clearance Time (s)					11.6		7.6	7.6				
Vehicle Extension (s)					5.0		5.0	5.0				
Lane Grp Cap (vph)					2128		223	261				
v/s Ratio Prot								0.04				
v/s Ratio Perm					0.67		c0.05					
v/c Ratio					1.16		0.24	0.21				
Uniform Delay, d1					19.1		29.5	29.3				
Progression Factor					1.00		1.00	1.00				
Incremental Delay, d2					77.1		1.2	0.8				
Delay (s)					96.2		30.7	30.1				
Level of Service					F		C	C				
Approach Delay (s)		0.0			96.2			30.4			0.0	
Approach LOS		A			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	93.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	149.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

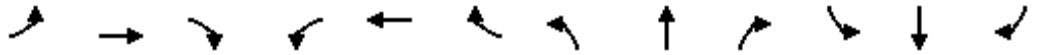
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	455	1678	0	0	0	0	0	825	541
Future Volume (veh/h)	0	0	0	455	1678	0	0	0	0	0	825	541
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.84
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1545	1573	0				0	1573	1485
Adj Flow Rate, veh/h				495	1824	0				0	897	579
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				721	2004	0				0	1955	481
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1471	4718	0				0	4435	1057
Grp Volume(v), veh/h				495	1824	0				0	897	579
Grp Sat Flow(s),veh/h/ln				1471	1573	0				0	1431	1057
Q Serve(g_s), s				24.4	28.6	0.0				0.0	14.3	34.1
Cycle Q Clear(g_c), s				24.4	28.6	0.0				0.0	14.3	34.1
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				721	2004	0				0	1955	481
V/C Ratio(X)				0.69	0.91	0.00				0.00	0.46	1.20
Avail Cap(c_a), veh/h				724	2013	0				0	1955	481
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				0.18	0.18	0.00				0.00	0.75	0.75
Uniform Delay (d), s/veh				29.0	30.8	0.0				0.0	23.4	31.9
Incr Delay (d2), s/veh				0.5	1.3	0.0				0.0	0.6	105.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.1	12.7	0.0				0.0	5.8	24.1
LnGrp Delay(d),s/veh				29.5	32.2	0.0				0.0	24.0	137.5
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2319						1476	
Approach Delay, s/veh					31.6						68.5	
Approach LOS					C						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						35.9		39.1
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						32.0		34.0
Max Q Clear Time (g_c+I1), s						30.6		36.1
Green Ext Time (p_c), s						1.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.0
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1100	120	1043	1211	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1100	120	1043	1211	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1485	1485	1398	1398	0			
Adj Flow Rate, veh/h				0	1196	104	1134	1316	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	1332	389	1468	1542	0			
Arrive On Green				0.00	0.33	0.33	0.18	0.18	0.00			
Sat Flow, veh/h				0	4189	1184	2663	2796	0			
Grp Volume(v), veh/h				0	1196	104	1134	1316	0			
Grp Sat Flow(s),veh/h/ln				0	1352	1184	1331	1398	0			
Q Serve(g_s), s				0.0	21.1	4.8	30.4	34.2	0.0			
Cycle Q Clear(g_c), s				0.0	21.1	4.8	30.4	34.2	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1332	389	1468	1542	0			
V/C Ratio(X)				0.00	0.90	0.27	0.77	0.85	0.00			
Avail Cap(c_a), veh/h				0	1379	403	1468	1542	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	0.09	0.09	0.00			
Uniform Delay (d), s/veh				0.0	24.0	18.5	26.2	27.7	0.0			
Incr Delay (d2), s/veh				0.0	8.0	0.4	0.4	0.6	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	8.8	1.6	11.3	13.4	0.0			
LnGrp Delay(d),s/veh				0.0	32.0	18.9	26.6	28.3	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1300			2450				
Approach Delay, s/veh					30.9			27.5				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				45.9		29.1		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				40.5		25.5		
Max Q Clear Time (g_c+I1), s				36.2		23.1		
Green Ext Time (p_c), s				3.8		1.6		

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2061	90	0	0	0	0	0	270	80	475	0
Future Volume (veh/h)	0	2061	90	0	0	0	0	0	270	80	475	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97	0.99		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	0	1660	1710				0	1573	1620	1748	1748	0
Adj Flow Rate, veh/h	0	2240	91				0	0	277	87	516	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	420	246	565	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.32	0.11	0.11	0.00
Sat Flow, veh/h		0					0	0	1300	1072	1748	0
Grp Volume(v), veh/h		0.0					0	0	277	87	516	0
Grp Sat Flow(s),veh/h/ln							0	0	1300	1072	1748	0
Q Serve(g_s), s							0.0	0.0	13.7	6.0	21.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	13.7	19.7	21.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	420	246	565	0
V/C Ratio(X)							0.00	0.00	0.66	0.35	0.91	0.00
Avail Cap(c_a), veh/h							0	0	440	263	592	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.86	0.86	0.00
Uniform Delay (d), s/veh							0.0	0.0	21.8	38.2	32.5	0.0
Incr Delay (d2), s/veh							0.0	0.0	2.6	0.3	15.7	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							0.0	0.0	5.2	1.8	13.1	0.0
LnGrp Delay(d),s/veh							0.0	0.0	24.4	38.5	48.2	0.0
LnGrp LOS									C	D	D	
Approach Vol, veh/h								277			603	
Approach Delay, s/veh								24.4			46.8	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				28.8				28.8
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				25.4				25.4
Max Q Clear Time (g_c+I1), s				23.9				15.7
Green Ext Time (p_c), s				0.3				0.6

Intersection Summary		
HCM 2010 Ctrl Delay		39.8
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2301	0	0	0	0	0	225	100	0	0	0
Future Volume (veh/h)	110	2301	0	0	0	0	0	225	100	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1485	0				0	1485	1440			
Adj Flow Rate, veh/h	120	2501	0				0	245	107			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	166	2789	0				0	361	152			
Arrive On Green	0.23	0.23	0.00				0.00	0.18	0.18			
Sat Flow, veh/h	159	3990	0				0	1966	827			
Grp Volume(v), veh/h	927	1694	0				0	183	169			
Grp Sat Flow(s),veh/h/ln	1446	1352	0				0	1485	1308			
Q Serve(g_s), s	39.4	45.6	0.0				0.0	8.6	9.1			
Cycle Q Clear(g_c), s	46.9	45.6	0.0				0.0	8.6	9.1			
Prop In Lane	0.13		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	1065	1890	0				0	273	240			
V/C Ratio(X)	0.87	0.90	0.00				0.00	0.67	0.70			
Avail Cap(c_a), veh/h	1065	1890	0				0	412	363			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.16	0.16	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	26.6	26.2	0.0				0.0	28.5	28.7			
Incr Delay (d2), s/veh	1.7	1.2	0.0				0.0	6.0	7.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	19.3	17.4	0.0				0.0	4.0	3.8			
LnGrp Delay(d),s/veh	28.3	27.4	0.0				0.0	34.5	36.5			
LnGrp LOS	C	C						C	D			
Approach Vol, veh/h		2621						352				
Approach Delay, s/veh		27.8						35.5				
Approach LOS		C						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				18.0		57.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		45.4		
Max Q Clear Time (g_c+I1), s				11.1		48.9		
Green Ext Time (p_c), s				2.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2326	70	0	0	0	0	0	170	70	230	0
Future Volume (veh/h)	0	2326	70	0	0	0	0	0	170	70	230	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.93	0.97		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	0	1485	1382				0	1573	1591	1545	1485	0
Adj Flow Rate, veh/h	0	2528	72				0	0	165	76	250	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	291	216	346	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.23	0.08	0.08	0.00
Sat Flow, veh/h		0					0	0	1247	1036	1485	0
Grp Volume(v), veh/h		0.0					0	0	165	76	250	0
Grp Sat Flow(s),veh/h/ln							0	0	1247	1036	1485	0
Q Serve(g_s), s							0.0	0.0	8.8	5.4	12.3	0.0
Cycle Q Clear(g_c), s							0.0	0.0	8.8	14.2	12.3	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	291	216	346	0
V/C Ratio(X)							0.00	0.00	0.57	0.35	0.72	0.00
Avail Cap(c_a), veh/h							0	0	357	272	426	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh							0.0	0.0	25.4	37.4	32.2	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.7	0.3	2.8	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	3.1	1.6	5.3	0.0
LnGrp Delay(d),s/veh							0.0	0.0	26.1	37.7	35.1	0.0
LnGrp LOS									C	D	D	
Approach Vol, veh/h								165			326	
Approach Delay, s/veh								26.1			35.7	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				22.0				22.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				21.5				21.5
Max Q Clear Time (g_c+I1), s				16.2				10.8
Green Ext Time (p_c), s				0.4				0.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	2251	205	0	0	0	0	260	20	50	125	0
Future Volume (veh/h)	100	2251	205	0	0	0	0	260	20	50	125	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	109	2447	210				0	283	13	54	136	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	124	2930	253				0	448	20	156	366	0
Arrive On Green	0.22	0.22	0.22				0.00	0.15	0.15	0.01	0.07	0.00
Sat Flow, veh/h	187	4423	383				0	3147	140	1581	1660	0
Grp Volume(v), veh/h	1013	840	914				0	145	151	54	136	0
Grp Sat Flow(s),veh/h/ln	1738	1590	1664				0	1577	1627	1581	1660	0
Q Serve(g_s), s	42.3	37.5	39.3				0.0	6.5	6.6	0.0	5.9	0.0
Cycle Q Clear(g_c), s	42.3	37.5	39.3				0.0	6.5	6.6	0.0	5.9	0.0
Prop In Lane	0.11		0.23				0.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	1152	1054	1103				0	231	238	156	366	0
V/C Ratio(X)	0.88	0.80	0.83				0.00	0.63	0.64	0.35	0.37	0.00
Avail Cap(c_a), veh/h	1152	1054	1103				0	336	347	170	487	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	26.4	24.5	25.2				0.0	30.1	30.1	35.9	29.8	0.0
Incr Delay (d2), s/veh	1.0	0.6	0.7				0.0	5.9	5.9	2.3	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.7	16.7	18.4				0.0	3.2	3.3	1.2	2.8	0.0
LnGrp Delay(d),s/veh	27.4	25.1	25.9				0.0	36.0	36.0	38.2	30.9	0.0
LnGrp LOS	C	C	C					D	D	D	C	
Approach Vol, veh/h		2766						296			190	
Approach Delay, s/veh		26.2						36.0			33.0	
Approach LOS		C						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		54.3		20.7			5.6	15.2
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		44.2		* 22			* 2	* 16
Max Q Clear Time (g_c+I1), s		44.3		7.9			2.0	8.6
Green Ext Time (p_c), s		0.0		0.8			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	37	33	90.5%	19.9	7.3	C
	Through						
	Right Turn						
	Subtotal	37	33	90.5%	19.9	7.3	C
EB	Left Turn	25	27	107.5%	3.3	0.9	A
	Through	2,306	2,305	99.9%	2.7	0.3	A
	Right Turn						
	Subtotal	2,331	2,332	100.0%	2.7	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,368	2,365	99.9%	2.9	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	52	58	111.1%	15.8	4.7	B
	Right Turn	281	278	99.0%	20.1	5.0	C
	Subtotal	333	336	100.9%	19.4	4.6	B
SB	Left Turn	72	70	97.6%	40.2	6.1	D
	Through	442	394	89.2%	35.4	3.0	D
	Right Turn						
	Subtotal	514	464	90.4%	36.0	3.1	D
EB	Left Turn	41	30	73.6%	15.5	5.6	B
	Through	2,277	2,260	99.2%	15.0	2.2	B
	Right Turn	60	57	94.5%	10.9	2.9	B
	Subtotal	2,378	2,347	98.7%	14.9	2.2	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,225	3,147	97.6%	18.5	1.8	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	2450	40	0	0	0	0	111	50	140	270	0
Future Volume (veh/h)	140	2450	40	0	0	0	0	111	50	140	270	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1398	1382	1342	0
Adj Flow Rate, veh/h	152	2663	26				0	121	41	152	293	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	146	2754	656				0	429	353	245	459	0
Arrive On Green	0.19	0.19	0.19				0.00	0.31	0.31	0.10	0.10	0.00
Sat Flow, veh/h	252	4741	1130				0	1398	1149	538	1555	0
Grp Volume(v), veh/h	837	1978	26				0	121	41	229	216	0
Grp Sat Flow(s),veh/h/ln	1385	1202	1130				0	1398	1149	872	1160	0
Q Serve(g_s), s	43.6	40.6	1.4				0.0	4.9	1.9	15.1	13.3	0.0
Cycle Q Clear(g_c), s	43.6	40.6	1.4				0.0	4.9	1.9	20.0	13.3	0.0
Prop In Lane	0.18		1.00				0.00		1.00	0.66		0.00
Lane Grp Cap(c), veh/h	805	2095	656				0	429	353	348	356	0
V/C Ratio(X)	1.04	0.94	0.04				0.00	0.28	0.12	0.66	0.60	0.00
Avail Cap(c_a), veh/h	805	2095	656				0	500	411	399	415	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	29.1	13.3				0.0	19.7	18.7	33.8	29.3	0.0
Incr Delay (d2), s/veh	22.1	1.2	0.0				0.0	0.4	0.1	3.3	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.7	13.8	0.4				0.0	1.9	0.6	5.0	4.5	0.0
LnGrp Delay(d),s/veh	52.4	30.4	13.3				0.0	20.1	18.8	37.1	31.2	0.0
LnGrp LOS	F	C	B					C	B	D	C	
Approach Vol, veh/h		2841						162			445	
Approach Delay, s/veh		36.7						19.7			34.3	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		47.8		27.2				27.2
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 40		* 27				* 27
Max Q Clear Time (g_c+I1), s		45.6		6.9				22.0
Green Ext Time (p_c), s		0.0		0.6				0.9

Intersection Summary	
HCM 2010 Ctrl Delay	35.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2505	70	0	0	0	0	50	270	100	200	0
Future Volume (veh/h)	50	2505	70	0	0	0	0	50	270	100	200	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1454	1398	1398	0
Adj Flow Rate, veh/h	54	2723	48				0	54	254	109	217	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	52	2794	615				0	360	310	288	360	0
Arrive On Green	0.19	0.19	0.19				0.00	0.26	0.26	0.26	0.26	0.00
Sat Flow, veh/h	91	4910	1081				0	1398	1204	845	1398	0
Grp Volume(v), veh/h	828	1949	48				0	54	254	109	217	0
Grp Sat Flow(s),veh/h/ln	1394	1202	1081				0	1398	1204	845	1398	0
Q Serve(g_s), s	42.7	40.1	2.7				0.0	2.2	14.9	8.6	10.2	0.0
Cycle Q Clear(g_c), s	42.7	40.1	2.7				0.0	2.2	14.9	10.8	10.2	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	793	2053	615				0	360	310	288	360	0
V/C Ratio(X)	1.04	0.95	0.08				0.00	0.15	0.82	0.38	0.60	0.00
Avail Cap(c_a), veh/h	793	2053	615				0	513	441	381	513	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.5	29.4	14.2				0.0	21.5	26.2	25.7	24.5	0.0
Incr Delay (d2), s/veh	23.8	1.4	0.0				0.0	0.2	8.0	0.8	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.7	13.6	0.8				0.0	0.9	5.6	2.1	4.1	0.0
LnGrp Delay(d),s/veh	54.2	30.8	14.3				0.0	21.7	34.2	26.5	26.1	0.0
LnGrp LOS	F	C	B					C	C	C	C	
Approach Vol, veh/h		2825						308			326	
Approach Delay, s/veh		37.4						32.0			26.2	
Approach LOS		D						C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		49.2		25.8				25.8
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		34.5		27.5				27.5
Max Q Clear Time (g_c+I1), s		44.7		16.9				12.8
Green Ext Time (p_c), s		0.0		2.4				2.8

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1266	1449	0	0	0	0	0	0	220	1060	0
Future Volume (veh/h)	0	1266	1449	0	0	0	0	0	0	220	1060	0
Number	5	2	12							7	4	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	0	1485	1485							1485	1485	0
Adj Flow Rate, veh/h	0	1376	1562							239	1152	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.92	0.92	0.92							0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3							3	3	0
Cap, veh/h	0	2406	1364							406	852	0
Arrive On Green	0.00	0.18	0.18							0.09	0.09	0.00
Sat Flow, veh/h	0	4456	2525							1415	2971	0
Grp Volume(v), veh/h	0	1376	1562							239	1152	0
Grp Sat Flow(s),veh/h/ln	0	1485	1263							1415	1485	0
Q Serve(g_s), s	0.0	21.2	40.5							12.1	21.5	0.0
Cycle Q Clear(g_c), s	0.0	21.2	40.5							12.1	21.5	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2406	1364							406	852	0
V/C Ratio(X)	0.00	0.57	1.15							0.59	1.35	0.00
Avail Cap(c_a), veh/h	0	2406	1364							406	852	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.86	0.86	0.00
Uniform Delay (d), s/veh	0.0	22.9	30.8							29.7	34.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	66.4							1.9	165.4	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	0.0	8.7	26.7							5.0	28.4	0.0
LnGrp Delay(d),s/veh	0.0	23.0	97.2							31.7	199.4	0.0
LnGrp LOS		C	F							C	F	
Approach Vol, veh/h		2938									1391	
Approach Delay, s/veh		62.4									170.6	
Approach LOS		E									F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		49.0		26.0				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		40.5		21.5				
Max Q Clear Time (g_c+I1), s		42.5		23.5				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	97.2
HCM 2010 LOS	F

Notes
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	776	880	0	0	0	0	0	1488	500	0	0	0
Future Volume (veh/h)	776	880	0	0	0	0	0	1488	500	0	0	0
Number	5	2	12				7	4	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	1454	1485	0				0	1398	1398			
Adj Flow Rate, veh/h	843	957	0				0	1617	516			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	1292	1180	0				0	2003	567			
Arrive On Green	0.13	0.13	0.00				0.00	0.48	0.48			
Sat Flow, veh/h	2769	2971	0				0	4194	1188			
Grp Volume(v), veh/h	843	957	0				0	1617	516			
Grp Sat Flow(s),veh/h/ln	1385	1485	0				0	1398	1188			
Q Serve(g_s), s	22.1	23.5	0.0				0.0	24.6	30.1			
Cycle Q Clear(g_c), s	22.1	23.5	0.0				0.0	24.6	30.1			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1292	1180	0				0	2003	567			
V/C Ratio(X)	0.65	0.81	0.00				0.00	0.81	0.91			
Avail Cap(c_a), veh/h	1292	1180	0				0	2013	570			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.35	0.35	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	29.2	29.8	0.0				0.0	16.7	18.1			
Incr Delay (d2), s/veh	0.9	2.2	0.0				0.0	2.9	19.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.6	10.0	0.0				0.0	10.0	12.8			
LnGrp Delay(d),s/veh	30.1	32.1	0.0				0.0	19.5	37.5			
LnGrp LOS	C	C						B	D			
Approach Vol, veh/h		1800						2133				
Approach Delay, s/veh		31.2						23.9				
Approach LOS		C						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		34.0		41.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 30		* 36				
Max Q Clear Time (g_c+I1), s		25.5		32.1				
Green Ext Time (p_c), s		3.7		3.7				

Intersection Summary	
HCM 2010 Ctrl Delay	27.2
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.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	330	50	10	80	220	63	60	299	160	71	221
Future Volume (veh/h)	20	330	50	10	80	220	63	60	299	160	71	221
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94		1.00		0.97	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2019	2019	2000		1942	1942	2000	1845	1845	1900	1845	1845
Adj Flow Rate, veh/h	22	359	46		87	239	56	65	325	150	77	240
Adj No. of Lanes	1	1	0		1	1	0	1	1	0	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
Percent Heavy Veh, %	3	3	3		3	3	3	3	3	3	3	3
Cap, veh/h	58	433	56		153	456	107	164	375	173	178	547
Arrive On Green	0.03	0.25	0.25		0.08	0.30	0.30	0.09	0.32	0.32	0.10	0.33
Sat Flow, veh/h	1923	1741	223		1849	1513	354	1757	1182	546	1757	1682
Grp Volume(v), veh/h	22	0	405		87	0	295	65	0	475	77	0
Grp Sat Flow(s),veh/h/ln	1923	0	1965		1849	0	1867	1757	0	1728	1757	0
Q Serve(g_s), s	0.8	0.0	13.3		3.1	0.0	9.0	2.4	0.0	17.7	2.8	0.0
Cycle Q Clear(g_c), s	0.8	0.0	13.3		3.1	0.0	9.0	2.4	0.0	17.7	2.8	0.0
Prop In Lane	1.00		0.11		1.00		0.19	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	58	0	489		153	0	563	164	0	548	178	0
V/C Ratio(X)	0.38	0.00	0.83		0.57	0.00	0.52	0.40	0.00	0.87	0.43	0.00
Avail Cap(c_a), veh/h	225	0	635		270	0	658	231	0	677	231	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
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	0.0	24.3		30.2	0.0	19.8	29.2	0.0	22.0	28.9	0.0
Incr Delay (d2), s/veh	1.5	0.0	7.0		1.2	0.0	0.8	0.6	0.0	9.8	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	8.2		1.6	0.0	4.7	1.2	0.0	9.9	1.4	0.0
LnGrp Delay(d),s/veh	34.1	0.0	31.3		31.4	0.0	20.6	29.8	0.0	31.7	29.5	0.0
LnGrp LOS	C		C		C		C	C		C	C	
Approach Vol, veh/h		427				382			540			335
Approach Delay, s/veh		31.5				23.0			31.5			21.2
Approach LOS		C				C			C			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	21.9	10.4	26.4	6.1	25.5	10.9	25.9
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	22.1	9.0	* 27	8.0	24.1	9.0	* 27
Max Q Clear Time (g_c+I1), s	5.1	15.3	4.4	9.7	2.8	11.0	4.8	19.7
Green Ext Time (p_c), s	0.1	1.0	0.0	0.9	0.0	0.9	0.0	1.3

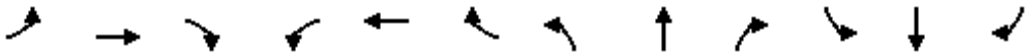
Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	20
Future Volume (veh/h)	20
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.92
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	18
Adj No. of Lanes	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	3
Cap, veh/h	41
Arrive On Green	0.33
Sat Flow, veh/h	126
Grp Volume(v), veh/h	258
Grp Sat Flow(s),veh/h/ln	1809
Q Serve(g_s), s	7.7
Cycle Q Clear(g_c), s	7.7
Prop In Lane	0.07
Lane Grp Cap(c), veh/h	588
V/C Ratio(X)	0.44
Avail Cap(c_a), veh/h	709
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	18.2
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.9
LnGrp Delay(d),s/veh	18.7
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	585	75	0	740	0	0
Future Volume (vph)	585	75	0	740	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			3.0		
Lane Util. Factor	1.00			1.00		
Frpb, ped/bikes	0.99			1.00		
Flpb, ped/bikes	1.00			1.00		
Frt	0.98			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	1540			1573		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	1540			1573		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	82	0	804	0	0
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	712	0	0	804	0	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA		
Protected Phases	2			3 4 6		
Permitted Phases						
Actuated Green, G (s)	34.4			51.8		
Effective Green, g (s)	34.4			46.2		
Actuated g/C Ratio	0.46			0.62		
Clearance Time (s)	5.6					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	706			968		
v/s Ratio Prot	c0.46			c0.51		
v/s Ratio Perm						
v/c Ratio	1.01			0.83		
Uniform Delay, d1	20.3			11.3		
Progression Factor	0.97			0.51		
Incremental Delay, d2	30.6			0.6		
Delay (s)	50.4			6.3		
Level of Service	D			A		
Approach Delay (s)	50.4			6.3	0.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

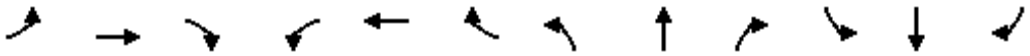


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	390	50	0	380	0	0	0	0	20	20	30
Future Volume (vph)	0	390	50	0	380	0	0	0	0	20	20	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6						5.6	
Lane Util. Factor		1.00			1.00						1.00	
Frpb, ped/bikes		0.99			1.00						0.98	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.98			1.00						0.94	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		1541			1573						1432	
Flt Permitted		1.00			1.00						0.99	
Satd. Flow (perm)		1541			1573						1432	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	424	54	0	413	0	0	0	0	22	22	33
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	473	0	0	413	0	0	0	0	0	48	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA					Perm	NA	
Protected Phases		2			4 6						8	
Permitted Phases										8		
Actuated Green, G (s)		39.3			55.7						8.1	
Effective Green, g (s)		39.3			55.7						8.1	
Actuated g/C Ratio		0.52			0.74						0.11	
Clearance Time (s)		5.6									5.6	
Vehicle Extension (s)		3.0									1.5	
Lane Grp Cap (vph)		807			1168						154	
v/s Ratio Prot		c0.31			c0.26							
v/s Ratio Perm											0.03	
v/c Ratio		0.59			0.35						0.31	
Uniform Delay, d1		12.3			3.4						30.9	
Progression Factor		0.57			0.09						0.85	
Incremental Delay, d2		1.8			0.1						0.0	
Delay (s)		8.8			0.4						26.2	
Level of Service		A			A						C	
Approach Delay (s)		8.8			0.4			0.0			26.2	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

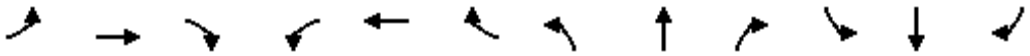
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	585	0	0	730	10	20
Future Volume (vph)	585	0	0	730	10	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			5.6	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1573			1573	1408	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1573			1573	1408	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	0	0	793	11	22
RTOR Reduction (vph)	0	0	0	0	19	0
Lane Group Flow (vph)	636	0	0	793	14	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	52.4			34.4	11.8	
Effective Green, g (s)	47.2			34.4	11.8	
Actuated g/C Ratio	0.63			0.46	0.16	
Clearance Time (s)				5.6		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	989			721	221	
v/s Ratio Prot	c0.40			c0.50	c0.01	
v/s Ratio Perm						
v/c Ratio	0.64			1.10	0.07	
Uniform Delay, d1	8.7			20.3	26.9	
Progression Factor	0.45			1.16	1.05	
Incremental Delay, d2	0.1			57.1	0.0	
Delay (s)	4.0			80.6	28.4	
Level of Service	A			F	C	
Approach Delay (s)	4.0			80.6	28.4	
Approach LOS	A			F	C	

Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	410	0	0	350	20	30	10	30	0	0	0
Future Volume (vph)	0	410	0	0	350	20	30	10	30	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.98				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1557			1422				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1557			1422				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	0	0	380	22	33	11	33	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	446	0	0	400	0	0	49	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		53.0			39.3			10.8				
Effective Green, g (s)		53.0			39.3			10.8				
Actuated g/C Ratio		0.71			0.52			0.14				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1111			815			204				
v/s Ratio Prot		c0.28			c0.26			c0.03				
v/s Ratio Perm												
v/c Ratio		0.40			0.49			0.24				
Uniform Delay, d1		4.5			11.4			28.5				
Progression Factor		0.02			0.65			1.26				
Incremental Delay, d2		0.1			2.0			0.1				
Delay (s)		0.1			9.4			36.1				
Level of Service		A			A			D				
Approach Delay (s)		0.1			9.4			36.1			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	500	0	0	420	70	10	10	10	0	0	0
Future Volume (vph)	0	500	0	0	420	70	10	10	10	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1517			1464				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1517			1464				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	0	0	457	76	11	11	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	543	0	0	525	0	0	24	0	0	0	0
Confl. Peds. (#/hr)	39		22			39			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		50.3			30.9			13.9				
Effective Green, g (s)		50.3			30.9			13.9				
Actuated g/C Ratio		0.67			0.41			0.19				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1054			625			271				
v/s Ratio Prot		c0.35			c0.35			c0.02				
v/s Ratio Perm												
v/c Ratio		0.52			0.84			0.09				
Uniform Delay, d1		6.2			19.8			25.3				
Progression Factor		0.07			0.98			1.01				
Incremental Delay, d2		0.4			11.5			0.1				
Delay (s)		0.8			30.9			25.7				
Level of Service		A			C			C				
Approach Delay (s)		0.8			30.9			25.7			0.0	
Approach LOS		A			C			C			A	

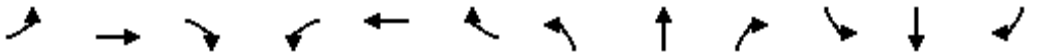
Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	495	20	70	550	70	40	525	60	0	400	320
Future Volume (veh/h)	280	495	20	70	550	70	40	525	60	0	400	320
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.99		0.93	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1800	1694	1728	0	1765	1728
Adj Flow Rate, veh/h	292	516	19	73	573	67	42	547	52	0	417	144
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	279	943	35	397	551	64	97	1035	96	0	937	319
Arrive On Green	0.17	0.59	0.59	0.75	0.75	0.75	0.77	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1597	1606	59	819	1469	172	119	2672	248	0	2506	823
Grp Volume(v), veh/h	292	0	535	73	0	640	332	0	309	0	287	274
Grp Sat Flow(s),veh/h/ln	1597	0	1665	819	0	1641	1563	0	1477	0	1676	1565
Q Serve(g_s), s	14.0	0.0	15.6	2.2	0.0	30.0	0.0	0.0	6.5	0.0	10.1	10.4
Cycle Q Clear(g_c), s	14.0	0.0	15.6	2.2	0.0	30.0	5.8	0.0	6.5	0.0	10.1	10.4
Prop In Lane	1.00		0.04	1.00		0.10	0.13		0.17	0.00		0.53
Lane Grp Cap(c), veh/h	279	0	978	397	0	615	656	0	572	0	650	606
V/C Ratio(X)	1.05	0.00	0.55	0.18	0.00	1.04	0.51	0.00	0.54	0.00	0.44	0.45
Avail Cap(c_a), veh/h	279	0	978	397	0	615	656	0	572	0	650	606
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.76	0.00	0.76	0.75	0.00	0.75	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	10.0	6.5	0.0	10.0	6.2	0.0	6.2	0.0	18.1	18.2
Incr Delay (d2), s/veh	66.1	0.0	2.2	0.8	0.0	42.5	2.1	0.0	2.7	0.0	2.2	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	11.3	0.0	7.7	0.6	0.0	19.9	2.9	0.0	2.8	0.0	5.1	4.9
LnGrp Delay(d),s/veh	99.1	0.0	12.2	7.3	0.0	52.5	8.3	0.0	9.0	0.0	20.3	20.6
LnGrp LOS	F		B	A		F	A		A		C	C
Approach Vol, veh/h		827			713			641			561	
Approach Delay, s/veh		42.9			47.9			8.6			20.4	
Approach LOS		D			D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.2		35.8	17.0	34.2		35.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 47		24.4	14.0	* 30		24.4
Max Q Clear Time (g_c+I1), s		17.6		8.5	16.0	32.0		12.4
Green Ext Time (p_c), s		5.8		5.2	0.0	0.0		3.8

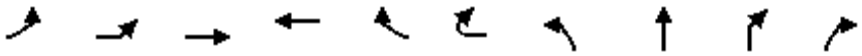
Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	50	40	180	0	0	0	0	250	1226	495
Future Volume (vph)	0	490	50	40	180	0	0	0	0	250	1226	495
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		1.00			1.00						1.00	0.98
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.99			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2769			1781						2992	1321
Flt Permitted		1.00			0.82						0.99	1.00
Satd. Flow (perm)		2769			1474						2992	1321
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	510	52	42	188	0	0	0	0	260	1277	516
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	230	0	0	0	0	0	1537	516
Confl. Peds. (#/hr)			15	15		4			11			
Confl. Bikes (#/hr)			3			3			3			2
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		23.8			23.8						47.4	40.4
Effective Green, g (s)		23.8			23.8						47.4	40.4
Actuated g/C Ratio		0.30			0.30						0.59	0.50
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		823			438						1772	667
v/s Ratio Prot		c0.20									c0.51	
v/s Ratio Perm					0.16							0.39
v/c Ratio		0.67			0.53						0.87	0.77
Uniform Delay, d1		24.7			23.4						13.7	16.1
Progression Factor		0.46			0.42						1.00	1.00
Incremental Delay, d2		3.8			3.8						6.0	8.5
Delay (s)		15.2			13.5						19.7	24.6
Level of Service		B			B						B	C
Approach Delay (s)		15.2			13.5			0.0			20.9	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



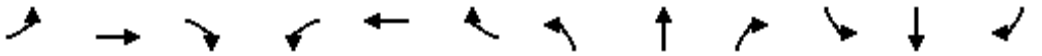
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	400	20	320	145	320	20	70	1623	200	60
Future Volume (vph)	400	20	320	145	320	20	70	1623	200	60
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1509	1812	1812	1485			3678	1316	
Flt Permitted		0.62	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		986	1812	1812	1485			3678	1316	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	417	21	333	151	333	21	73	1691	208	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	39	0
Lane Group Flow (vph)	0	438	333	151	354	0	0	1764	232	0
Confl. Peds. (#/hr)							8			3
Confl. Bikes (#/hr)					4	4				
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		33.8	33.8	18.8	18.8			37.8	37.8	
Effective Green, g (s)		33.8	33.8	18.8	18.8			37.8	37.8	
Actuated g/C Ratio		0.42	0.42	0.24	0.24			0.47	0.47	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		487	765	425	348			1737	621	
v/s Ratio Prot		c0.12	0.18	0.08	c0.24					
v/s Ratio Perm		0.26						0.48	0.18	
v/c Ratio		0.90	0.44	0.36	1.02			1.02	0.37	
Uniform Delay, d1		21.5	16.3	25.5	30.6			21.1	13.5	
Progression Factor		0.68	0.77	1.00	1.00			0.48	0.24	
Incremental Delay, d2		13.7	0.3	0.5	52.7			19.2	0.9	
Delay (s)		28.4	12.8	26.1	83.3			29.4	4.2	
Level of Service		C	B	C	F			C	A	
Approach Delay (s)			21.7	66.2				26.1		
Approach LOS			C	E				C		

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	400	40	30	245	65	60	470	90	90	360	40
Future Volume (veh/h)	90	400	40	30	245	65	60	470	90	90	360	40
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)	0.99		0.97	1.00		0.97	0.98		0.93	0.98		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1412	1560	1530	1412	1500	1530	1440	1500	1469	1440	1500	1469
Adj Flow Rate, veh/h	94	417	38	31	255	56	62	490	76	94	375	34
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	427	622	57	244	525	115	137	933	142	223	812	75
Arrive On Green	0.44	0.44	0.44	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Sat Flow, veh/h	846	1405	128	745	1185	260	189	2110	321	361	1836	170
Grp Volume(v), veh/h	94	0	455	31	0	311	325	0	303	238	0	265
Grp Sat Flow(s),veh/h/ln	846	0	1533	745	0	1446	1339	0	1280	1046	0	1320
Q Serve(g_s), s	6.0	0.0	18.8	2.1	0.0	3.5	0.0	0.0	4.1	0.9	0.0	3.1
Cycle Q Clear(g_c), s	9.5	0.0	18.8	20.9	0.0	3.5	3.5	0.0	4.1	5.1	0.0	3.1
Prop In Lane	1.00		0.08	1.00		0.18	0.19		0.25	0.39		0.13
Lane Grp Cap(c), veh/h	427	0	679	244	0	640	646	0	566	526	0	584
V/C Ratio(X)	0.22	0.00	0.67	0.13	0.00	0.49	0.50	0.00	0.54	0.45	0.00	0.45
Avail Cap(c_a), veh/h	427	0	679	244	0	640	646	0	566	526	0	584
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.82	0.00	0.82	0.68	0.00	0.68
Uniform Delay (d), s/veh	16.3	0.0	17.7	9.8	0.0	2.8	2.8	0.0	2.8	2.7	0.0	2.7
Incr Delay (d2), s/veh	1.2	0.0	5.2	1.0	0.0	2.5	2.3	0.0	3.0	1.9	0.0	1.7
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	1.5	0.0	8.8	0.5	0.0	1.7	1.7	0.0	1.6	1.1	0.0	1.3
LnGrp Delay(d),s/veh	17.4	0.0	22.9	10.8	0.0	5.3	5.1	0.0	5.8	4.6	0.0	4.5
LnGrp LOS	B		C	B		A	A		A	A		A
Approach Vol, veh/h		549			342			628			503	
Approach Delay, s/veh		22.0			5.8			5.4			4.5	
Approach LOS		C			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		40.0		40.0		40.0		40.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		35.4		35.4		35.4		35.4
Max Q Clear Time (g_c+I1), s		20.8		6.1		22.9		7.1
Green Ext Time (p_c), s		2.4		3.0		1.2		2.5

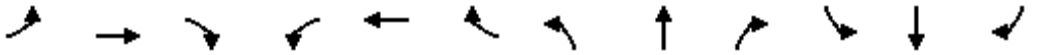
Intersection Summary	
HCM 2010 Ctrl Delay	9.8
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	360	190	70	180	0	0	0	0	50	1126	140
Future Volume (vph)	0	360	190	70	180	0	0	0	0	50	1126	140
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1700			1773						4164	1147
Flt Permitted		1.00			0.67						1.00	1.00
Satd. Flow (perm)		1700			1209						4164	1147
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	375	198	73	188	0	0	0	0	52	1173	146
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	566	0	0	261	0	0	0	0	0	1225	146
Confl. Peds. (#/hr)	12		12	12		12			12	12		7
Confl. Bikes (#/hr)			6			4			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		40.8			40.8						30.4	23.4
Effective Green, g (s)		40.8			40.8						30.4	23.4
Actuated g/C Ratio		0.51			0.51						0.38	0.29
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		867			616						1582	335
v/s Ratio Prot		c0.33										
v/s Ratio Perm					0.22						0.29	0.13
v/c Ratio		0.65			0.42						0.77	0.44
Uniform Delay, d1		14.4			12.3						21.8	22.9
Progression Factor		0.33			0.97						0.70	0.77
Incremental Delay, d2		3.5			1.7						1.9	2.1
Delay (s)		8.3			13.6						17.1	19.6
Level of Service		A			B						B	B
Approach Delay (s)		8.3			13.6			0.0			17.3	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	160	0	0	140	120	100	1548	20	0	0	0
Future Volume (veh/h)	270	160	0	0	140	120	100	1548	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1620	1588	1620			
Adj Flow Rate, veh/h	281	167	0	0	146	120	104	1612	19			
Adj No. of Lanes	1	1	0	0	1	0	0	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	366	683	0	0	297	244	118	1950	24			
Arrive On Green	0.72	0.72	0.00	0.00	0.43	0.43	0.15	0.15	0.15			
Sat Flow, veh/h	994	1588	0	0	691	568	259	4286	52			
Grp Volume(v), veh/h	281	167	0	0	0	266	632	527	576			
Grp Sat Flow(s),veh/h/ln	994	1588	0	0	0	1259	1575	1445	1577			
Q Serve(g_s), s	22.2	2.9	0.0	0.0	0.0	12.2	31.4	28.2	28.2			
Cycle Q Clear(g_c), s	34.4	2.9	0.0	0.0	0.0	12.2	31.4	28.2	28.2			
Prop In Lane	1.00		0.00	0.00		0.45	0.16		0.03			
Lane Grp Cap(c), veh/h	366	683	0	0	0	541	717	658	717			
V/C Ratio(X)	0.77	0.24	0.00	0.00	0.00	0.49	0.88	0.80	0.80			
Avail Cap(c_a), veh/h	366	683	0	0	0	541	717	658	717			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.71	0.71	0.00	0.00	0.00	1.00	0.49	0.49	0.49			
Uniform Delay (d), s/veh	17.6	6.8	0.0	0.0	0.0	16.5	31.9	30.5	30.5			
Incr Delay (d2), s/veh	6.9	0.1	0.0	0.0	0.0	0.7	8.0	5.1	4.7			
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	6.8	1.3	0.0	0.0	0.0	4.3	15.3	12.2	13.3			
LnGrp Delay(d),s/veh	24.5	7.0	0.0	0.0	0.0	17.2	39.8	35.6	35.2			
LnGrp LOS	C	A				B	D	D	D			
Approach Vol, veh/h		448			266			1735				
Approach Delay, s/veh		18.0			17.2			37.0				
Approach LOS		B			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		39.0		41.0		39.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		34.4		36.4		34.4		
Max Q Clear Time (g_c+I1), s		36.4		33.4		14.2		
Green Ext Time (p_c), s		0.0		2.2		1.1		

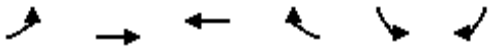
Intersection Summary	
HCM 2010 Ctrl Delay	31.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	245	40	115	280	155	30	430	90	50	310	70
Future Volume (veh/h)	50	245	40	115	280	155	30	430	90	50	310	70
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	0.97		0.90	0.93		0.83	0.97		0.83
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	1588	1525	1620	1588	1588	1620	1620	1588	1555	1620	1588	1555
Adj Flow Rate, veh/h	52	255	34	120	292	135	31	448	73	52	323	52
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	647	86	446	493	228	83	934	147	123	719	125
Arrive On Green	0.50	0.50	0.50	0.16	0.16	0.16	0.13	0.13	0.13	0.80	0.80	0.80
Sat Flow, veh/h	861	1300	173	949	991	458	84	2350	370	167	1809	315
Grp Volume(v), veh/h	52	0	289	120	0	427	297	0	255	210	0	217
Grp Sat Flow(s),veh/h/ln	861	0	1473	949	0	1450	1513	0	1291	975	0	1316
Q Serve(g_s), s	4.0	0.0	9.8	9.3	0.0	21.8	0.0	0.0	14.7	4.4	0.0	4.0
Cycle Q Clear(g_c), s	25.8	0.0	9.8	19.1	0.0	21.8	13.9	0.0	14.7	19.0	0.0	4.0
Prop In Lane	1.00		0.12	1.00		0.32	0.10		0.29	0.25		0.24
Lane Grp Cap(c), veh/h	284	0	733	446	0	721	651	0	513	444	0	523
V/C Ratio(X)	0.18	0.00	0.39	0.27	0.00	0.59	0.46	0.00	0.50	0.47	0.00	0.42
Avail Cap(c_a), veh/h	284	0	733	446	0	721	651	0	513	444	0	523
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.93	0.00	0.93	0.80	0.00	0.80	0.80	0.00	0.80
Uniform Delay (d), s/veh	25.6	0.0	12.6	29.3	0.0	25.9	27.0	0.0	27.3	6.7	0.0	5.4
Incr Delay (d2), s/veh	1.4	0.0	1.6	1.4	0.0	3.3	1.9	0.0	2.7	2.9	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	4.3	2.6	0.0	9.4	6.5	0.0	5.6	1.6	0.0	1.6
LnGrp Delay(d),s/veh	27.0	0.0	14.2	30.6	0.0	29.2	28.8	0.0	30.0	9.5	0.0	7.3
LnGrp LOS	C		B	C		C	C		C	A		A
Approach Vol, veh/h		341			547			552			427	
Approach Delay, s/veh		16.1			29.5			29.4			8.4	
Approach LOS		B			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		44.0		36.0		44.0		36.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 40		* 32		* 40		* 32
Max Q Clear Time (g_c+I1), s		27.8		16.7		23.8		21.0
Green Ext Time (p_c), s		2.3		4.3		4.8		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.2
HCM 2010 LOS	C

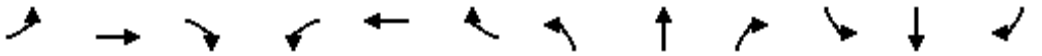
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Traffic Volume (vph)	0	465	440	0	0	120
Future Volume (vph)	0	465	440	0	0	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0			5.6
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00			0.78
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	1.00			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1588	1588			1074
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1588	1588			1074
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	484	458	0	0	125
RTOR Reduction (vph)	0	0	0	0	0	104
Lane Group Flow (vph)	0	484	458	0	0	21
Confl. Peds. (#/hr)				59		78
Confl. Bikes (#/hr)				14		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		54.9	55.1			13.3
Effective Green, g (s)		54.9	55.1			13.3
Actuated g/C Ratio		0.69	0.69			0.17
Clearance Time (s)						5.6
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1089	1093			178
v/s Ratio Prot		c0.30	c0.29			
v/s Ratio Perm						0.02
v/c Ratio		0.44	0.42			0.12
Uniform Delay, d1		5.7	5.4			28.4
Progression Factor		0.95	0.15			1.00
Incremental Delay, d2		0.3	0.2			0.3
Delay (s)		5.7	1.0			28.6
Level of Service		A	A			C
Approach Delay (s)		5.7	1.0		28.6	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

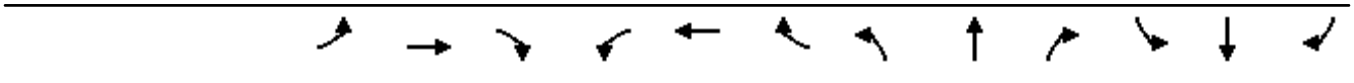
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	285	190	80	260	0	0	0	0	135	1046	205
Future Volume (vph)	0	285	190	80	260	0	0	0	0	135	1046	205
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.93	1.00	1.00						1.00	0.92
Flpb, ped/bikes		1.00	1.00	0.97	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1641	1172	1609	1535						4143	1102
Flt Permitted		1.00	1.00	0.47	1.00						0.99	1.00
Satd. Flow (perm)		1641	1172	792	1535						4143	1102
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	297	198	83	271	0	0	0	0	141	1090	214
RTOR Reduction (vph)	0	0	37	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	297	161	83	271	0	0	0	0	0	1231	214
Confl. Peds. (#/hr)			51	51		28			11	11		19
Confl. Bikes (#/hr)			10			16			1			1
Parking (#/hr)											2	2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		29.8	29.8	29.8	29.8						41.4	34.4
Effective Green, g (s)		29.8	29.8	29.8	29.8						41.4	34.4
Actuated g/C Ratio		0.37	0.37	0.37	0.37						0.52	0.43
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		611	436	295	571						2144	473
v/s Ratio Prot		c0.18			0.18							
v/s Ratio Perm			0.14	0.10							0.30	0.19
v/c Ratio		0.49	0.37	0.28	0.47						0.57	0.45
Uniform Delay, d1		19.2	18.3	17.6	19.1						13.2	16.1
Progression Factor		0.56	0.40	0.93	0.95						0.33	0.47
Incremental Delay, d2		2.5	2.2	2.2	2.6						0.7	2.0
Delay (s)		13.2	9.5	18.5	20.7						5.1	9.7
Level of Service		B	A	B	C						A	A
Approach Delay (s)		11.7			20.2			0.0			5.8	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	230	0	0	210	90	120	1403	170	0	0	0
Future Volume (veh/h)	180	230	0	0	210	90	120	1403	170	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1525	1588	1620			
Adj Flow Rate, veh/h	188	240	0	0	219	83	125	1461	157			
Adj No. of Lanes	1	1	0	0	1	0	1	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	262	631	0	0	374	142	722	1976	212			
Arrive On Green	0.13	0.13	0.00	0.00	0.13	0.13	0.16	0.16	0.16			
Sat Flow, veh/h	963	1588	0	0	941	356	1452	3971	427			
Grp Volume(v), veh/h	188	240	0	0	0	302	125	1063	555			
Grp Sat Flow(s),veh/h/ln	963	1588	0	0	0	1297	1452	1445	1507			
Q Serve(g_s), s	14.3	11.1	0.0	0.0	0.0	17.5	5.9	28.0	28.0			
Cycle Q Clear(g_c), s	31.8	11.1	0.0	0.0	0.0	17.5	5.9	28.0	28.0			
Prop In Lane	1.00		0.00	0.00		0.27	1.00		0.28			
Lane Grp Cap(c), veh/h	262	631	0	0	0	516	722	1438	750			
V/C Ratio(X)	0.72	0.38	0.00	0.00	0.00	0.59	0.17	0.74	0.74			
Avail Cap(c_a), veh/h	262	631	0	0	0	516	722	1438	750			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.00	1.00	0.35	0.35	0.35			
Uniform Delay (d), s/veh	44.1	25.7	0.0	0.0	0.0	28.6	19.3	28.5	28.5			
Incr Delay (d2), s/veh	13.7	1.5	0.0	0.0	0.0	4.8	0.2	1.2	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			
%ile BackOfQ(50%),veh/ln	5.2	5.1	0.0	0.0	0.0	7.0	2.4	11.5	12.2			
LnGrp Delay(d),s/veh	57.9	27.3	0.0	0.0	0.0	33.4	19.5	29.7	30.9			
LnGrp LOS	E	C				C	B	C	C			
Approach Vol, veh/h		428			302			1743				
Approach Delay, s/veh		40.7			33.4			29.4				
Approach LOS		D			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		36.0		44.0		36.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 32		* 40		* 32		
Max Q Clear Time (g_c+I1), s		33.8		30.0		19.5		
Green Ext Time (p_c), s		0.0		6.0		1.0		

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	335	1590	0	0	0	0	0	300	60
Future Volume (veh/h)	0	0	0	335	1590	0	0	0	0	0	300	60
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.94
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.82
Adj Sat Flow, veh/h/ln				1530	1500	0				0	1500	1530
Adj Flow Rate, veh/h				349	1656	0				0	312	43
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				510	2183	0				0	462	63
Arrive On Green				0.23	0.23	0.00				0.00	0.20	0.20
Sat Flow, veh/h				645	3301	0				0	2352	309
Grp Volume(v), veh/h				725	1280	0				0	193	162
Grp Sat Flow(s),veh/h/ln				1339	1242	0				0	1425	1161
Q Serve(g_s), s				40.8	38.4	0.0				0.0	10.0	10.3
Cycle Q Clear(g_c), s				40.8	38.4	0.0				0.0	10.0	10.3
Prop In Lane				0.48		0.00				0.00		0.27
Lane Grp Cap(c), veh/h				986	1707	0				0	289	236
V/C Ratio(X)				0.73	0.75	0.00				0.00	0.67	0.69
Avail Cap(c_a), veh/h				986	1707	0				0	417	339
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.45	0.45	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				25.4	24.5	0.0				0.0	29.4	29.5
Incr Delay (d2), s/veh				2.2	1.4	0.0				0.0	2.7	3.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.7	13.6	0.0				0.0	4.1	3.5
LnGrp Delay(d),s/veh				27.7	25.9	0.0				0.0	32.1	33.0
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					2005						355	
Approach Delay, s/veh					26.6						32.5	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		59.2		20.8				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 48		23.4				
Max Q Clear Time (g_c+I1), s		42.8		12.3				
Green Ext Time (p_c), s		3.9		1.1				

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1785	160	150	330	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1785	160	150	330	0	0	0	0
Number				5	2	12	7	4	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				0	1412	1412	1440	1412	0			
Adj Flow Rate, veh/h				0	1859	133	156	344	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2481	757	247	442	0			
Arrive On Green				0.00	0.21	0.21	0.08	0.08	0.00			
Sat Flow, veh/h				0	3981	1175	700	1822	0			
Grp Volume(v), veh/h				0	1859	133	270	230	0			
Grp Sat Flow(s),veh/h/ln				0	1285	1175	1237	1220	0			
Q Serve(g_s), s				0.0	36.1	7.4	16.9	14.7	0.0			
Cycle Q Clear(g_c), s				0.0	36.1	7.4	17.3	14.7	0.0			
Prop In Lane				0.00		1.00	0.58		0.00			
Lane Grp Cap(c), veh/h				0	2481	757	382	307	0			
V/C Ratio(X)				0.00	0.75	0.18	0.71	0.75	0.00			
Avail Cap(c_a), veh/h				0	2481	757	408	333	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	0.27	0.27	0.74	0.74	0.00			
Uniform Delay (d), s/veh				0.0	25.5	14.1	35.4	34.2	0.0			
Incr Delay (d2), s/veh				0.0	0.6	0.1	3.9	6.3	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	13.0	2.4	6.3	5.5	0.0			
LnGrp Delay(d),s/veh				0.0	26.0	14.3	39.3	40.6	0.0			
LnGrp LOS					C	B	D	D				
Approach Vol, veh/h					1992			500				
Approach Delay, s/veh					25.3			39.9				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		55.7		24.3				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 50		* 22				
Max Q Clear Time (g_c+I1), s		38.1		19.3				
Green Ext Time (p_c), s		8.0		0.6				

Intersection Summary	
HCM 2010 Ctrl Delay	28.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	1850	0	0	0	0	0	290	100
Future Volume (veh/h)	0	0	0	195	1850	0	0	0	0	0	290	100
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.85
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1412	0				0	1412	1440
Adj Flow Rate, veh/h				203	1927	0				0	302	95
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				272	2176	0				0	446	134
Arrive On Green				0.22	0.22	0.00				0.00	0.24	0.24
Sat Flow, veh/h				330	3453	0				0	1904	552
Grp Volume(v), veh/h				786	1344	0				0	217	180
Grp Sat Flow(s),veh/h/ln				1329	1169	0				0	1341	1044
Q Serve(g_s), s				44.3	44.5	0.0				0.0	11.7	12.6
Cycle Q Clear(g_c), s				46.1	44.5	0.0				0.0	11.7	12.6
Prop In Lane				0.26		0.00				0.00		0.53
Lane Grp Cap(c), veh/h				923	1524	0				0	326	254
V/C Ratio(X)				0.85	0.88	0.00				0.00	0.67	0.71
Avail Cap(c_a), veh/h				923	1524	0				0	389	303
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.46	0.46	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				29.0	28.4	0.0				0.0	27.3	27.7
Incr Delay (d2), s/veh				4.8	3.8	0.0				0.0	3.3	6.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				18.2	15.3	0.0				0.0	4.6	4.0
LnGrp Delay(d),s/veh				33.8	32.2	0.0				0.0	30.7	33.7
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					2130						397	
Approach Delay, s/veh					32.8						32.0	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		56.4		23.6				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 48		* 23				
Max Q Clear Time (g_c+I1), s		48.1		14.6				
Green Ext Time (p_c), s		0.2		1.1				

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	80	1695	100	260	175	0	0	180	50
Future Volume (veh/h)	0	0	0	80	1695	100	260	175	0	0	180	50
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				83	1766	96	271	182	0	0	188	38
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				108	2452	137	315	666	0	0	275	56
Arrive On Green				0.53	0.53	0.53	0.03	0.12	0.00	0.00	0.21	0.21
Sat Flow, veh/h				203	4590	257	1765	1853	0	0	1308	264
Grp Volume(v), veh/h				717	597	631	271	182	0	0	0	226
Grp Sat Flow(s),veh/h/ln				1755	1606	1690	1765	1853	0	0	0	1572
Q Serve(g_s), s				25.8	22.0	22.2	5.3	7.2	0.0	0.0	0.0	10.6
Cycle Q Clear(g_c), s				25.8	22.0	22.2	5.3	7.2	0.0	0.0	0.0	10.6
Prop In Lane				0.12		0.15	1.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				937	858	903	315	666	0	0	0	330
V/C Ratio(X)				0.77	0.70	0.70	0.86	0.27	0.00	0.00	0.00	0.68
Avail Cap(c_a), veh/h				937	858	903	327	718	0	0	0	364
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.73	0.73	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				14.7	13.8	13.9	35.8	25.7	0.0	0.0	0.0	29.2
Incr Delay (d2), s/veh				5.9	4.6	4.5	16.4	0.3	0.0	0.0	0.0	6.7
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				13.9	10.7	11.3	7.4	3.7	0.0	0.0	0.0	5.2
LnGrp Delay(d),s/veh				20.6	18.5	18.3	52.2	26.1	0.0	0.0	0.0	35.9
LnGrp LOS				C	B	B	D	C				D
Approach Vol, veh/h					1945			453			226	
Approach Delay, s/veh					19.2			41.7			35.9	
Approach LOS					B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			11.5	21.3		47.2		32.8
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			8.0	18.5		40.5		31.0
Max Q Clear Time (g_c+I1), s			7.3	12.6		27.8		9.2
Green Ext Time (p_c), s			0.1	0.8		11.1		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	24.5
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	41	37	90.8%	15.9	7.3	C
	Through	5	3	69.1%	12.7	16.4	B
	Right Turn						
	Subtotal	46	41	88.5%	16.1	6.6	C
SB	Left Turn						
	Through	15	18	122.9%	34.6	12.8	D
	Right Turn	10	9	92.2%	14.7	9.9	B
	Subtotal	25	28	110.6%	29.0	11.6	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	65	72	110.5%	3.4	0.4	A
	Through	1,829	1,817	99.4%	3.1	0.6	A
	Right Turn	10	6	61.4%	2.1	0.4	A
	Subtotal	1,904	1,895	99.5%	3.1	0.6	A
Total		1,975	1,964	99.4%	3.7	0.6	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	129	129	100.3%	32.3	3.4	C
	Through	20	27	134.4%	34.5	9.3	C
	Right Turn						
	Subtotal	149	156	104.9%	32.7	3.8	C
SB	Left Turn						
	Through	50	50	99.8%	30.4	9.7	C
	Right Turn	10	8	80.6%	18.9	14.5	B
	Subtotal	60	58	96.6%	29.7	8.3	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	253	104.7%	9.3	1.4	A
	Through	1,852	1,822	98.4%	8.2	1.5	A
	Right Turn	40	41	102.7%	8.1	3.6	A
	Subtotal	2,134	2,117	99.2%	8.3	1.4	A
Total		2,343	2,331	99.5%	10.6	1.6	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	110	1814	150	50	345	0	0	285	160
Future Volume (veh/h)	0	0	0	110	1814	150	50	345	0	0	285	160
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.98		1.00	1.00		0.82
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				1620	1588	1620	1620	1588	0	0	1525	1555
Adj Flow Rate, veh/h				115	1890	145	52	359	0	0	297	161
Adj No. of Lanes				0	3	0	0	2	0	0	2	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				132	2293	180	102	668	0	0	536	274
Arrive On Green				0.19	0.19	0.19	0.62	0.62	0.00	0.00	0.10	0.10
Sat Flow, veh/h				229	3984	313	145	2215	0	0	1796	878
Grp Volume(v), veh/h				793	661	696	201	210	0	0	247	211
Grp Sat Flow(s),veh/h/ln				1577	1445	1503	915	1373	0	0	1448	1150
Q Serve(g_s), s				39.1	34.9	35.4	3.9	6.7	0.0	0.0	13.0	14.0
Cycle Q Clear(g_c), s				39.1	34.9	35.4	17.9	6.7	0.0	0.0	13.0	14.0
Prop In Lane				0.14		0.21	0.26		0.00	0.00		0.76
Lane Grp Cap(c), veh/h				908	832	866	342	428	0	0	452	359
V/C Ratio(X)				0.87	0.79	0.80	0.59	0.49	0.00	0.00	0.55	0.59
Avail Cap(c_a), veh/h				936	858	893	342	428	0	0	452	359
HCM Platoon Ratio				0.33	0.33	0.33	2.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				0.29	0.29	0.29	1.00	1.00	0.00	0.00	0.88	0.88
Uniform Delay (d), s/veh				29.6	27.9	28.1	12.6	11.6	0.0	0.0	30.5	31.0
Incr Delay (d2), s/veh				2.9	1.5	1.6	7.2	4.0	0.0	0.0	4.2	6.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.8	14.3	15.2	2.8	2.9	0.0	0.0	5.7	5.1
LnGrp Delay(d),s/veh				32.5	29.4	29.7	19.8	15.6	0.0	0.0	34.7	37.1
LnGrp LOS				C	C	C	B	B			C	D
Approach Vol, veh/h					2150			411			458	
Approach Delay, s/veh					30.6			17.7			35.8	
Approach LOS					C			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.4		50.6		29.4
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				23.5		47.5		23.5
Max Q Clear Time (g_c+I1), s				19.9		41.1		16.0
Green Ext Time (p_c), s				0.6		4.9		1.3

Intersection Summary		
HCM 2010 Ctrl Delay		29.6
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	350	1934	50	125	55	0	0	0	0
Future Volume (vph)	0	0	0	350	1934	50	125	55	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6				
Lane Util. Factor					0.91		1.00	1.00				
Frpb, ped/bikes					1.00		1.00	1.00				
Flpb, ped/bikes					0.96		0.96	1.00				
Frt					1.00		1.00	1.00				
Flt Protected					0.99		0.95	1.00				
Satd. Flow (prot)					3667		1098	1249				
Flt Permitted					0.99		0.95	1.00				
Satd. Flow (perm)					3667		1098	1249				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	365	2015	52	130	57	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2429	0	130	57	0	0	0	0
Confl. Peds. (#/hr)			106	106		44	30		69			30
Confl. Bikes (#/hr)						2			3			8
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA				
Protected Phases					6			4				
Permitted Phases				6			4					
Actuated Green, G (s)					51.8		19.0	19.0				
Effective Green, g (s)					51.8		19.0	19.0				
Actuated g/C Ratio					0.58		0.21	0.21				
Clearance Time (s)					11.6		7.6	7.6				
Vehicle Extension (s)					5.0		5.0	5.0				
Lane Grp Cap (vph)					2110		231	263				
v/s Ratio Prot								0.05				
v/s Ratio Perm					0.66		c0.12					
v/c Ratio					1.15		0.56	0.22				
Uniform Delay, d1					19.1		31.8	29.3				
Progression Factor					1.00		1.00	1.00				
Incremental Delay, d2					74.1		5.1	0.9				
Delay (s)					93.2		36.9	30.2				
Level of Service					F		D	C				
Approach Delay (s)		0.0			93.2			34.8			0.0	
Approach LOS		A			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	89.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	163.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	510	1728	0	0	0	0	0	725	591
Future Volume (veh/h)	0	0	0	510	1728	0	0	0	0	0	725	591
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1560	1588	0				0	1588	1500
Adj Flow Rate, veh/h				531	1800	0				0	755	608
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				716	2009	0				0	2020	509
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1486	4765	0				0	4479	1093
Grp Volume(v), veh/h				531	1800	0				0	755	608
Grp Sat Flow(s),veh/h/ln				1486	1588	0				0	1445	1093
Q Serve(g_s), s				27.9	29.7	0.0				0.0	12.5	37.3
Cycle Q Clear(g_c), s				27.9	29.7	0.0				0.0	12.5	37.3
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				716	2009	0				0	2020	509
V/C Ratio(X)				0.74	0.90	0.00				0.00	0.37	1.19
Avail Cap(c_a), veh/h				721	2025	0				0	2020	509
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				0.09	0.09	0.00				0.00	0.83	0.83
Uniform Delay (d), s/veh				31.9	32.7	0.0				0.0	23.4	33.9
Incr Delay (d2), s/veh				0.4	0.6	0.0				0.0	0.4	102.7
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	13.2	0.0				0.0	5.1	25.8
LnGrp Delay(d),s/veh				32.3	33.3	0.0				0.0	23.8	136.5
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2331						1363	
Approach Delay, s/veh					33.1						74.1	
Approach LOS					C						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						37.7		42.3
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						34.0		37.0
Max Q Clear Time (g_c+I1), s						31.7		39.3
Green Ext Time (p_c), s						2.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.2
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

User approved ignoring U-Turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1235	210	998	1483	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1235	210	998	1483	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.93	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				0	1500	1500	1398	1398	0			
Adj Flow Rate, veh/h				0	1286	200	1127	1424	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	3	3	0			
Cap, veh/h				0	1254	363	1548	1625	0			
Arrive On Green				0.00	0.31	0.31	0.19	0.19	0.00			
Sat Flow, veh/h				0	4230	1184	2663	2796	0			
Grp Volume(v), veh/h				0	1286	200	1127	1424	0			
Grp Sat Flow(s),veh/h/ln				0	1365	1184	1331	1398	0			
Q Serve(g_s), s				0.0	24.5	11.3	31.8	39.6	0.0			
Cycle Q Clear(g_c), s				0.0	24.5	11.3	31.8	39.6	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1254	363	1548	1625	0			
V/C Ratio(X)				0.00	1.03	0.55	0.73	0.88	0.00			
Avail Cap(c_a), veh/h				0	1254	363	1548	1625	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	0.09	0.09	0.00			
Uniform Delay (d), s/veh				0.0	27.8	23.2	26.4	29.5	0.0			
Incr Delay (d2), s/veh				0.0	32.1	1.8	0.3	0.7	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				0.0	12.9	3.8	11.8	15.5	0.0			
LnGrp Delay(d),s/veh				0.0	59.8	25.0	26.7	30.2	0.0			
LnGrp LOS					F	C	C	C				
Approach Vol, veh/h					1486			2551				
Approach Delay, s/veh					55.1			28.7				
Approach LOS					E			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				51.0		29.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				46.5		24.5		
Max Q Clear Time (g_c+I1), s				41.6		26.5		
Green Ext Time (p_c), s				4.3		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	38.4
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1626	110	0	0	0	0	0	435	185	470	0
Future Volume (veh/h)	0	1626	110	0	0	0	0	0	435	185	470	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.96	0.99		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	0	1676	1710				0	1588	1620	1765	1765	0
Adj Flow Rate, veh/h	0	1694	106				0	0	439	193	490	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	575	238	781	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.44	0.15	0.15	0.00
Sat Flow, veh/h		0					0	0	1300	933	1765	0
Grp Volume(v), veh/h		0.0					0	0	439	193	490	0
Grp Sat Flow(s),veh/h/ln							0	0	1300	933	1765	0
Q Serve(g_s), s							0.0	0.0	22.7	12.7	20.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	22.7	35.4	20.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	575	238	781	0
V/C Ratio(X)							0.00	0.00	0.76	0.81	0.63	0.00
Avail Cap(c_a), veh/h							0	0	575	238	781	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.74	0.74	0.00
Uniform Delay (d), s/veh							0.0	0.0	18.8	47.0	28.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	5.4	13.7	0.9	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							0.0	0.0	8.9	5.2	10.4	0.0
LnGrp Delay(d),s/veh							0.0	0.0	24.2	60.7	28.9	0.0
LnGrp LOS									C	E	C	
Approach Vol, veh/h								439			683	
Approach Delay, s/veh								24.2			37.9	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				40.0				40.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				35.4				35.4
Max Q Clear Time (g_c+I1), s				37.4				24.7
Green Ext Time (p_c), s				0.0				1.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	2051	0	0	0	0	0	260	120	0	0	0
Future Volume (veh/h)	200	2051	0	0	0	0	0	260	120	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1500	0				0	1500	1440			
Adj Flow Rate, veh/h	208	2136	0				0	271	117			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	299	2663	0				0	376	157			
Arrive On Green	0.23	0.23	0.00				0.00	0.19	0.19			
Sat Flow, veh/h	346	3798	0				0	1992	833			
Grp Volume(v), veh/h	818	1526	0				0	202	186			
Grp Sat Flow(s),veh/h/ln	1414	1365	0				0	1500	1325			
Q Serve(g_s), s	42.0	42.1	0.0				0.0	10.1	10.6			
Cycle Q Clear(g_c), s	44.0	42.1	0.0				0.0	10.1	10.6			
Prop In Lane	0.25		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	1048	1914	0				0	283	250			
V/C Ratio(X)	0.78	0.80	0.00				0.00	0.71	0.74			
Avail Cap(c_a), veh/h	1048	1914	0				0	390	344			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.37	0.37	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	26.0	25.4	0.0				0.0	30.4	30.6			
Incr Delay (d2), s/veh	2.2	1.3	0.0				0.0	7.2	9.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	17.9	16.3	0.0				0.0	4.7	4.6			
LnGrp Delay(d),s/veh	28.2	26.7	0.0				0.0	37.6	40.4			
LnGrp LOS	C	C						D	D			
Approach Vol, veh/h		2344						388				
Approach Delay, s/veh		27.2						39.0				
Approach LOS		C						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				19.3		60.7		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		50.4		
Max Q Clear Time (g_c+I1), s				12.6		46.0		
Green Ext Time (p_c), s				2.0		4.3		

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2086	90	0	0	0	0	0	250	210	290	0
Future Volume (veh/h)	0	2086	90	0	0	0	0	0	250	210	290	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.90	0.97		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	0	1500	1382				0	1588	1591	1560	1500	0
Adj Flow Rate, veh/h	0	2173	88				0	0	243	219	302	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	359	205	441	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.29	0.10	0.10	0.00
Sat Flow, veh/h		0					0	0	1221	974	1500	0
Grp Volume(v), veh/h		0.0					0	0	243	219	302	0
Grp Sat Flow(s),veh/h/ln							0	0	1221	974	1500	0
Q Serve(g_s), s							0.0	0.0	14.0	9.5	15.6	0.0
Cycle Q Clear(g_c), s							0.0	0.0	14.0	23.5	15.6	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	359	205	441	0
V/C Ratio(X)							0.00	0.00	0.68	1.07	0.69	0.00
Avail Cap(c_a), veh/h							0	0	359	205	441	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.68	0.68	0.00
Uniform Delay (d), s/veh							0.0	0.0	24.9	45.2	32.5	0.0
Incr Delay (d2), s/veh							0.0	0.0	4.2	70.9	2.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	5.1	8.6	6.8	0.0
LnGrp Delay(d),s/veh							0.0	0.0	29.1	116.1	35.1	0.0
LnGrp LOS									C	F	D	
Approach Vol, veh/h								243			521	
Approach Delay, s/veh								29.1			69.1	
Approach LOS								C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				28.0				28.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				23.5				23.5
Max Q Clear Time (g_c+I1), s				25.5				16.0
Green Ext Time (p_c), s				0.0				0.4

Intersection Summary	
HCM 2010 Ctrl Delay	56.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2251	185	0	0	0	0	335	30	120	140	0
Future Volume (veh/h)	110	2251	185	0	0	0	0	335	30	120	140	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.90	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	115	2345	182				0	349	23	125	146	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	134	2881	227				0	516	34	161	431	0
Arrive On Green	0.21	0.21	0.21				0.00	0.17	0.17	0.01	0.08	0.00
Sat Flow, veh/h	208	4483	353				0	3096	197	1597	1744	0
Grp Volume(v), veh/h	969	804	869				0	183	189	125	146	0
Grp Sat Flow(s),veh/h/ln	1754	1606	1684				0	1593	1616	1597	1744	0
Q Serve(g_s), s	42.6	37.8	39.2				0.0	8.6	8.8	0.0	6.3	0.0
Cycle Q Clear(g_c), s	42.6	37.8	39.2				0.0	8.6	8.8	0.0	6.3	0.0
Prop In Lane	0.12		0.21				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	1127	1032	1082				0	273	277	161	431	0
V/C Ratio(X)	0.86	0.78	0.80				0.00	0.67	0.68	0.77	0.34	0.00
Avail Cap(c_a), veh/h	1127	1032	1082				0	321	325	164	482	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.16	0.16	0.16				0.00	1.00	1.00	0.63	0.63	0.00
Uniform Delay (d), s/veh	28.0	26.2	26.7				0.0	31.0	31.1	38.4	30.6	0.0
Incr Delay (d2), s/veh	1.5	1.0	1.1				0.0	7.0	7.3	15.6	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.1	17.1	18.6				0.0	4.3	4.4	3.5	3.1	0.0
LnGrp Delay(d),s/veh	29.5	27.1	27.8				0.0	38.0	38.4	54.0	31.2	0.0
LnGrp LOS	C	C	C					D	D	D	C	
Approach Vol, veh/h		2642						372			271	
Approach Delay, s/veh		28.2						38.2			41.7	
Approach LOS		C						D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		56.0		24.0			6.1	17.9
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		49.1		* 22			* 2	* 16
Max Q Clear Time (g_c+I1), s		44.6		8.3			2.0	10.8
Green Ext Time (p_c), s		4.5		0.8			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	94	96	102.5%	29.9	7.1	D
	Through						
	Right Turn						
	Subtotal	94	96	102.5%	29.9	7.1	D
EB	Left Turn	45	40	89.6%	3.1	0.4	A
	Through	2,391	2,383	99.7%	2.7	0.2	A
	Right Turn						
	Subtotal	2,436	2,423	99.5%	2.7	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,530	2,519	99.6%	3.8	0.6	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	89	87	97.5%	18.4	3.4	B
	Right Turn	433	435	100.6%	31.4	8.8	C
	Subtotal	522	522	100.0%	29.3	7.9	C
SB	Left Turn	117	115	98.1%	31.4	11.3	C
	Through	180	195	108.2%	19.3	4.9	B
	Right Turn						
	Subtotal	297	310	104.2%	23.7	6.6	C
EB	Left Turn	60	65	108.2%	20.4	3.5	C
	Through	2,353	2,307	98.1%	19.9	2.4	B
	Right Turn	42	38	91.4%	16.4	3.5	B
	Subtotal	2,455	2,411	98.2%	19.8	2.4	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,274	3,242	99.0%	21.7	2.2	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	2547	61	0	0	0	0	210	140	150	190	0
Future Volume (veh/h)	235	2547	61	0	0	0	0	210	140	150	190	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1412	1382	1355	0
Adj Flow Rate, veh/h	245	2653	43				0	219	134	156	198	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	222	2597	657				0	473	389	246	409	0
Arrive On Green	0.18	0.18	0.18				0.00	0.34	0.34	0.67	0.67	0.00
Sat Flow, veh/h	397	4637	1172				0	1412	1161	477	1281	0
Grp Volume(v), veh/h	859	2039	43				0	219	134	169	185	0
Grp Sat Flow(s),veh/h/ln	1392	1214	1172				0	1412	1161	525	1172	0
Q Serve(g_s), s	44.8	44.8	2.4				0.0	9.8	6.9	15.9	6.1	0.0
Cycle Q Clear(g_c), s	44.8	44.8	2.4				0.0	9.8	6.9	25.6	6.1	0.0
Prop In Lane	0.29		1.00				0.00		1.00	0.92		0.00
Lane Grp Cap(c), veh/h	779	2040	657				0	473	389	262	393	0
V/C Ratio(X)	1.10	1.00	0.07				0.00	0.46	0.34	0.64	0.47	0.00
Avail Cap(c_a), veh/h	779	2040	657				0	473	389	262	393	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	32.6	15.3				0.0	20.9	20.0	17.5	9.8	0.0
Incr Delay (d2), s/veh	48.2	5.9	0.0				0.0	0.7	0.5	5.3	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	27.7	16.1	0.8				0.0	3.9	2.3	4.0	1.9	0.0
LnGrp Delay(d),s/veh	80.8	38.5	15.4				0.0	21.6	20.5	22.8	10.7	0.0
LnGrp LOS	F	D	B					C	C	C	B	
Approach Vol, veh/h		2941						353			354	
Approach Delay, s/veh		50.5						21.2			16.4	
Approach LOS		D						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		49.0		31.0				31.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 45		* 27				* 27
Max Q Clear Time (g_c+I1), s		46.8		11.8				27.6
Green Ext Time (p_c), s		0.0		1.3				0.0

Intersection Summary	
HCM 2010 Ctrl Delay	44.4
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	2677	120	0	0	0	0	150	370	85	255	0
Future Volume (veh/h)	40	2677	120	0	0	0	0	150	370	85	255	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1468	1412	1412	0
Adj Flow Rate, veh/h	42	2789	80				0	156	351	89	266	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	37	2599	582				0	446	384	254	446	0
Arrive On Green	0.17	0.17	0.17				0.00	0.32	0.32	0.32	0.32	0.00
Sat Flow, veh/h	70	4981	1116				0	1412	1217	710	1412	0
Grp Volume(v), veh/h	845	1986	80				0	156	351	89	266	0
Grp Sat Flow(s),veh/h/ln	1408	1214	1116				0	1412	1217	710	1412	0
Q Serve(g_s), s	41.7	41.7	4.9				0.0	6.8	22.2	8.8	12.7	0.0
Cycle Q Clear(g_c), s	41.7	41.7	4.9				0.0	6.8	22.2	15.6	12.7	0.0
Prop In Lane	0.05		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	735	1901	582				0	446	384	254	446	0
V/C Ratio(X)	1.15	1.05	0.14				0.00	0.35	0.91	0.35	0.60	0.00
Avail Cap(c_a), veh/h	735	1901	582				0	468	403	265	468	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.10	0.10	0.10				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.1	33.1	17.8				0.0	21.1	26.3	27.1	23.1	0.0
Incr Delay (d2), s/veh	68.9	22.3	0.0				0.0	0.5	24.3	0.8	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.3	17.9	1.5				0.0	2.7	10.0	1.8	5.2	0.0
LnGrp Delay(d),s/veh	102.1	55.4	17.9				0.0	21.5	50.7	27.9	25.0	0.0
LnGrp LOS	F	F	B					C	D	C	C	
Approach Vol, veh/h		2911						507			355	
Approach Delay, s/veh		67.9						41.7			25.7	
Approach LOS		E						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.2		31.8				31.8
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		40.5		26.5				26.5
Max Q Clear Time (g_c+I1), s		43.7		24.2				17.6
Green Ext Time (p_c), s		0.0		1.1				3.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1968	1159	0	0	0	0	0	0	390	845	0
Future Volume (veh/h)	0	1968	1159	0	0	0	0	0	0	390	845	0
Number	5	2	12							7	4	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	0	1500	1500							1500	1500	0
Adj Flow Rate, veh/h	0	2050	1176							406	880	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.96	0.96	0.96							0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2							2	2	0
Cap, veh/h	0	2303	1305							465	977	0
Arrive On Green	0.00	0.17	0.17							0.11	0.11	0.00
Sat Flow, veh/h	0	4500	2550							1429	3000	0
Grp Volume(v), veh/h	0	2050	1176							406	880	0
Grp Sat Flow(s),veh/h/ln	0	1500	1275							1429	1500	0
Q Serve(g_s), s	0.0	35.6	36.2							22.4	23.2	0.0
Cycle Q Clear(g_c), s	0.0	35.6	36.2							22.4	23.2	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2303	1305							465	977	0
V/C Ratio(X)	0.00	0.89	0.90							0.87	0.90	0.00
Avail Cap(c_a), veh/h	0	2303	1305							473	994	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.90	0.90	0.00
Uniform Delay (d), s/veh	0.0	31.0	31.3							34.1	34.4	0.0
Incr Delay (d2), s/veh	0.0	0.6	1.1							14.7	10.0	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	0.0	14.9	13.0							10.8	11.0	0.0
LnGrp Delay(d),s/veh	0.0	31.6	32.4							48.8	44.5	0.0
LnGrp LOS		C	C							D	D	
Approach Vol, veh/h		3226									1286	
Approach Delay, s/veh		31.9									45.8	
Approach LOS		C									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		49.4		30.6				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		40.5		26.5				
Max Q Clear Time (g_c+I1), s		38.2		25.2				
Green Ext Time (p_c), s		2.3		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D

Notes
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1013	1395	0	0	0	0	0	1488	600	0	0	0
Future Volume (veh/h)	1013	1395	0	0	0	0	0	1488	600	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1468	1500	0				0	1412	1412			
Adj Flow Rate, veh/h	1095	1397	0				0	1653	540			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	1466	1380	0				0	1789	495			
Arrive On Green	0.15	0.15	0.00				0.00	0.42	0.42			
Sat Flow, veh/h	2797	3000	0				0	4235	1172			
Grp Volume(v), veh/h	1095	1397	0				0	1653	540			
Grp Sat Flow(s),veh/h/ln	1398	1500	0				0	1412	1172			
Q Serve(g_s), s	30.5	36.8	0.0				0.0	29.6	33.8			
Cycle Q Clear(g_c), s	30.5	36.8	0.0				0.0	29.6	33.8			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1466	1380	0				0	1789	495			
V/C Ratio(X)	0.75	1.01	0.00				0.00	0.92	1.09			
Avail Cap(c_a), veh/h	1466	1380	0				0	1789	495			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	31.3	33.9	0.0				0.0	21.9	23.1			
Incr Delay (d2), s/veh	0.3	10.6	0.0				0.0	8.9	67.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	11.9	17.3	0.0				0.0	13.0	20.1			
LnGrp Delay(d),s/veh	31.6	44.5	0.0				0.0	30.8	90.4			
LnGrp LOS	C	F						C	F			
Approach Vol, veh/h		2492						2193				
Approach Delay, s/veh		38.8						45.5				
Approach LOS		D						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		41.0		39.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 37		* 34				
Max Q Clear Time (g_c+I1), s		38.8		35.8				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Notes
User approved volume balancing among the lanes for turning movement.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	300	40	80	300	51	70	236	180	102	139	30
Future Volume (veh/h)	20	300	40	80	300	51	70	236	180	102	139	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		0.96	1.00		0.96	1.00		0.96	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2039	2039	2000	1961	1961	2000	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	21	312	36	83	312	46	73	246	155	106	145	22
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	401	46	160	466	69	255	310	195	215	426	65
Arrive On Green	0.03	0.22	0.22	0.09	0.28	0.28	0.14	0.30	0.30	0.12	0.27	0.27
Sat Flow, veh/h	1942	1786	206	1867	1661	245	1774	1050	662	1774	1562	237
Grp Volume(v), veh/h	21	0	348	83	0	358	73	0	401	106	0	167
Grp Sat Flow(s),veh/h/ln	1942	0	1992	1867	0	1906	1774	0	1712	1774	0	1800
Q Serve(g_s), s	0.7	0.0	10.3	2.7	0.0	10.4	2.3	0.0	13.5	3.5	0.0	4.7
Cycle Q Clear(g_c), s	0.7	0.0	10.3	2.7	0.0	10.4	2.3	0.0	13.5	3.5	0.0	4.7
Prop In Lane	1.00		0.10	1.00		0.13	1.00		0.39	1.00		0.13
Lane Grp Cap(c), veh/h	57	0	447	160	0	535	255	0	506	215	0	490
V/C Ratio(X)	0.37	0.00	0.78	0.52	0.00	0.67	0.29	0.00	0.79	0.49	0.00	0.34
Avail Cap(c_a), veh/h	249	0	736	299	0	766	284	0	679	284	0	714
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.8	0.0	22.8	27.3	0.0	19.9	23.9	0.0	20.3	25.7	0.0	18.2
Incr Delay (d2), s/veh	1.5	0.0	3.0	1.0	0.0	1.5	0.2	0.0	4.7	0.7	0.0	0.4
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	0.4	0.0	6.0	1.4	0.0	5.7	1.1	0.0	7.0	1.7	0.0	2.4
LnGrp Delay(d),s/veh	31.2	0.0	25.7	28.3	0.0	21.4	24.1	0.0	24.9	26.3	0.0	18.6
LnGrp LOS	C		C	C		C	C		C	C		B
Approach Vol, veh/h		369			441			474			273	
Approach Delay, s/veh		26.1			22.7			24.8			21.6	
Approach LOS		C			C			C			C	

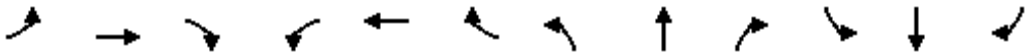
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	18.9	13.0	21.2	5.8	22.4	11.6	22.7
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	23.1	10.0	* 25	8.0	25.1	10.0	* 25
Max Q Clear Time (g_c+I1), s	4.7	12.3	4.3	6.7	2.7	12.4	5.5	15.5
Green Ext Time (p_c), s	0.1	1.1	0.0	0.6	0.0	1.2	0.1	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	23.9
HCM 2010 LOS	C

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	520	60	0	685	0	0
Future Volume (vph)	520	60	0	685	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			3.0		
Lane Util. Factor	1.00			1.00		
Frpb, ped/bikes	0.99			1.00		
Flpb, ped/bikes	1.00			1.00		
Frt	0.99			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	1557			1588		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	1557			1588		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	542	62	0	714	0	0
RTOR Reduction (vph)	5	0	0	0	0	0
Lane Group Flow (vph)	600	0	0	714	0	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA		
Protected Phases	2			3 4 6		
Permitted Phases						
Actuated Green, G (s)	36.4			56.5		
Effective Green, g (s)	36.4			50.5		
Actuated g/C Ratio	0.45			0.63		
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	708			1002		
v/s Ratio Prot	c0.38			c0.45		
v/s Ratio Perm						
v/c Ratio	0.85			0.71		
Uniform Delay, d1	19.3			9.9		
Progression Factor	0.62			0.37		
Incremental Delay, d2	10.2			0.6		
Delay (s)	22.1			4.3		
Level of Service	C			A		
Approach Delay (s)	22.1			4.3	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

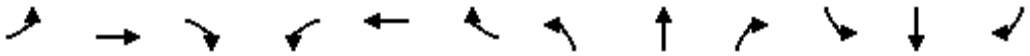


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	500	60	0	330	0	0	0	0	30	20	20
Future Volume (vph)	0	500	60	0	330	0	0	0	0	30	20	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0						6.0	
Lane Util. Factor		1.00			1.00						1.00	
Frpb, ped/bikes		0.99			1.00						0.99	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.99			1.00						0.96	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		1557			1588						1476	
Flt Permitted		1.00			1.00						0.98	
Satd. Flow (perm)		1557			1588						1476	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	521	62	0	344	0	0	0	0	31	21	21
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	580	0	0	344	0	0	0	0	0	54	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA					Perm	NA	
Protected Phases		2			4 6						8	
Permitted Phases										8		
Actuated Green, G (s)		42.7			58.9						9.1	
Effective Green, g (s)		42.7			58.9						9.1	
Actuated g/C Ratio		0.53			0.74						0.11	
Clearance Time (s)		6.0									6.0	
Vehicle Extension (s)		3.0									1.5	
Lane Grp Cap (vph)		831			1169						167	
v/s Ratio Prot		c0.37			c0.22							
v/s Ratio Perm											0.04	
v/c Ratio		0.70			0.29						0.33	
Uniform Delay, d1		13.9			3.6						32.6	
Progression Factor		0.66			0.06						0.64	
Incremental Delay, d2		3.6			0.0						0.3	
Delay (s)		12.8			0.3						21.2	
Level of Service		B			A						C	
Approach Delay (s)		12.8			0.3			0.0			21.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

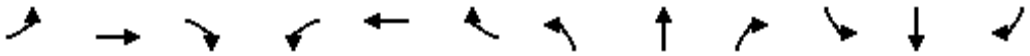
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	520	0	0	675	10	20
Future Volume (vph)	520	0	0	675	10	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			6.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1588			1588	1420	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1588			1588	1420	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	542	0	0	703	10	21
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	542	0	0	703	14	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	54.3			36.4	14.1	
Effective Green, g (s)	48.7			36.4	14.1	
Actuated g/C Ratio	0.61			0.45	0.18	
Clearance Time (s)				6.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	966			722	250	
v/s Ratio Prot	c0.34			c0.44	c0.01	
v/s Ratio Perm						
v/c Ratio	0.56			0.97	0.05	
Uniform Delay, d1	9.3			21.3	27.4	
Progression Factor	0.22			1.07	1.94	
Incremental Delay, d2	0.4			22.2	0.0	
Delay (s)	2.4			45.0	53.3	
Level of Service	A			D	D	
Approach Delay (s)	2.4			45.0	53.3	
Approach LOS	A			D	D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	530	0	0	310	10	20	20	20	0	0	0
Future Volume (vph)	0	530	0	0	310	10	20	20	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			1.00			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1580			1470				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1580			1470				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	552	0	0	323	10	21	21	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	332	0	0	45	0	0	0	0
Confl. Peds. (#/hr)	10		10			10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		57.8			42.7			10.2				
Effective Green, g (s)		57.8			42.7			10.2				
Actuated g/C Ratio		0.72			0.53			0.13				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1147			843			187				
v/s Ratio Prot		c0.35			0.21			c0.03				
v/s Ratio Perm												
v/c Ratio		0.48			0.39			0.24				
Uniform Delay, d1		4.7			11.0			31.4				
Progression Factor		0.15			0.63			1.16				
Incremental Delay, d2		0.1			1.3			0.2				
Delay (s)		0.8			8.2			36.7				
Level of Service		A			A			D				
Approach Delay (s)		0.8			8.2			36.7			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	465	0	0	420	40	20	15	20	0	0	0
Future Volume (vph)	0	465	0	0	420	40	20	15	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1546			1469				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1546			1469				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	484	0	0	438	42	21	16	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	484	0	0	476	0	0	41	0	0	0	0
Confl. Peds. (#/hr)	59		21			59			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		54.9			35.6			13.5				
Effective Green, g (s)		54.9			35.6			13.5				
Actuated g/C Ratio		0.69			0.45			0.17				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1089			687			247				
v/s Ratio Prot		c0.30			c0.31			c0.03				
v/s Ratio Perm												
v/c Ratio		0.44			0.69			0.16				
Uniform Delay, d1		5.7			17.8			28.4				
Progression Factor		0.18			0.62			1.02				
Incremental Delay, d2		0.3			5.1			0.2				
Delay (s)		1.3			16.2			29.3				
Level of Service		A			B			C				
Approach Delay (s)		1.3			16.2			29.3			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	36.0	54.1	0.07	4.5	F
C	IV	25	18.9	8.9	27.8	0.07	9.2	D
B	IV	25	17.9	30.8	48.7	0.07	5.0	F
A	IV	25	18.5	9.6	28.1	0.07	8.9	E
Lindaro	IV	25	25.3	39.2	64.5	0.14	7.8	E
Lincoln	IV	25	21.4	44.8	66.2	0.10	5.3	F
Francisco W.	IV	25	12.2	69.3	81.5	0.05	2.0	F
101 SBOn 2nd	IV	25	14.2	11.6	25.8	0.05	7.5	E
Total	IV		146.5	250.2	396.7	0.61	5.6	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	99.7	118.7	0.07	2.2	F
Tamalpais	IV	25	14.4	98.0	112.4	0.05	1.7	F
Lincoln	IV	25	13.2	73.6	86.8	0.05	2.1	F
Lindaro	IV	25	21.4	1.1	22.5	0.10	15.6	C
A	IV	25	19.5	10.0	29.5	0.07	9.0	E
B	IV	25	17.9	9.3	27.2	0.07	8.9	E
C	IV	25	19.0	3.6	22.6	0.07	11.4	D
D	IV	25	18.7	1.7	20.4	0.07	12.4	D
Total	IV		143.1	297.0	440.1	0.56	4.6	F

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	29	24.0	21.3	45.3	0.16	12.7	D
5th	IV	25	16.3	12.8	29.1	0.06	7.6	E
4th	IV	25	14.6	7.5	22.1	0.05	8.9	E
3rd	IV	25	17.7	7.6	25.3	0.07	9.5	D
2nd	IV	25	15.6	261.4	277.0	0.06	0.8	F
Total	IV		88.2	310.6	398.8	0.40	3.6	F

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	30	25.2	36.9	62.1	0.17	9.7	D
3rd St	IV	25	14.8	30.0	44.8	0.06	4.5	F
4th	IV	25	18.3	29.9	48.2	0.07	5.1	F
5th	IV	25	14.6	8.4	23.0	0.06	8.6	E
Mission	IV	25	15.7	6.9	22.6	0.06	9.4	D
Total	IV		88.6	112.1	200.7	0.41	7.3	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	15.7	44.2	0.16	12.9	D
Tamalpais	IV	25	16.0	52.8	68.8	0.06	3.2	F
Tamalpais	IV	25	3.1	2.9	6.0	0.01	7.0	E
Hetherton	IV	25	8.7	21.6	30.3	0.03	3.9	F
Irwin	IV	25	18.9	12.1	31.0	0.07	8.3	E
Total	IV		75.2	105.1	180.3	0.33	6.7	F

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	26.8	48.4	0.10	7.3	E
Hetherton	IV	25	18.9	36.1	55.0	0.07	4.7	F
Tamalpais	IV	25	8.7	82.6	91.3	0.03	1.3	F
Tamalpais	IV	25	3.1	3.7	6.8	0.01	6.2	F
Lincoln	IV	25	16.0	88.7	104.7	0.06	2.1	F
Total	IV		68.3	237.9	306.2	0.27	3.2	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	24.8	42.9	0.07	5.7	F
C	IV	25	18.9	8.4	27.3	0.07	9.4	D
B	IV	25	17.9	18.9	36.8	0.07	6.6	F
A	IV	25	18.5	9.7	28.2	0.07	8.9	E
Lindaro	IV	25	25.3	51.0	76.3	0.14	6.6	F
Lincoln	IV	25	21.4	24.2	45.6	0.10	7.7	E
Francisco W.	IV	25	12.2	86.3	98.5	0.05	1.7	F
101 SBOn Hetherton	IV	25	14.2	80.5	94.7	0.05	2.0	F
Total	IV		146.5	303.8	450.3	0.61	4.9	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	93.3	112.3	0.07	2.3	F
Tamalpais	IV	25	14.4	95.0	109.4	0.05	1.8	F
Lincoln	IV	25	13.2	18.5	31.7	0.05	5.7	F
Lindaro	IV	25	21.4	3.7	25.1	0.10	14.0	C
A	IV	25	19.5	10.9	30.4	0.07	8.7	E
B	IV	25	17.9	10.2	28.1	0.07	8.6	E
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		143.1	239.9	383.0	0.56	5.2	F

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	35	22.2	20.6	42.8	0.16	13.4	C
5th	IV	25	16.3	17.3	33.6	0.06	6.6	F
4th	IV	25	14.6	5.2	19.8	0.05	10.0	D
3rd	IV	25	17.7	21.9	39.6	0.07	6.1	F
2nd	IV	25	15.6	54.2	69.8	0.06	3.0	F
Total	IV		86.4	119.2	205.6	0.40	7.0	E

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	38	19.3	82.6	101.9	0.17	5.9	F
3rd St	IV	25	14.8	13.7	28.5	0.06	7.0	E
4th	IV	25	18.9	11.8	30.7	0.07	8.4	E
5th	IV	25	14.0	14.1	28.1	0.05	6.8	F
Mission	IV	25	15.7	3.4	19.1	0.06	11.2	D
Total	IV		82.7	125.6	208.3	0.41	7.0	E

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	12.8	41.3	0.16	13.8	C
Tamalpais	IV	25	16.1	24.0	40.1	0.06	5.5	F
Tamalpais	IV	25	4.3	2.3	6.6	0.02	8.9	E
Hetherton	IV	25	7.5	15.1	22.6	0.03	4.5	F
Irwin	IV	25	18.9	14.1	33.0	0.07	7.8	E
Total	IV		75.3	68.3	143.6	0.33	8.4	E

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	28.4	50.0	0.10	7.1	E
Hetherton	IV	25	18.9	13.8	32.7	0.07	7.8	E
Tamalpais	IV	25	7.5	47.5	55.0	0.03	1.8	F
Tamalpais	IV	25	4.3	2.7	7.0	0.02	8.4	E
Lincoln	IV	25	16.1	88.2	104.3	0.06	2.1	F
Total	IV		68.4	180.6	249.0	0.27	4.0	F

Leisch Method for Weaving Analysis

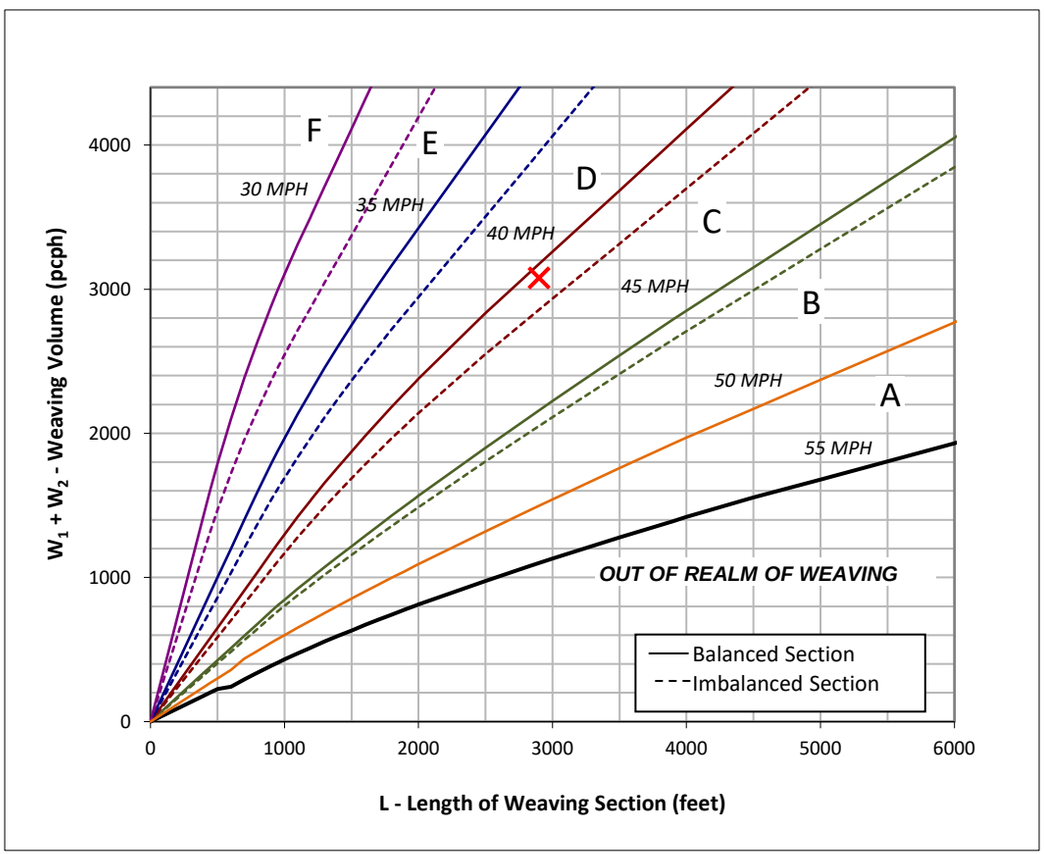
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

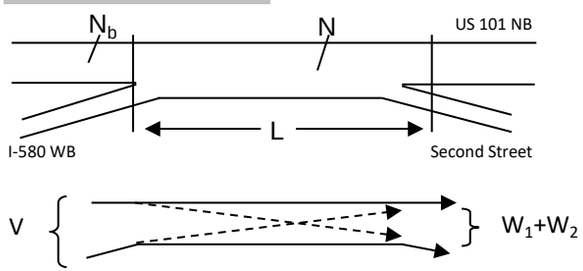
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,036	Volume (vph)*	1,951	Volume (vph)*	1,000
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	4%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	6,302	Volume (pcph)	2,037	Volume (pcph)	1,041

Project Information

Project	BioMarin
Scenario	Cumulative Plus Project No CS AM PH
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	N
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.6
4. Weaving Intensity Factor (k)	2.61
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,595
6. Level of Service (LOS)	D

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4150	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1520
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.66
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	25.3
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000

Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	820
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.50
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.8
Speed 2 (S_2), mi/h	0.2	Density (D_{ML}), pc/mi/ln	13.7
Speed 2 (S_3), mi/h	1.4	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6021	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1710
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.74
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.8
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	28.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000

Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6275	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	2267
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.99
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	51.9
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	43.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000

Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	3/17/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	6275	2047
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	4.40	3.72
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.958
Flow Rate (v_i), pc/h	6802	2323
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.99	1.11

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	111476.2	Density in Ramp Influence Area (D_R), pc/mi/ln	-
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2316
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.483	Outer Lanes Freeway Speed (S_O), mi/h	60.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	4486	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

Managed Lane Geometric Data			
Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4234	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1583
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.69
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	26.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000

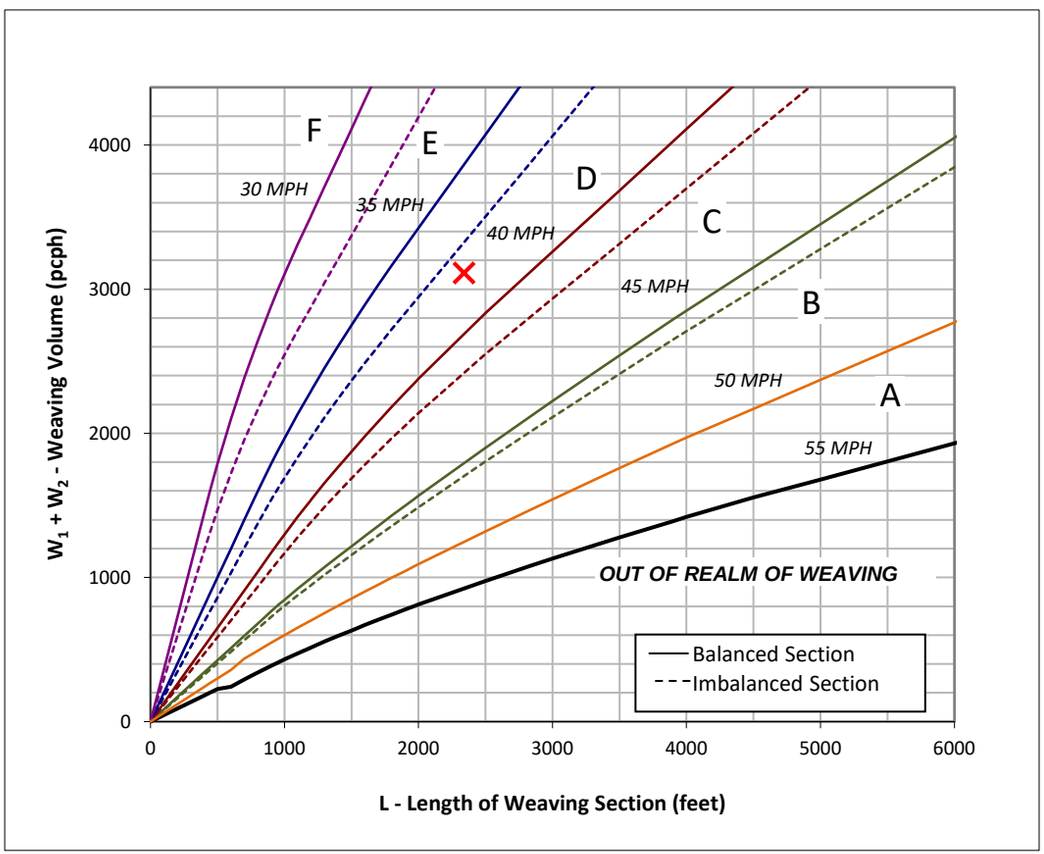
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	998	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1104
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.0
Speed 2 (S_2), mi/h	1.0	Density (D_{ML}), pc/mi/ln	18.7
Speed 2 (S_3), mi/h	5.0	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

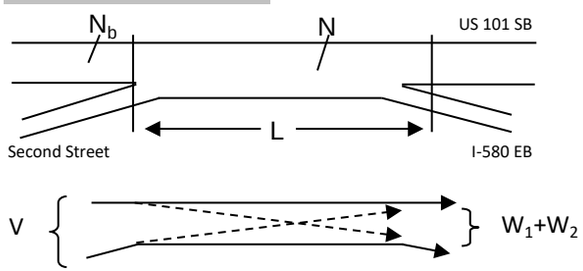
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Cumulative Plus Project No SenCent PM PH
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,720	Volume (vph)*	1,767	Volume (vph)*	1,225
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	7,016	Volume (pcph)	1,814	Volume (pcph)	1,298



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	Y
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.2
4. Weaving Intensity Factor (k)	2.63
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	2,284
6. Level of Service (LOS)	F

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

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

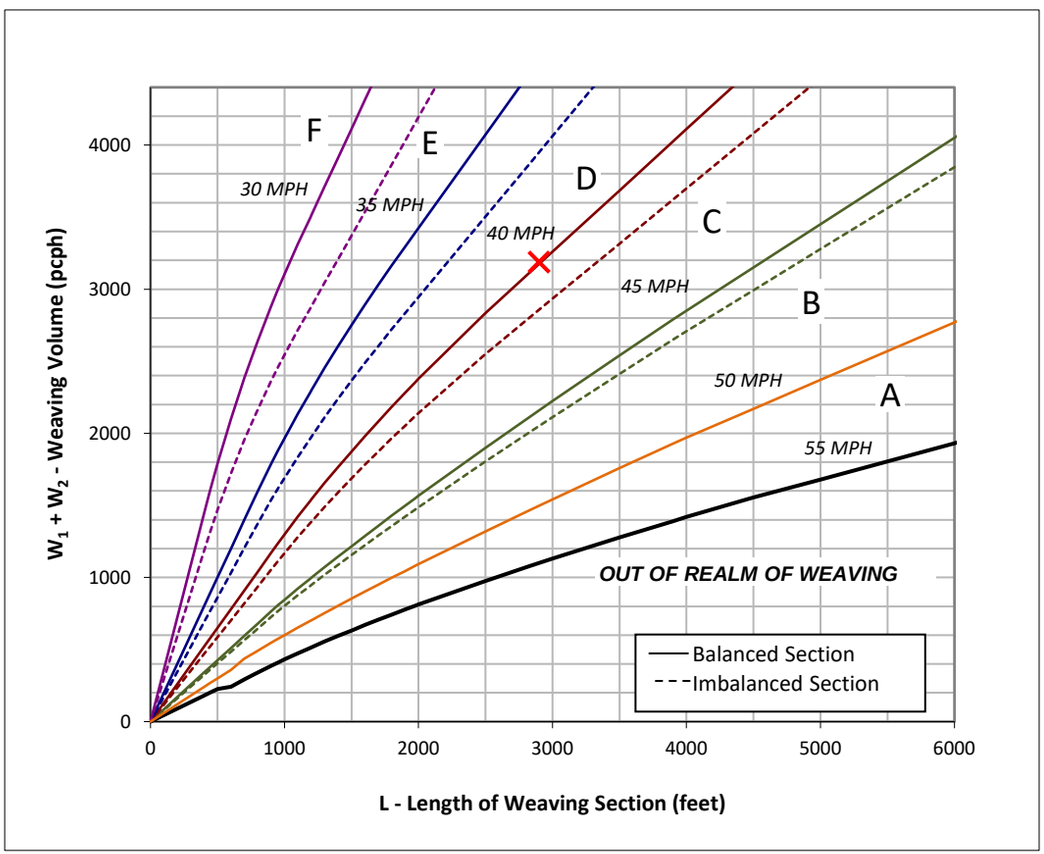
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Leisch Method for Weaving Analysis

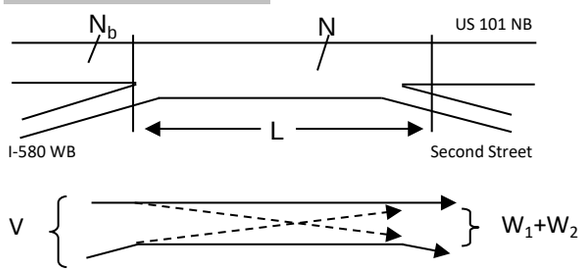
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Cumulative Plus Project PM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	7,257	Volume (vph)*	1,661	Volume (vph)*	1,417
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	7,576	Volume (pcph)	1,734	Volume (pcph)	1,454



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	N
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.5
4. Weaving Intensity Factor (k)	2.62
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,985
6. Level of Service (LOS)	F

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative + Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5170	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1913
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.83
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	58.2
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	32.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	848	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	890
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.7
Speed 2 (S_2), mi/h	0.3	Density (D_{ML}), pc/mi/ln	14.9
Speed 2 (S_3), mi/h	2.1	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6021	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1710
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.74
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.8
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	28.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000

Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5442	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1966
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.85
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	57.6
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	34.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1377	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1555
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	56.0
Speed 2 (S_2), mi/h	4.0	Density (D_{ML}), pc/mi/ln	27.8
Speed 2 (S_3), mi/h	15.4	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	5442	2080
Peak Hour Factor (PHF)	0.97	0.96
Total Trucks, %	4.40	2.00
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.973
Flow Rate (v_i), pc/h	5899	2227
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.85	1.06

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	151607.6	Density in Ramp Influence Area (D_R), pc/mi/ln	-
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1799
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.510	Outer Lanes Freeway Speed (S_O), mi/h	62.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	4100	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

Managed Lane Geometric Data			
Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1380	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1559
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	40.4
Speed 2 (S_2), mi/h	4.1	Density (D_{ML}), pc/mi/ln	38.6
Speed 2 (S_3), mi/h	15.5	Level of Service (LOS)	E

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative Plus Project No Senior Center Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3369	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1260
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.55
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	21.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

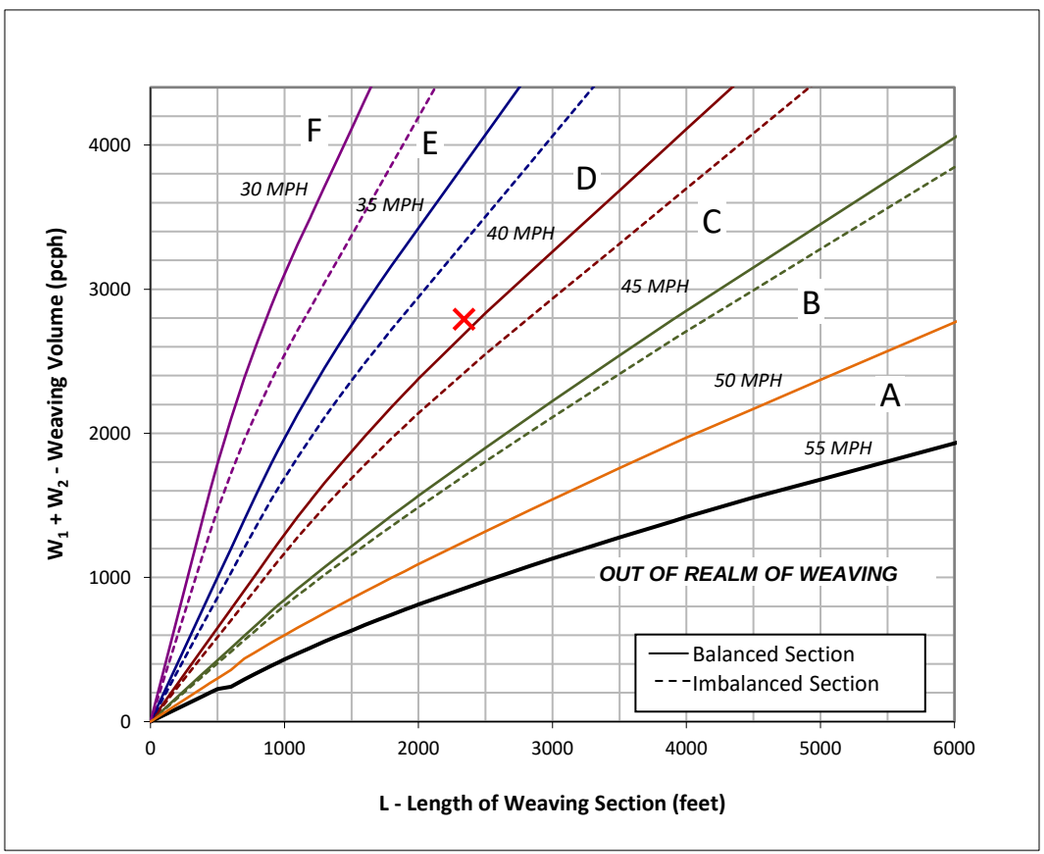
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	918	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1049
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.64
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.2
Speed 2 (S_2), mi/h	0.8	Density (D_{ML}), pc/mi/ln	17.7
Speed 2 (S_3), mi/h	4.2	Level of Service (LOS)	B

Leisch Method for Weaving Analysis

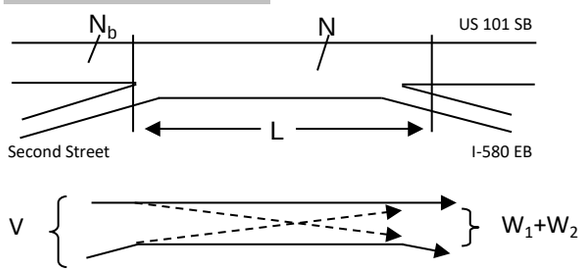
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Cumulative Plus Project No SenCent PM PH
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,432	Volume (vph)*	1,180	Volume (vph)*	1,442
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	5,671	Volume (pcph)	1,210	Volume (pcph)	1,582



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? *If optional exit lane, then "Y". Otherwise "N".*	Y
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.6
4. Weaving Intensity Factor (k)	2.55
5. Service Volume (SV, pcph) $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$	1,886
6. Level of Service (LOS)	E

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

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

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

Appendix G:
Cumulative Plus Project Conditions (R&D and Senior Services and Housing) – Technical Calculations

Transportation Impact Study

for BioMarin 999 3rd Street

San Rafael Campus Expansion

April 5, 2019

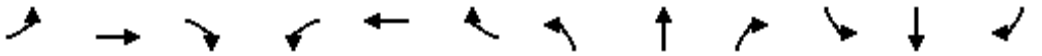
FEHR PEERS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	500	20	80	585	50	20	230	90	60	421	380
Future Volume (veh/h)	120	500	20	80	585	50	20	230	90	60	421	380
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	0.99		0.97	0.99		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1660	1660	1710	1660	1660	1710	1800	1678	1728	1800	1748	1728
Adj Flow Rate, veh/h	130	543	20	87	636	50	22	250	80	65	458	206
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	148	868	32	341	626	49	68	439	134	136	833	362
Arrive On Green	0.09	0.55	0.55	0.55	0.55	0.55	0.85	0.85	0.85	0.43	0.43	0.43
Sat Flow, veh/h	1581	1588	59	787	1515	119	39	1028	314	187	1953	849
Grp Volume(v), veh/h	130	0	563	87	0	686	352	0	0	395	0	334
Grp Sat Flow(s),veh/h/ln	1581	0	1647	787	0	1634	1381	0	0	1614	0	1376
Q Serve(g_s), s	6.1	0.0	17.7	5.7	0.0	31.0	0.0	0.0	0.0	4.5	0.0	13.8
Cycle Q Clear(g_c), s	6.1	0.0	17.7	13.4	0.0	31.0	5.3	0.0	0.0	13.2	0.0	13.8
Prop In Lane	1.00		0.04	1.00		0.07	0.06		0.23	0.16		0.62
Lane Grp Cap(c), veh/h	148	0	900	341	0	676	640	0	0	744	0	587
V/C Ratio(X)	0.88	0.00	0.63	0.26	0.00	1.02	0.55	0.00	0.00	0.53	0.00	0.57
Avail Cap(c_a), veh/h	148	0	900	341	0	676	640	0	0	744	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.64	0.00	0.64	0.84	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.6	0.0	11.7	15.5	0.0	16.9	3.5	0.0	0.0	16.0	0.0	16.3
Incr Delay (d2), s/veh	47.7	0.0	3.3	1.1	0.0	31.5	2.8	0.0	0.0	2.7	0.0	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	8.8	1.3	0.0	19.5	2.3	0.0	0.0	6.6	0.0	5.8
LnGrp Delay(d),s/veh	81.3	0.0	15.0	16.7	0.0	48.4	6.4	0.0	0.0	18.7	0.0	20.2
LnGrp LOS	F		B	B		F	A			B		C
Approach Vol, veh/h		693			773			352			729	
Approach Delay, s/veh		27.4			44.8			6.4			19.4	
Approach LOS		C			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		45.2		36.8	10.0	35.2		36.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 41		25.4	7.0	* 31		25.4
Max Q Clear Time (g_c+I1), s		19.7		7.3	8.1	33.0		15.8
Green Ext Time (p_c), s		5.5		3.1	0.0	0.0		4.4

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	515	90	40	230	0	0	0	0	245	1097	500
Future Volume (vph)	0	515	90	40	230	0	0	0	0	245	1097	500
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.97
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.98			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2711			1767						2961	1303
Flt Permitted		1.00			0.80						0.99	1.00
Satd. Flow (perm)		2711			1421						2961	1303
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	560	98	43	250	0	0	0	0	266	1192	543
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	639	0	0	293	0	0	0	0	0	1458	543
Confl. Peds. (#/hr)	15		22	22		15			16			1
Confl. Bikes (#/hr)			3			2			1			3
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		23.8			23.8						42.4	35.4
Effective Green, g (s)		23.8			23.8						42.4	35.4
Actuated g/C Ratio		0.32			0.32						0.57	0.47
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		860			450						1673	615
v/s Ratio Prot		c0.24									c0.49	
v/s Ratio Perm					0.21							0.42
v/c Ratio		0.74			0.65						0.87	0.88
Uniform Delay, d1		22.9			22.0						14.0	17.9
Progression Factor		0.74			1.33						1.00	1.00
Incremental Delay, d2		4.8			5.6						6.6	16.7
Delay (s)		21.8			34.9						20.5	34.7
Level of Service		C			C						C	C
Approach Delay (s)		21.8			34.9			0.0			24.4	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	400	30	330	170	340	10	110	1150	140	40
Future Volume (vph)	400	30	330	170	340	10	110	1150	140	40
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1494	1794	1615	1471			3430	1294	
Flt Permitted		0.58	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		919	1794	1615	1471			3430	1294	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	435	33	359	185	370	11	120	1250	152	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	468	359	185	381	0	0	1370	149	0
Confl. Peds. (#/hr)							13			6
Confl. Bikes (#/hr)					2	2				2
Parking (#/hr)				0				2		
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		34.8	34.8	19.8	19.8			31.8	31.8	
Effective Green, g (s)		34.8	34.8	19.8	19.8			31.8	31.8	
Actuated g/C Ratio		0.46	0.46	0.26	0.26			0.42	0.42	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		509	832	426	388			1454	548	
v/s Ratio Prot		c0.13	0.20	0.11	0.26					
v/s Ratio Perm		c0.29						0.40	0.12	
v/c Ratio		0.92	0.43	0.43	0.98			0.94	0.27	
Uniform Delay, d1		19.1	13.5	22.9	27.4			20.7	14.1	
Progression Factor		0.91	0.80	1.00	1.00			0.75	0.71	
Incremental Delay, d2		14.6	0.2	0.7	40.7			6.1	0.5	
Delay (s)		32.0	11.0	23.7	68.1			21.7	10.5	
Level of Service		C	B	C	E			C	B	
Approach Delay (s)			22.9	53.6				20.3		
Approach LOS			C	D				C		

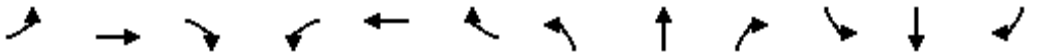
Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	320	40	70	290	70	20	240	70	50	421	50
Future Volume (veh/h)	40	320	40	70	290	70	20	240	70	50	421	50
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.99		0.95	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1398	1545	1530	1398	1485	1530	1440	1485	1469	1440	1485	1469
Adj Flow Rate, veh/h	43	348	36	76	315	63	22	261	62	54	458	49
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	409	42	143	356	71	72	563	128	97	612	63
Arrive On Green	0.30	0.30	0.30	0.10	0.10	0.10	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	792	1370	142	785	1193	239	37	973	221	76	1057	108
Grp Volume(v), veh/h	43	0	384	76	0	378	345	0	0	561	0	0
Grp Sat Flow(s),veh/h/ln	792	0	1512	785	0	1432	1231	0	0	1242	0	0
Q Serve(g_s), s	2.9	0.0	17.9	4.5	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.4	0.0	17.9	22.4	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.17	0.06		0.18	0.10		0.09
Lane Grp Cap(c), veh/h	126	0	452	143	0	428	763	0	0	771	0	0
V/C Ratio(X)	0.34	0.00	0.85	0.53	0.00	0.88	0.45	0.00	0.00	0.73	0.00	0.00
Avail Cap(c_a), veh/h	126	0	452	143	0	428	763	0	0	771	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.00	0.94	0.86	0.00	0.00	0.38	0.00	0.00
Uniform Delay (d), s/veh	36.5	0.0	24.7	43.6	0.0	32.5	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	7.2	0.0	17.9	12.7	0.0	21.4	1.7	0.0	0.0	2.3	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	1.1	0.0	9.7	2.1	0.0	10.3	0.4	0.0	0.0	0.5	0.0	0.0
LnGrp Delay(d),s/veh	43.7	0.0	42.6	56.3	0.0	54.0	1.7	0.0	0.0	2.3	0.0	0.0
LnGrp LOS	D		D	E		D	A			A		
Approach Vol, veh/h		427			454			345			561	
Approach Delay, s/veh		42.7			54.3			1.7			2.3	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.0		48.0		27.0		48.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		22.4		43.4		22.4		43.4
Max Q Clear Time (g_c+I1), s		24.4		2.0		24.4		2.0
Green Ext Time (p_c), s		0.0		1.7		0.0		3.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.1
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	260	180	40	245	0	0	0	0	50	1052	125
Future Volume (vph)	0	260	180	40	245	0	0	0	0	50	1052	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.94			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1665			1769						4119	1127
Flt Permitted		1.00			0.90						1.00	1.00
Satd. Flow (perm)		1665			1604						4119	1127
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	283	196	43	266	0	0	0	0	54	1143	136
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	468	0	0	309	0	0	0	0	0	1197	136
Confl. Peds. (#/hr)			15	15		14			22	22		10
Confl. Bikes (#/hr)			4			2			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		35.8			35.8						30.4	23.4
Effective Green, g (s)		35.8			35.8						30.4	23.4
Actuated g/C Ratio		0.48			0.48						0.41	0.31
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		794			765						1669	351
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.19						0.29	0.12
v/c Ratio		0.59			0.40						0.72	0.39
Uniform Delay, d1		14.2			12.7						18.7	20.2
Progression Factor		0.45			1.32						0.61	0.69
Incremental Delay, d2		3.0			0.9						1.3	1.6
Delay (s)		9.5			17.6						12.7	15.5
Level of Service		A			B						B	B
Approach Delay (s)		9.5			17.6			0.0			13.0	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	110	0	0	160	130	150	1190	20	0	0	0
Future Volume (veh/h)	150	110	0	0	160	130	150	1190	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	0.89	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1620	1573	1620			
Adj Flow Rate, veh/h	163	120	0	0	174	103	163	1293	21			
Adj No. of Lanes	1	1	0	0	1	0	0	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0			
Cap, veh/h	218	491	0	0	254	151	165	1381	23			
Arrive On Green	0.10	0.10	0.00	0.00	0.31	0.31	0.19	0.19	0.19			
Sat Flow, veh/h	976	1573	0	0	816	483	292	2443	41			
Grp Volume(v), veh/h	163	120	0	0	0	277	772	0	705			
Grp Sat Flow(s),veh/h/ln	976	1573	0	0	0	1299	1385	0	1392			
Q Serve(g_s), s	9.4	5.3	0.0	0.0	0.0	14.0	41.7	0.0	37.1			
Cycle Q Clear(g_c), s	23.4	5.3	0.0	0.0	0.0	14.0	41.7	0.0	37.1			
Prop In Lane	1.00		0.00	0.00		0.37	0.21		0.03			
Lane Grp Cap(c), veh/h	218	491	0	0	0	405	783	0	787			
V/C Ratio(X)	0.75	0.24	0.00	0.00	0.00	0.68	0.99	0.00	0.90			
Avail Cap(c_a), veh/h	218	491	0	0	0	405	783	0	787			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.77	0.77	0.00	0.00	0.00	1.00	0.09	0.00	0.09			
Uniform Delay (d), s/veh	41.8	25.5	0.0	0.0	0.0	22.6	30.2	0.0	28.3			
Incr Delay (d2), s/veh	10.4	0.2	0.0	0.0	0.0	4.7	6.9	0.0	1.7			
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	4.0	2.3	0.0	0.0	0.0	5.5	17.5	0.0	14.7			
LnGrp Delay(d),s/veh	52.2	25.7	0.0	0.0	0.0	27.3	37.1	0.0	30.1			
LnGrp LOS	D	C				C	D		C			
Approach Vol, veh/h		283			277			1477				
Approach Delay, s/veh		41.0			27.3			33.7				
Approach LOS		D			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.0		47.0		28.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		23.4		42.4		23.4		
Max Q Clear Time (g_c+I1), s		25.4		43.7		16.0		
Green Ext Time (p_c), s		0.0		0.0		0.7		

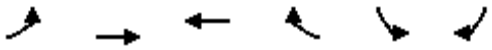
Intersection Summary	
HCM 2010 Ctrl Delay	33.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	265	20	80	340	60	20	240	70	85	371	80
Future Volume (veh/h)	40	265	20	80	340	60	20	240	70	85	371	80
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	0.97		0.91	0.97		0.92	0.99		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln	1573	1510	1620	1573	1573	1620	1620	1573	1555	1620	1573	1555
Adj Flow Rate, veh/h	43	288	19	87	370	56	22	261	62	92	403	78
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	117	423	28	209	400	60	74	598	136	144	541	99
Arrive On Green	0.30	0.30	0.30	0.10	0.10	0.10	0.19	0.19	0.19	1.00	1.00	1.00
Sat Flow, veh/h	853	1390	92	925	1314	199	39	1024	233	151	927	170
Grp Volume(v), veh/h	43	0	307	87	0	426	345	0	0	573	0	0
Grp Sat Flow(s),veh/h/ln	853	0	1482	925	0	1513	1296	0	0	1248	0	0
Q Serve(g_s), s	1.9	0.0	13.6	7.0	0.0	20.9	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.8	0.0	13.6	20.6	0.0	20.9	17.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.13	0.06		0.18	0.16		0.14
Lane Grp Cap(c), veh/h	117	0	450	209	0	460	808	0	0	784	0	0
V/C Ratio(X)	0.37	0.00	0.68	0.42	0.00	0.93	0.43	0.00	0.00	0.73	0.00	0.00
Avail Cap(c_a), veh/h	117	0	450	209	0	460	808	0	0	784	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.75	0.00	0.00	0.48	0.00	0.00
Uniform Delay (d), s/veh	37.0	0.0	22.9	39.5	0.0	32.9	19.5	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	8.7	0.0	8.1	5.5	0.0	25.5	1.2	0.0	0.0	2.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	6.6	2.1	0.0	12.1	6.6	0.0	0.0	0.6	0.0	0.0
LnGrp Delay(d),s/veh	45.7	0.0	31.0	45.1	0.0	58.4	20.8	0.0	0.0	2.9	0.0	0.0
LnGrp LOS	D		C	D		E	C			A		
Approach Vol, veh/h		350			513			345			573	
Approach Delay, s/veh		32.8			56.1			20.8			2.9	
Approach LOS		C			E			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		27.0		48.0		27.0		48.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 23		* 44		* 23		* 44
Max Q Clear Time (g_c+I1), s		24.8		19.1		22.9		2.0
Green Ext Time (p_c), s		0.0		3.3		0.0		7.4

Intersection Summary	
HCM 2010 Ctrl Delay	27.6
HCM 2010 LOS	C

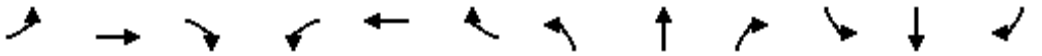
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Traffic Volume (vph)	0	500	430	0	0	55
Future Volume (vph)	0	500	430	0	0	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6	5.6			5.2
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00			0.87
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	1.00			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1573	1573			1188
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1573	1573			1188
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	467	0	0	60
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	0	543	467	0	0	11
Confl. Peds. (#/hr)				39		46
Confl. Bikes (#/hr)				4		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		50.3	50.4			13.8
Effective Green, g (s)		50.3	50.4			13.8
Actuated g/C Ratio		0.67	0.67			0.18
Clearance Time (s)						5.2
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1054	1057			218
v/s Ratio Prot		c0.35	c0.30			
v/s Ratio Perm						0.01
v/c Ratio		0.52	0.44			0.05
Uniform Delay, d1		6.2	5.7			25.2
Progression Factor		1.32	0.48			1.00
Incremental Delay, d2		0.3	0.2			0.1
Delay (s)		8.6	2.9			25.3
Level of Service		A	A			C
Approach Delay (s)		8.6	2.9		25.3	
Approach LOS		A	A		C	

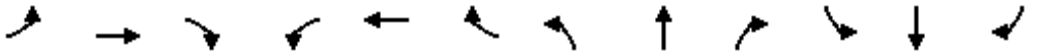
Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	305	200	200	305	0	0	0	0	110	972	190
Future Volume (vph)	0	305	200	200	305	0	0	0	0	110	972	190
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.95	1.00	1.00						1.00	0.89
Flpb, ped/bikes		1.00	1.00	0.98	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1625	1181	1607	1520						4265	1184
Flt Permitted		1.00	1.00	0.49	1.00						0.99	1.00
Satd. Flow (perm)		1625	1181	824	1520						4265	1184
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	332	217	217	332	0	0	0	0	120	1057	207
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	332	190	217	332	0	0	0	0	0	1177	207
Confl. Peds. (#/hr)			40	40		22			9	9		30
Confl. Bikes (#/hr)			8			4						2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		35.8	35.8	35.8	35.8						30.4	23.4
Effective Green, g (s)		35.8	35.8	35.8	35.8						30.4	23.4
Actuated g/C Ratio		0.48	0.48	0.48	0.48						0.41	0.31
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		775	563	393	725						1728	369
v/s Ratio Prot		0.20			0.22							
v/s Ratio Perm			0.16	c0.26							0.28	0.17
v/c Ratio		0.43	0.34	0.55	0.46						0.68	0.56
Uniform Delay, d1		12.9	12.2	13.9	13.1						18.3	21.5
Progression Factor		0.49	0.42	1.03	1.07						0.32	0.42
Incremental Delay, d2		1.5	1.4	3.8	1.4						1.6	4.4
Delay (s)		7.9	6.6	18.2	15.4						7.4	13.3
Level of Service		A	A	B	B						A	B
Approach Delay (s)		7.4			16.5			0.0			8.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	240	0	0	380	70	130	1150	50	0	0	0
Future Volume (veh/h)	170	240	0	0	380	70	130	1150	50	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.89			
Adj Sat Flow, veh/h/ln	1573	1573	0	0	1573	1620	1510	1573	1620			
Adj Flow Rate, veh/h	185	261	0	0	413	66	141	1250	50			
Adj No. of Lanes	1	1	0	0	1	0	1	2	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	137	625	0	0	465	74	706	1356	54			
Arrive On Green	0.79	0.79	0.00	0.00	0.13	0.13	0.16	0.16	0.16			
Sat Flow, veh/h	813	1573	0	0	1170	187	1438	2763	110			
Grp Volume(v), veh/h	185	261	0	0	0	479	141	675	625			
Grp Sat Flow(s),veh/h/ln	813	1573	0	0	0	1357	1438	1494	1380			
Q Serve(g_s), s	3.8	3.8	0.0	0.0	0.0	26.0	6.4	33.4	33.5			
Cycle Q Clear(g_c), s	29.8	3.8	0.0	0.0	0.0	26.0	6.4	33.4	33.5			
Prop In Lane	1.00		0.00	0.00		0.14	1.00		0.08			
Lane Grp Cap(c), veh/h	137	625	0	0	0	539	706	733	677			
V/C Ratio(X)	1.35	0.42	0.00	0.00	0.00	0.89	0.20	0.92	0.92			
Avail Cap(c_a), veh/h	137	625	0	0	0	539	706	733	677			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.91	0.91	0.00	0.00	0.00	1.00	0.16	0.16	0.16			
Uniform Delay (d), s/veh	22.0	5.0	0.0	0.0	0.0	31.0	18.7	30.0	30.0			
Incr Delay (d2), s/veh	196.0	1.9	0.0	0.0	0.0	19.3	0.1	4.1	4.5			
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	10.2	1.8	0.0	0.0	0.0	12.7	2.6	14.7	13.6			
LnGrp Delay(d),s/veh	218.1	6.9	0.0	0.0	0.0	50.2	18.8	34.1	34.6			
LnGrp LOS	F	A				D	B	C	C			
Approach Vol, veh/h		446			479			1441				
Approach Delay, s/veh		94.5			50.2			32.8				
Approach LOS		F			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		34.0		41.0		34.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 30		* 37		* 30		
Max Q Clear Time (g_c+I1), s		31.8		35.5		28.0		
Green Ext Time (p_c), s		0.0		0.9		0.4		

Intersection Summary	
HCM 2010 Ctrl Delay	48.0
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	320	1222	0	0	0	0	0	240	30
Future Volume (veh/h)	0	0	0	320	1222	0	0	0	0	0	240	30
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1530	1485	0				0	1485	1530
Adj Flow Rate, veh/h				348	1328	0				0	261	17
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				586	2029	0				0	525	34
Arrive On Green				0.22	0.22	0.00				0.00	0.21	0.21
Sat Flow, veh/h				754	3124	0				0	2611	164
Grp Volume(v), veh/h				598	1078	0				0	144	134
Grp Sat Flow(s),veh/h/ln				1297	1230	0				0	1411	1290
Q Serve(g_s), s				31.7	29.8	0.0				0.0	6.8	6.9
Cycle Q Clear(g_c), s				31.7	29.8	0.0				0.0	6.8	6.9
Prop In Lane				0.58		0.00				0.00		0.13
Lane Grp Cap(c), veh/h				952	1662	0				0	292	267
V/C Ratio(X)				0.63	0.65	0.00				0.00	0.49	0.50
Avail Cap(c_a), veh/h				952	1662	0				0	440	402
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.68	0.68	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				21.8	21.0	0.0				0.0	26.3	26.3
Incr Delay (d2), s/veh				2.2	1.3	0.0				0.0	1.3	1.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.0	10.5	0.0				0.0	2.8	2.6
LnGrp Delay(d),s/veh				23.9	22.4	0.0				0.0	27.6	27.8
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1676						278	
Approach Delay, s/veh					22.9						27.6	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.9		20.1				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 43		23.4				
Max Q Clear Time (g_c+I1), s		33.7		8.9				
Green Ext Time (p_c), s		5.6		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1417	120	110	250	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1417	120	110	250	0	0	0	0
Number				5	2	12	7	4	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				0	1398	1398	1440	1398	0			
Adj Flow Rate, veh/h				0	1540	97	120	272	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	2536	774	218	404	0			
Arrive On Green				0.00	0.22	0.22	0.07	0.07	0.00			
Sat Flow, veh/h				0	3943	1164	640	1870	0			
Grp Volume(v), veh/h				0	1540	97	216	176	0			
Grp Sat Flow(s),veh/h/ln				0	1272	1164	1238	1209	0			
Q Serve(g_s), s				0.0	27.3	5.0	11.7	10.7	0.0			
Cycle Q Clear(g_c), s				0.0	27.3	5.0	12.8	10.7	0.0			
Prop In Lane				0.00		1.00	0.56		0.00			
Lane Grp Cap(c), veh/h				0	2536	774	351	270	0			
V/C Ratio(X)				0.00	0.61	0.13	0.61	0.65	0.00			
Avail Cap(c_a), veh/h				0	2536	774	421	338	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	0.56	0.56	0.79	0.79	0.00			
Uniform Delay (d), s/veh				0.0	20.5	11.8	32.8	31.9	0.0			
Incr Delay (d2), s/veh				0.0	0.6	0.2	1.5	2.5	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	9.8	1.7	4.6	3.7	0.0			
LnGrp Delay(d),s/veh				0.0	21.1	12.0	34.3	34.4	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1637			392				
Approach Delay, s/veh					20.5			34.3				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		54.0		21.0				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 46		* 21				
Max Q Clear Time (g_c+I1), s		29.3		14.8				
Green Ext Time (p_c), s		8.4		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	23.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	90	1472	0	0	0	0	0	200	60
Future Volume (veh/h)	0	0	0	90	1472	0	0	0	0	0	200	60
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1398	0				0	1398	1440
Adj Flow Rate, veh/h				98	1600	0				0	217	45
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				165	2266	0				0	486	97
Arrive On Green				0.21	0.21	0.00				0.00	0.24	0.24
Sat Flow, veh/h				170	3616	0				0	2091	401
Grp Volume(v), veh/h				631	1067	0				0	139	123
Grp Sat Flow(s),veh/h/ln				1356	1158	0				0	1328	1094
Q Serve(g_s), s				23.2	32.0	0.0				0.0	6.7	7.2
Cycle Q Clear(g_c), s				32.3	32.0	0.0				0.0	6.7	7.2
Prop In Lane				0.16		0.00				0.00		0.37
Lane Grp Cap(c), veh/h				933	1499	0				0	320	263
V/C Ratio(X)				0.68	0.71	0.00				0.00	0.44	0.47
Avail Cap(c_a), veh/h				933	1499	0				0	411	338
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.69	0.69	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				23.0	23.0	0.0				0.0	24.2	24.3
Incr Delay (d2), s/veh				2.7	2.0	0.0				0.0	0.9	1.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.9	10.7	0.0				0.0	2.5	2.3
LnGrp Delay(d),s/veh				25.7	25.0	0.0				0.0	25.1	25.6
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					1698						262	
Approach Delay, s/veh					25.3						25.3	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		52.7		22.3				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 43		* 23				
Max Q Clear Time (g_c+I1), s		34.3		9.2				
Green Ext Time (p_c), s		5.6		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	40	1312	80	210	135	0	0	140	30
Future Volume (veh/h)	0	0	0	40	1312	80	210	135	0	0	140	30
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				43	1426	78	228	147	0	0	152	21
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				73	2568	145	303	606	0	0	302	42
Arrive On Green				0.56	0.56	0.56	0.02	0.11	0.00	0.00	0.22	0.22
Sat Flow, veh/h				131	4618	261	1748	1835	0	0	1389	192
Grp Volume(v), veh/h				571	475	501	228	147	0	0	0	173
Grp Sat Flow(s),veh/h/ln				1741	1590	1679	1748	1835	0	0	0	1581
Q Serve(g_s), s				16.2	14.2	14.2	0.6	5.5	0.0	0.0	0.0	7.2
Cycle Q Clear(g_c), s				16.2	14.2	14.2	0.6	5.5	0.0	0.0	0.0	7.2
Prop In Lane				0.08		0.16	1.00		0.00	0.00		0.12
Lane Grp Cap(c), veh/h				968	885	934	303	606	0	0	0	344
V/C Ratio(X)				0.59	0.54	0.54	0.75	0.24	0.00	0.00	0.00	0.50
Avail Cap(c_a), veh/h				968	885	934	443	807	0	0	0	390
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.84	0.84	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				11.0	10.5	10.5	33.1	24.8	0.0	0.0	0.0	25.8
Incr Delay (d2), s/veh				2.6	2.3	2.2	6.8	0.4	0.0	0.0	0.0	2.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.5	6.8	7.1	5.2	2.9	0.0	0.0	0.0	3.4
LnGrp Delay(d),s/veh				13.6	12.9	12.7	40.0	25.2	0.0	0.0	0.0	28.2
LnGrp LOS				B	B	B	D	C				C
Approach Vol, veh/h					1547			375			173	
Approach Delay, s/veh					13.1			34.2			28.2	
Approach LOS					B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.0	20.8		46.2		28.8
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			10.0	18.5		33.5		33.0
Max Q Clear Time (g_c+I1), s			2.6	9.2		18.2		7.5
Green Ext Time (p_c), s			1.0	0.8		11.2		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.1
HCM 2010 LOS	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	16	75.4%	7.5	4.0	A
	Through	5	3	51.5%	16.5	17.3	C
	Right Turn						
	Subtotal	26	18	70.8%	10.6	4.7	B
SB	Left Turn						
	Through	5	6	110.4%	13.6	13.1	B
	Right Turn	10	9	88.3%	19.8	13.6	C
	Subtotal	15	14	95.7%	18.8	11.8	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	51	39	76.5%	2.4	0.2	A
	Through	1,401	1,338	95.5%	1.9	0.4	A
	Right Turn	10	10	95.7%	1.7	1.1	A
	Subtotal	1,462	1,387	94.9%	2.0	0.4	A
Total		1,503	1,420	94.5%	2.3	0.3	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	86	85	99.3%	24.0	6.5	C
	Through	10	8	81.0%	19.4	18.3	B
	Right Turn						
	Subtotal	96	93	97.4%	23.9	6.3	C
SB	Left Turn						
	Through	40	39	98.4%	51.0	25.2	D
	Right Turn	10	10	95.7%	37.4	38.5	D
	Subtotal	50	49	97.9%	48.6	27.8	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	431	90.4%	29.6	10.7	C
	Through	1,396	1,319	94.5%	9.0	3.0	A
	Right Turn	30	31	101.8%	8.3	2.6	A
	Subtotal	1,903	1,781	93.6%	13.9	4.8	B
Total		2,049	1,924	93.9%	15.3	4.7	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	175	1775	75	42	195	0	0	290	166
Future Volume (veh/h)	0	0	0	175	1775	75	42	195	0	0	290	166
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	1.00		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln				1620	1573	1620	1620	1573	0	0	1510	1555
Adj Flow Rate, veh/h				190	1929	77	46	212	0	0	315	179
Adj No. of Lanes				0	3	0	0	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				174	1884	77	57	184	0	0	315	179
Arrive On Green				0.16	0.16	0.16	0.13	0.13	0.00	0.00	0.13	0.13
Sat Flow, veh/h				367	3980	163	0	452	0	0	774	440
Grp Volume(v), veh/h				804	671	721	258	0	0	0	0	494
Grp Sat Flow(s),veh/h/ln				1554	1431	1525	452	0	0	0	0	1214
Q Serve(g_s), s				35.5	35.1	35.4	0.0	0.0	0.0	0.0	0.0	30.5
Cycle Q Clear(g_c), s				35.5	35.1	35.4	30.5	0.0	0.0	0.0	0.0	30.5
Prop In Lane				0.24		0.11	0.18		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				736	677	722	240	0	0	0	0	494
V/C Ratio(X)				1.09	0.99	1.00	1.07	0.00	0.00	0.00	0.00	1.00
Avail Cap(c_a), veh/h				736	677	722	240	0	0	0	0	494
HCM Platoon Ratio				0.33	0.33	0.33	0.33	0.33	1.00	1.00	0.33	0.33
Upstream Filter(I)				0.24	0.24	0.24	1.00	0.00	0.00	0.00	0.00	0.44
Uniform Delay (d), s/veh				31.6	31.5	31.6	27.7	0.0	0.0	0.0	0.0	32.5
Incr Delay (d2), s/veh				47.7	14.9	16.2	79.2	0.0	0.0	0.0	0.0	26.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				25.0	16.7	18.2	10.3	0.0	0.0	0.0	0.0	13.9
LnGrp Delay(d),s/veh				79.3	46.4	47.8	106.9	0.0	0.0	0.0	0.0	59.3
LnGrp LOS				F	D	D	F					F
Approach Vol, veh/h					2196			258			494	
Approach Delay, s/veh					58.9			106.9			59.3	
Approach LOS					E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				35.0		40.0		35.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				30.5		35.5		30.5
Max Q Clear Time (g_c+I1), s				32.5		37.5		32.5
Green Ext Time (p_c), s				0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	63.2
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	295	1960	30	50	50	0	0	0	0
Future Volume (vph)	0	0	0	295	1960	30	50	50	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6				
Lane Util. Factor					0.91		1.00	1.00				
Frpb, ped/bikes					1.00		1.00	1.00				
Flpb, ped/bikes					0.98		0.93	1.00				
Frt					1.00		1.00	1.00				
Flt Protected					0.99		0.95	1.00				
Satd. Flow (prot)					3699		1057	1237				
Flt Permitted					0.99		0.95	1.00				
Satd. Flow (perm)					3699		1057	1237				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	321	2130	33	54	54	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2482	0	54	54	0	0	0	0
Confl. Peds. (#/hr)			73	73		38	49		63			49
Confl. Bikes (#/hr)						2			2			2
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA				
Protected Phases					6			4				
Permitted Phases				6			4					
Actuated Green, G (s)					51.8		19.0	19.0				
Effective Green, g (s)					51.8		19.0	19.0				
Actuated g/C Ratio					0.58		0.21	0.21				
Clearance Time (s)					11.6		7.6	7.6				
Vehicle Extension (s)					5.0		5.0	5.0				
Lane Grp Cap (vph)					2128		223	261				
v/s Ratio Prot								0.04				
v/s Ratio Perm					0.67		c0.05					
v/c Ratio					1.17		0.24	0.21				
Uniform Delay, d1					19.1		29.5	29.3				
Progression Factor					1.00		1.00	1.00				
Incremental Delay, d2					80.4		1.2	0.8				
Delay (s)					99.5		30.7	30.1				
Level of Service					F		C	C				
Approach Delay (s)		0.0			99.5			30.4			0.0	
Approach LOS		A			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	96.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	150.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

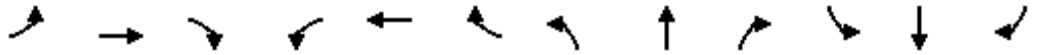
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	455	1688	0	0	0	0	0	825	547
Future Volume (veh/h)	0	0	0	455	1688	0	0	0	0	0	825	547
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.84
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1545	1573	0				0	1573	1485
Adj Flow Rate, veh/h				495	1835	0				0	897	586
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %				3	3	0				0	3	3
Cap, veh/h				721	2006	0				0	1954	481
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1471	4718	0				0	4435	1057
Grp Volume(v), veh/h				495	1835	0				0	897	586
Grp Sat Flow(s),veh/h/ln				1471	1573	0				0	1431	1057
Q Serve(g_s), s				24.4	28.8	0.0				0.0	14.3	34.1
Cycle Q Clear(g_c), s				24.4	28.8	0.0				0.0	14.3	34.1
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				721	2006	0				0	1954	481
V/C Ratio(X)				0.69	0.91	0.00				0.00	0.46	1.22
Avail Cap(c_a), veh/h				724	2013	0				0	1954	481
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				0.17	0.17	0.00				0.00	0.75	0.75
Uniform Delay (d), s/veh				29.0	30.9	0.0				0.0	23.4	31.9
Incr Delay (d2), s/veh				0.5	1.4	0.0				0.0	0.6	112.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.1	12.8	0.0				0.0	5.8	24.9
LnGrp Delay(d),s/veh				29.5	32.3	0.0				0.0	24.0	143.9
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2330						1483	
Approach Delay, s/veh					31.7						71.4	
Approach LOS					C						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						35.9		39.1
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						32.0		34.0
Max Q Clear Time (g_c+I1), s						30.8		36.1
Green Ext Time (p_c), s						1.1		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		47.1
HCM 2010 LOS		D

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1101	120	1052	1215	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1101	120	1052	1215	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.94	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				0	1485	1485	1398	1398	0			
Adj Flow Rate, veh/h				0	1197	104	1143	1321	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	3	3	3	3	0			
Cap, veh/h				0	1333	389	1468	1542	0			
Arrive On Green				0.00	0.33	0.33	0.18	0.18	0.00			
Sat Flow, veh/h				0	4189	1184	2663	2796	0			
Grp Volume(v), veh/h				0	1197	104	1143	1321	0			
Grp Sat Flow(s),veh/h/ln				0	1352	1184	1331	1398	0			
Q Serve(g_s), s				0.0	21.1	4.8	30.7	34.3	0.0			
Cycle Q Clear(g_c), s				0.0	21.1	4.8	30.7	34.3	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1333	389	1468	1542	0			
V/C Ratio(X)				0.00	0.90	0.27	0.78	0.86	0.00			
Avail Cap(c_a), veh/h				0	1379	403	1468	1542	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	0.09	0.09	0.00			
Uniform Delay (d), s/veh				0.0	24.0	18.5	26.3	27.8	0.0			
Incr Delay (d2), s/veh				0.0	8.0	0.4	0.4	0.6	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	8.9	1.6	11.4	13.4	0.0			
LnGrp Delay(d),s/veh				0.0	32.0	18.9	26.7	28.4	0.0			
LnGrp LOS					C	B	C	C				
Approach Vol, veh/h					1301			2464				
Approach Delay, s/veh					31.0			27.6				
Approach LOS					C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				45.8		29.2		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				40.5		25.5		
Max Q Clear Time (g_c+I1), s				36.3		23.1		
Green Ext Time (p_c), s				3.7		1.6		

Intersection Summary	
HCM 2010 Ctrl Delay	28.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2062	90	0	0	0	0	0	270	80	475	0
Future Volume (veh/h)	0	2062	90	0	0	0	0	0	270	80	475	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97	0.99		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	0	1660	1710				0	1573	1620	1748	1748	0
Adj Flow Rate, veh/h	0	2241	91				0	0	277	87	516	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	420	246	565	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.32	0.11	0.11	0.00
Sat Flow, veh/h		0					0	0	1300	1072	1748	0
Grp Volume(v), veh/h		0.0					0	0	277	87	516	0
Grp Sat Flow(s),veh/h/ln							0	0	1300	1072	1748	0
Q Serve(g_s), s							0.0	0.0	13.7	6.0	21.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	13.7	19.7	21.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	420	246	565	0
V/C Ratio(X)							0.00	0.00	0.66	0.35	0.91	0.00
Avail Cap(c_a), veh/h							0	0	440	263	592	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.86	0.86	0.00
Uniform Delay (d), s/veh							0.0	0.0	21.8	38.2	32.5	0.0
Incr Delay (d2), s/veh							0.0	0.0	2.6	0.3	15.7	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							0.0	0.0	5.2	1.8	13.1	0.0
LnGrp Delay(d),s/veh							0.0	0.0	24.4	38.5	48.2	0.0
LnGrp LOS									C	D	D	
Approach Vol, veh/h								277			603	
Approach Delay, s/veh								24.4			46.8	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				28.8				28.8
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				25.4				25.4
Max Q Clear Time (g_c+I1), s				23.9				15.7
Green Ext Time (p_c), s				0.3				0.6

Intersection Summary	
HCM 2010 Ctrl Delay	39.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2302	0	0	0	0	0	225	100	0	0	0
Future Volume (veh/h)	110	2302	0	0	0	0	0	225	100	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1485	0				0	1485	1440			
Adj Flow Rate, veh/h	120	2502	0				0	245	107			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	166	2789	0				0	361	152			
Arrive On Green	0.23	0.23	0.00				0.00	0.18	0.18			
Sat Flow, veh/h	159	3990	0				0	1966	827			
Grp Volume(v), veh/h	928	1694	0				0	183	169			
Grp Sat Flow(s),veh/h/ln	1446	1352	0				0	1485	1308			
Q Serve(g_s), s	39.4	45.6	0.0				0.0	8.6	9.1			
Cycle Q Clear(g_c), s	46.9	45.6	0.0				0.0	8.6	9.1			
Prop In Lane	0.13		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	1065	1890	0				0	273	240			
V/C Ratio(X)	0.87	0.90	0.00				0.00	0.67	0.70			
Avail Cap(c_a), veh/h	1065	1890	0				0	412	363			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.15	0.15	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	26.6	26.2	0.0				0.0	28.5	28.7			
Incr Delay (d2), s/veh	1.7	1.2	0.0				0.0	6.0	7.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	19.3	17.4	0.0				0.0	4.0	3.8			
LnGrp Delay(d),s/veh	28.4	27.4	0.0				0.0	34.5	36.5			
LnGrp LOS	C	C						C	D			
Approach Vol, veh/h		2622						352				
Approach Delay, s/veh		27.8						35.5				
Approach LOS		C						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				18.0		57.0		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		45.4		
Max Q Clear Time (g_c+I1), s				11.1		48.9		
Green Ext Time (p_c), s				2.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2327	70	0	0	0	0	0	170	70	230	0
Future Volume (veh/h)	0	2327	70	0	0	0	0	0	170	70	230	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.93	0.97		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	0	1485	1382				0	1573	1591	1545	1485	0
Adj Flow Rate, veh/h	0	2529	72				0	0	165	76	250	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	0	0	0				0	0	291	216	346	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.23	0.08	0.08	0.00
Sat Flow, veh/h		0					0	0	1247	1036	1485	0
Grp Volume(v), veh/h		0.0					0	0	165	76	250	0
Grp Sat Flow(s),veh/h/ln							0	0	1247	1036	1485	0
Q Serve(g_s), s							0.0	0.0	8.8	5.4	12.3	0.0
Cycle Q Clear(g_c), s							0.0	0.0	8.8	14.2	12.3	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	291	216	346	0
V/C Ratio(X)							0.00	0.00	0.57	0.35	0.72	0.00
Avail Cap(c_a), veh/h							0	0	357	272	426	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.90	0.90	0.00
Uniform Delay (d), s/veh							0.0	0.0	25.4	37.4	32.2	0.0
Incr Delay (d2), s/veh							0.0	0.0	0.7	0.3	2.8	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	3.1	1.6	5.3	0.0
LnGrp Delay(d),s/veh							0.0	0.0	26.1	37.7	35.1	0.0
LnGrp LOS									C	D	D	
Approach Vol, veh/h								165			326	
Approach Delay, s/veh								26.1			35.7	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				22.0				22.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				21.5				21.5
Max Q Clear Time (g_c+I1), s				16.2				10.8
Green Ext Time (p_c), s				0.4				0.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	2252	205	0	0	0	0	260	20	50	125	0
Future Volume (veh/h)	100	2252	205	0	0	0	0	260	20	50	125	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	109	2448	210				0	283	13	54	136	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	124	2931	253				0	448	20	156	366	0
Arrive On Green	0.22	0.22	0.22				0.00	0.15	0.15	0.01	0.07	0.00
Sat Flow, veh/h	187	4424	382				0	3147	140	1581	1660	0
Grp Volume(v), veh/h	1013	840	914				0	145	151	54	136	0
Grp Sat Flow(s),veh/h/ln	1738	1590	1664				0	1577	1627	1581	1660	0
Q Serve(g_s), s	42.3	37.5	39.3				0.0	6.5	6.6	0.0	5.9	0.0
Cycle Q Clear(g_c), s	42.3	37.5	39.3				0.0	6.5	6.6	0.0	5.9	0.0
Prop In Lane	0.11		0.23				0.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	1152	1054	1103				0	231	238	156	366	0
V/C Ratio(X)	0.88	0.80	0.83				0.00	0.63	0.64	0.35	0.37	0.00
Avail Cap(c_a), veh/h	1152	1054	1103				0	336	347	170	487	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	26.4	24.5	25.2				0.0	30.1	30.1	35.9	29.8	0.0
Incr Delay (d2), s/veh	1.0	0.6	0.7				0.0	5.9	5.9	2.3	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.7	16.7	18.4				0.0	3.2	3.3	1.2	2.8	0.0
LnGrp Delay(d),s/veh	27.4	25.1	25.9				0.0	36.0	36.0	38.2	30.9	0.0
LnGrp LOS	C	C	C					D	D	D	C	
Approach Vol, veh/h		2767						296			190	
Approach Delay, s/veh		26.2						36.0			33.0	
Approach LOS		C						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		54.3		20.7			5.6	15.2
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		44.2		* 22			* 2	* 16
Max Q Clear Time (g_c+I1), s		44.3		7.9			2.0	8.6
Green Ext Time (p_c), s		0.0		0.8			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	50	44	88.3%	22.0	9.9	C
	Through						
	Right Turn						
	Subtotal	50	44	88.3%	22.0	9.9	C
EB	Left Turn	25	17	67.7%	2.6	0.8	A
	Through	2,307	2,281	98.9%	2.5	0.2	A
	Right Turn						
	Subtotal	2,332	2,298	98.5%	2.5	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,382	2,342	98.3%	2.9	0.4	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	57	104.9%	18.0	2.8	B
	Right Turn	281	276	98.1%	18.7	4.6	B
	Subtotal	335	332	99.2%	18.7	3.9	B
SB	Left Turn	72	62	86.4%	39.3	5.7	D
	Through	442	406	91.8%	37.4	2.8	D
	Right Turn						
	Subtotal	514	468	91.0%	37.7	2.7	D
EB	Left Turn	42	37	88.5%	16.0	3.5	B
	Through	2,289	2,233	97.5%	14.7	2.5	B
	Right Turn	61	74	121.9%	14.1	3.2	B
	Subtotal	2,392	2,344	98.0%	14.7	2.4	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,241	3,144	97.0%	18.6	2.2	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	2461	41	0	0	0	0	112	50	140	270	0
Future Volume (veh/h)	140	2461	41	0	0	0	0	112	50	140	270	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1398	1382	1342	0
Adj Flow Rate, veh/h	152	2675	28				0	122	41	152	293	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	145	2752	656				0	430	354	245	459	0
Arrive On Green	0.19	0.19	0.19				0.00	0.31	0.31	0.10	0.10	0.00
Sat Flow, veh/h	251	4742	1130				0	1398	1149	537	1554	0
Grp Volume(v), veh/h	840	1987	28				0	122	41	229	216	0
Grp Sat Flow(s),veh/h/ln	1386	1202	1130				0	1398	1149	870	1160	0
Q Serve(g_s), s	43.5	40.8	1.5				0.0	5.0	1.9	15.1	13.3	0.0
Cycle Q Clear(g_c), s	43.5	40.8	1.5				0.0	5.0	1.9	20.1	13.3	0.0
Prop In Lane	0.18		1.00				0.00		1.00	0.66		0.00
Lane Grp Cap(c), veh/h	804	2093	656				0	430	354	347	357	0
V/C Ratio(X)	1.04	0.95	0.04				0.00	0.28	0.12	0.66	0.60	0.00
Avail Cap(c_a), veh/h	804	2093	656				0	500	411	399	415	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	29.2	13.3				0.0	19.7	18.6	33.8	29.3	0.0
Incr Delay (d2), s/veh	24.2	1.4	0.0				0.0	0.4	0.1	3.3	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.1	13.9	0.5				0.0	1.9	0.6	5.0	4.5	0.0
LnGrp Delay(d),s/veh	54.5	30.6	13.3				0.0	20.1	18.8	37.1	31.2	0.0
LnGrp LOS	F	C	B					C	B	D	C	
Approach Vol, veh/h		2855						163			445	
Approach Delay, s/veh		37.4						19.7			34.3	
Approach LOS		D						B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		47.7		27.3				27.3
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 40		* 27				* 27
Max Q Clear Time (g_c+I1), s		45.5		7.0				22.1
Green Ext Time (p_c), s		0.0		0.6				0.9

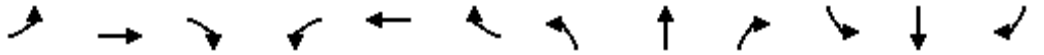
Intersection Summary	
HCM 2010 Ctrl Delay	36.2
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2516	70	0	0	0	0	50	270	100	200	0
Future Volume (veh/h)	50	2516	70	0	0	0	0	50	270	100	200	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91				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
Adj Sat Flow, veh/h/ln	1440	1398	1398				0	1398	1454	1398	1398	0
Adj Flow Rate, veh/h	54	2735	48				0	54	254	109	217	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	3	3	3	3	0
Cap, veh/h	53	2867	633				0	339	292	275	339	0
Arrive On Green	0.19	0.19	0.19				0.00	0.24	0.24	0.08	0.08	0.00
Sat Flow, veh/h	90	4910	1084				0	1398	1204	845	1398	0
Grp Volume(v), veh/h	832	1957	48				0	54	254	109	217	0
Grp Sat Flow(s),veh/h/ln	1394	1202	1084				0	1398	1204	845	1398	0
Q Serve(g_s), s	43.8	40.0	2.7				0.0	2.3	15.2	9.4	11.3	0.0
Cycle Q Clear(g_c), s	43.8	40.0	2.7				0.0	2.3	15.2	11.7	11.3	0.0
Prop In Lane	0.06		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	814	2106	633				0	339	292	275	339	0
V/C Ratio(X)	1.02	0.93	0.08				0.00	0.16	0.87	0.40	0.64	0.00
Avail Cap(c_a), veh/h	814	2106	633				0	513	441	380	513	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	28.8	13.7				0.0	22.4	27.3	32.6	31.3	0.0
Incr Delay (d2), s/veh	15.7	1.0	0.0				0.0	0.2	11.5	0.9	2.0	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
%ile BackOfQ(50%),veh/ln	20.5	13.6	0.8				0.0	0.9	5.9	2.3	4.6	0.0
LnGrp Delay(d),s/veh	46.0	29.7	13.7				0.0	22.6	38.7	33.5	33.3	0.0
LnGrp LOS	F	C	B					C	D	C	C	
Approach Vol, veh/h		2837						308			326	
Approach Delay, s/veh		34.2						35.9			33.4	
Approach LOS		C						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.3		24.7				24.7
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		34.5		27.5				27.5
Max Q Clear Time (g_c+I1), s		45.8		17.2				13.7
Green Ext Time (p_c), s		0.0		1.0				1.4

Intersection Summary	
HCM 2010 Ctrl Delay	34.3
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1270	1456	0	0	0	0	0	0	220	1060	0
Future Volume (veh/h)	0	1270	1456	0	0	0	0	0	0	220	1060	0
Number	5	2	12							7	4	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	0	1485	1485							1485	1485	0
Adj Flow Rate, veh/h	0	1380	1570							239	1152	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.92	0.92	0.92							0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3							3	3	0
Cap, veh/h	0	2406	1364							406	852	0
Arrive On Green	0.00	0.18	0.18							0.09	0.09	0.00
Sat Flow, veh/h	0	4456	2525							1415	2971	0
Grp Volume(v), veh/h	0	1380	1570							239	1152	0
Grp Sat Flow(s),veh/h/ln	0	1485	1263							1415	1485	0
Q Serve(g_s), s	0.0	21.3	40.5							12.1	21.5	0.0
Cycle Q Clear(g_c), s	0.0	21.3	40.5							12.1	21.5	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2406	1364							406	852	0
V/C Ratio(X)	0.00	0.57	1.15							0.59	1.35	0.00
Avail Cap(c_a), veh/h	0	2406	1364							406	852	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.78	0.78	0.00
Uniform Delay (d), s/veh	0.0	22.9	30.8							29.7	34.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	69.0							1.8	164.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.8	27.2							5.0	28.3	0.0
LnGrp Delay(d),s/veh	0.0	23.0	99.8							31.5	198.7	0.0
LnGrp LOS		C	F							C	F	
Approach Vol, veh/h		2950									1391	
Approach Delay, s/veh		63.9									170.0	
Approach LOS		E									F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		49.0		26.0				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		40.5		21.5				
Max Q Clear Time (g_c+I1), s		42.5		23.5				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	97.9
HCM 2010 LOS	F

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	780	880	0	0	0	0	0	1497	500	0	0	0
Future Volume (veh/h)	780	880	0	0	0	0	0	1497	500	0	0	0
Number	5	2	12				7	4	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	1454	1485	0				0	1398	1398			
Adj Flow Rate, veh/h	848	957	0				0	1627	513			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0				0	3	3			
Cap, veh/h	1326	1216	0				0	1952	553			
Arrive On Green	0.14	0.14	0.00				0.00	0.47	0.47			
Sat Flow, veh/h	2769	2971	0				0	4194	1188			
Grp Volume(v), veh/h	848	957	0				0	1627	513			
Grp Sat Flow(s),veh/h/ln	1385	1485	0				0	1398	1188			
Q Serve(g_s), s	22.1	23.4	0.0				0.0	25.4	30.5			
Cycle Q Clear(g_c), s	22.1	23.4	0.0				0.0	25.4	30.5			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1326	1216	0				0	1952	553			
V/C Ratio(X)	0.64	0.79	0.00				0.00	0.83	0.93			
Avail Cap(c_a), veh/h	1326	1216	0				0	1957	555			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.34	0.34	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	28.7	29.3	0.0				0.0	17.5	18.9			
Incr Delay (d2), s/veh	0.8	1.8	0.0				0.0	3.6	22.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.6	9.9	0.0				0.0	10.4	13.3			
LnGrp Delay(d),s/veh	29.5	31.1	0.0				0.0	21.1	41.5			
LnGrp LOS	C	C						C	D			
Approach Vol, veh/h		1805						2140				
Approach Delay, s/veh		30.4						26.0				
Approach LOS		C						C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		34.9		40.1				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 31		* 35				
Max Q Clear Time (g_c+I1), s		25.4		32.5				
Green Ext Time (p_c), s		4.7		2.4				

Intersection Summary	
HCM 2010 Ctrl Delay	28.0
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.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	20	330	50	10	80	220	64	60	300	160	71	222
Future Volume (veh/h)	20	330	50	10	80	220	64	60	300	160	71	222
Number	5	2	12		1	6	16	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94		1.00		0.97	1.00		0.97	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2019	2019	2000		1942	1942	2000	1845	1845	1900	1845	1845
Adj Flow Rate, veh/h	22	359	46		87	239	58	65	326	150	77	241
Adj No. of Lanes	1	1	0		1	1	0	1	1	0	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
Percent Heavy Veh, %	3	3	3		3	3	3	3	3	3	3	3
Cap, veh/h	58	433	56		153	453	110	164	376	173	178	548
Arrive On Green	0.03	0.25	0.25		0.08	0.30	0.30	0.09	0.32	0.32	0.10	0.33
Sat Flow, veh/h	1923	1741	223		1849	1501	364	1757	1183	545	1757	1683
Grp Volume(v), veh/h	22	0	405		87	0	297	65	0	476	77	0
Grp Sat Flow(s),veh/h/ln	1923	0	1965		1849	0	1865	1757	0	1728	1757	0
Q Serve(g_s), s	0.8	0.0	13.4		3.1	0.0	9.1	2.4	0.0	17.8	2.8	0.0
Cycle Q Clear(g_c), s	0.8	0.0	13.4		3.1	0.0	9.1	2.4	0.0	17.8	2.8	0.0
Prop In Lane	1.00		0.11		1.00		0.20	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	58	0	489		153	0	562	164	0	549	178	0
V/C Ratio(X)	0.38	0.00	0.83		0.57	0.00	0.53	0.40	0.00	0.87	0.43	0.00
Avail Cap(c_a), veh/h	225	0	634		270	0	657	231	0	677	231	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
Upstream Filter(I)	1.00	0.00	1.00		1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	0.0	24.3		30.2	0.0	19.9	29.2	0.0	22.0	28.9	0.0
Incr Delay (d2), s/veh	1.5	0.0	7.1		1.2	0.0	0.8	0.6	0.0	9.9	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	8.2		1.6	0.0	4.7	1.2	0.0	10.0	1.4	0.0
LnGrp Delay(d),s/veh	34.1	0.0	31.4		31.5	0.0	20.6	29.8	0.0	31.9	29.5	0.0
LnGrp LOS	C		C		C		C	C		C	C	
Approach Vol, veh/h		427				384			541			336
Approach Delay, s/veh		31.5				23.1			31.6			21.2
Approach LOS		C				C			C			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	21.9	10.4	26.5	6.1	25.5	10.9	25.9
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	22.1	9.0	* 27	8.0	24.1	9.0	* 27
Max Q Clear Time (g_c+I1), s	5.1	15.4	4.4	9.7	2.8	11.1	4.8	19.8
Green Ext Time (p_c), s	0.1	1.0	0.0	0.9	0.0	0.9	0.0	1.3

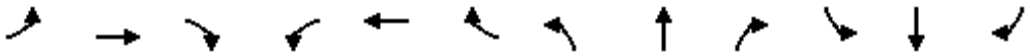
Intersection Summary	
HCM 2010 Ctrl Delay	27.6
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	20
Future Volume (veh/h)	20
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.92
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	18
Adj No. of Lanes	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	3
Cap, veh/h	41
Arrive On Green	0.33
Sat Flow, veh/h	126
Grp Volume(v), veh/h	259
Grp Sat Flow(s),veh/h/ln	1809
Q Serve(g_s), s	7.7
Cycle Q Clear(g_c), s	7.7
Prop In Lane	0.07
Lane Grp Cap(c), veh/h	589
V/C Ratio(X)	0.44
Avail Cap(c_a), veh/h	708
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	18.2
Incr Delay (d2), s/veh	0.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.9
LnGrp Delay(d),s/veh	18.7
LnGrp LOS	B
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	585	75	0	740	0	0
Future Volume (vph)	585	75	0	740	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			3.0		
Lane Util. Factor	1.00			1.00		
Frpb, ped/bikes	0.99			1.00		
Flpb, ped/bikes	1.00			1.00		
Frt	0.98			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	1540			1573		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	1540			1573		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	82	0	804	0	0
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	712	0	0	804	0	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA		
Protected Phases	2			3 4 6		
Permitted Phases						
Actuated Green, G (s)	34.4			51.8		
Effective Green, g (s)	34.4			46.2		
Actuated g/C Ratio	0.46			0.62		
Clearance Time (s)	5.6					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	706			968		
v/s Ratio Prot	c0.46			c0.51		
v/s Ratio Perm						
v/c Ratio	1.01			0.83		
Uniform Delay, d1	20.3			11.3		
Progression Factor	0.97			0.51		
Incremental Delay, d2	30.6			0.6		
Delay (s)	50.4			6.3		
Level of Service	D			A		
Approach Delay (s)	50.4			6.3	0.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

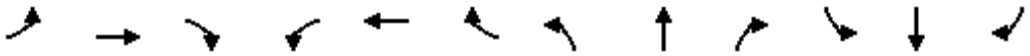


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	390	50	0	380	0	0	0	0	20	20	30
Future Volume (vph)	0	390	50	0	380	0	0	0	0	20	20	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6						5.6	
Lane Util. Factor		1.00			1.00						1.00	
Frpb, ped/bikes		0.99			1.00						0.98	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.98			1.00						0.94	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		1541			1573						1432	
Flt Permitted		1.00			1.00						0.99	
Satd. Flow (perm)		1541			1573						1432	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	424	54	0	413	0	0	0	0	22	22	33
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	473	0	0	413	0	0	0	0	0	48	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA					Perm	NA	
Protected Phases		2			4 6						8	
Permitted Phases										8		
Actuated Green, G (s)		39.3			55.7						8.1	
Effective Green, g (s)		39.3			55.7						8.1	
Actuated g/C Ratio		0.52			0.74						0.11	
Clearance Time (s)		5.6									5.6	
Vehicle Extension (s)		3.0									1.5	
Lane Grp Cap (vph)		807			1168						154	
v/s Ratio Prot		c0.31			c0.26							
v/s Ratio Perm											0.03	
v/c Ratio		0.59			0.35						0.31	
Uniform Delay, d1		12.3			3.4						30.9	
Progression Factor		0.57			0.09						0.85	
Incremental Delay, d2		1.8			0.1						0.0	
Delay (s)		8.8			0.4						26.2	
Level of Service		A			A						C	
Approach Delay (s)		8.8			0.4			0.0			26.2	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

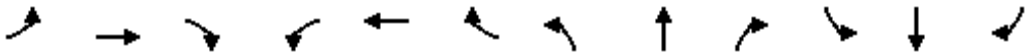
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	585	0	0	730	10	20
Future Volume (vph)	585	0	0	730	10	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.6			5.6	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1573			1573	1408	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1573			1573	1408	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	0	0	793	11	22
RTOR Reduction (vph)	0	0	0	0	19	0
Lane Group Flow (vph)	636	0	0	793	14	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	52.4			34.4	11.8	
Effective Green, g (s)	47.2			34.4	11.8	
Actuated g/C Ratio	0.63			0.46	0.16	
Clearance Time (s)				5.6		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	989			721	221	
v/s Ratio Prot	c0.40			c0.50	c0.01	
v/s Ratio Perm						
v/c Ratio	0.64			1.10	0.07	
Uniform Delay, d1	8.7			20.3	26.9	
Progression Factor	0.45			1.16	1.05	
Incremental Delay, d2	0.1			57.1	0.0	
Delay (s)	4.0			80.6	28.4	
Level of Service	A			F	C	
Approach Delay (s)	4.0			80.6	28.4	
Approach LOS	A			F	C	

Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	410	0	0	350	20	30	10	30	0	0	0
Future Volume (vph)	0	410	0	0	350	20	30	10	30	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.98				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.94				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1557			1422				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1557			1422				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	446	0	0	380	22	33	11	33	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	446	0	0	400	0	0	49	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		53.0			39.3			10.8				
Effective Green, g (s)		53.0			39.3			10.8				
Actuated g/C Ratio		0.71			0.52			0.14				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1111			815			204				
v/s Ratio Prot		c0.28			c0.26			c0.03				
v/s Ratio Perm												
v/c Ratio		0.40			0.49			0.24				
Uniform Delay, d1		4.5			11.4			28.5				
Progression Factor		0.02			0.65			1.26				
Incremental Delay, d2		0.1			2.0			0.1				
Delay (s)		0.1			9.3			36.1				
Level of Service		A			A			D				
Approach Delay (s)		0.1			9.3			36.1			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	500	0	0	420	70	10	10	10	0	0	0
Future Volume (vph)	0	500	0	0	420	70	10	10	10	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.6			5.6			5.6				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1573			1517			1464				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1573			1517			1464				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	0	0	457	76	11	11	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	543	0	0	525	0	0	24	0	0	0	0
Confl. Peds. (#/hr)	39		22			39			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		50.3			30.9			13.9				
Effective Green, g (s)		50.3			30.9			13.9				
Actuated g/C Ratio		0.67			0.41			0.19				
Clearance Time (s)					5.6			5.6				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1054			625			271				
v/s Ratio Prot		c0.35			c0.35			c0.02				
v/s Ratio Perm												
v/c Ratio		0.52			0.84			0.09				
Uniform Delay, d1		6.2			19.8			25.3				
Progression Factor		0.07			0.98			1.01				
Incremental Delay, d2		0.4			11.5			0.1				
Delay (s)		0.8			30.9			25.7				
Level of Service		A			C			C				
Approach Delay (s)		0.8			30.9			25.7			0.0	
Approach LOS		A			C			C			A	

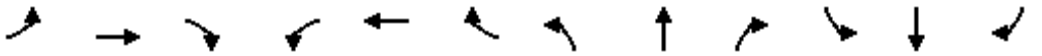
Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	495	20	70	550	70	40	526	60	0	401	320
Future Volume (veh/h)	280	495	20	70	550	70	40	526	60	0	401	320
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.99		0.93	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1800	1694	1728	0	1765	1728
Adj Flow Rate, veh/h	292	516	19	73	573	67	42	548	52	0	418	144
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	279	943	35	397	551	64	97	1036	96	0	938	318
Arrive On Green	0.17	0.59	0.59	0.75	0.75	0.75	0.77	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1597	1606	59	819	1469	172	119	2673	248	0	2508	822
Grp Volume(v), veh/h	292	0	535	73	0	640	332	0	310	0	288	274
Grp Sat Flow(s),veh/h/ln	1597	0	1665	819	0	1641	1562	0	1477	0	1676	1565
Q Serve(g_s), s	14.0	0.0	15.6	2.2	0.0	30.0	0.0	0.0	6.5	0.0	10.2	10.4
Cycle Q Clear(g_c), s	14.0	0.0	15.6	2.2	0.0	30.0	5.8	0.0	6.5	0.0	10.2	10.4
Prop In Lane	1.00		0.04	1.00		0.10	0.13		0.17	0.00		0.53
Lane Grp Cap(c), veh/h	279	0	978	397	0	615	656	0	572	0	650	606
V/C Ratio(X)	1.05	0.00	0.55	0.18	0.00	1.04	0.51	0.00	0.54	0.00	0.44	0.45
Avail Cap(c_a), veh/h	279	0	978	397	0	615	656	0	572	0	650	606
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.76	0.00	0.76	0.75	0.00	0.75	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	10.0	6.5	0.0	10.0	6.2	0.0	6.2	0.0	18.1	18.2
Incr Delay (d2), s/veh	66.1	0.0	2.2	0.8	0.0	42.5	2.1	0.0	2.7	0.0	2.2	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	11.3	0.0	7.7	0.6	0.0	19.9	3.0	0.0	2.8	0.0	5.1	4.9
LnGrp Delay(d),s/veh	99.1	0.0	12.2	7.3	0.0	52.5	8.3	0.0	9.0	0.0	20.3	20.6
LnGrp LOS	F		B	A		F	A		A		C	C
Approach Vol, veh/h		827			713			642			562	
Approach Delay, s/veh		42.9			47.9			8.6			20.5	
Approach LOS		D			D			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.2		35.8	17.0	34.2		35.8
Change Period (Y+Rc), s		* 4.2		4.6	3.0	* 4.2		4.6
Max Green Setting (Gmax), s		* 47		24.4	14.0	* 30		24.4
Max Q Clear Time (g_c+I1), s		17.6		8.5	16.0	32.0		12.4
Green Ext Time (p_c), s		5.8		5.2	0.0	0.0		3.8

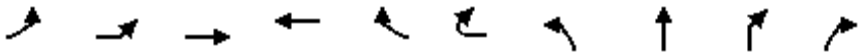
Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Notes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	490	50	40	180	0	0	0	0	250	1233	495
Future Volume (vph)	0	490	50	40	180	0	0	0	0	250	1233	495
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		0.95			1.00						0.95	1.00
Frpb, ped/bikes		1.00			1.00						1.00	0.98
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.99			1.00						1.00	0.85
Flt Protected		1.00			0.99						0.99	1.00
Satd. Flow (prot)		2769			1781						2992	1321
Flt Permitted		1.00			0.80						0.99	1.00
Satd. Flow (perm)		2769			1431						2992	1321
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	510	52	42	188	0	0	0	0	260	1284	516
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	553	0	0	230	0	0	0	0	0	1544	516
Confl. Peds. (#/hr)			15	15		4			11			
Confl. Bikes (#/hr)			3			3			3			2
Turn Type		NA		Perm	NA					Split	NA	custom
Protected Phases		4			8					2	2	
Permitted Phases				8								5
Actuated Green, G (s)		22.8			22.8						48.4	41.4
Effective Green, g (s)		22.8			22.8						48.4	41.4
Actuated g/C Ratio		0.29			0.29						0.60	0.52
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		789			407						1810	683
v/s Ratio Prot		c0.20									c0.52	
v/s Ratio Perm					0.16							0.39
v/c Ratio		0.70			0.57						0.85	0.76
Uniform Delay, d1		25.5			24.4						12.9	15.3
Progression Factor		0.47			0.44						1.00	1.00
Incremental Delay, d2		4.5			4.7						5.3	7.6
Delay (s)		16.6			15.5						18.2	22.9
Level of Service		B			B						B	C
Approach Delay (s)		16.6			15.5			0.0			19.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



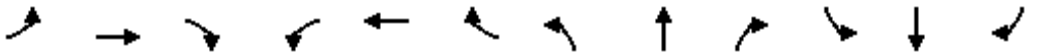
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations										
Traffic Volume (vph)	400	20	320	145	320	20	70	1630	200	60
Future Volume (vph)	400	20	320	145	320	20	70	1630	200	60
Ideal Flow (vphpl)	2200	1800	2200	2200	2200	1800	2200	2200	1800	2200
Lane Width	9	12	10	10	9	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	1.00	
Frpb, ped/bikes		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	
Frt		1.00	1.00	1.00	0.85			1.00	0.85	
Flt Protected		0.95	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (prot)		1509	1812	1812	1485			3678	1316	
Flt Permitted		0.62	1.00	1.00	1.00			1.00	1.00	
Satd. Flow (perm)		986	1812	1812	1485			3678	1316	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	417	21	333	151	333	21	73	1698	208	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	39	0
Lane Group Flow (vph)	0	438	333	151	354	0	0	1771	232	0
Confl. Peds. (#/hr)							8			3
Confl. Bikes (#/hr)					4	4				
Turn Type	pm+pt	pm+pt	NA	NA	Prot		Perm	NA	Perm	
Protected Phases	5	5	2	6	6			4		
Permitted Phases	2	2					4		4	
Actuated Green, G (s)		33.8	33.8	18.8	18.8			37.8	37.8	
Effective Green, g (s)		33.8	33.8	18.8	18.8			37.8	37.8	
Actuated g/C Ratio		0.42	0.42	0.24	0.24			0.47	0.47	
Clearance Time (s)		4.2	4.2	4.2	4.2			4.2	4.2	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		487	765	425	348			1737	621	
v/s Ratio Prot		c0.12	0.18	0.08	c0.24					
v/s Ratio Perm		0.26						0.48	0.18	
v/c Ratio		0.90	0.44	0.36	1.02			1.02	0.37	
Uniform Delay, d1		21.5	16.3	25.5	30.6			21.1	13.5	
Progression Factor		0.69	0.79	1.00	1.00			0.48	0.24	
Incremental Delay, d2		13.4	0.3	0.5	52.7			20.3	0.8	
Delay (s)		28.2	13.2	26.1	83.3			30.5	4.1	
Level of Service		C	B	C	F			C	A	
Approach Delay (s)			21.7	66.2				27.0		
Approach LOS			C	E				C		

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	400	40	30	245	65	60	471	90	90	361	40
Future Volume (veh/h)	90	400	40	30	245	65	60	471	90	90	361	40
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)	0.99		0.97	1.00		0.97	0.98		0.93	0.98		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1412	1560	1530	1412	1500	1530	1440	1500	1469	1440	1500	1469
Adj Flow Rate, veh/h	94	417	38	31	255	56	62	491	76	94	376	34
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	427	622	57	244	525	115	137	934	142	222	813	75
Arrive On Green	0.44	0.44	0.44	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Sat Flow, veh/h	846	1405	128	745	1185	260	188	2111	320	360	1837	169
Grp Volume(v), veh/h	94	0	455	31	0	311	325	0	304	239	0	265
Grp Sat Flow(s),veh/h/ln	846	0	1533	745	0	1446	1339	0	1280	1046	0	1321
Q Serve(g_s), s	6.0	0.0	18.8	2.1	0.0	3.5	0.0	0.0	4.2	0.9	0.0	3.1
Cycle Q Clear(g_c), s	9.5	0.0	18.8	20.9	0.0	3.5	3.5	0.0	4.2	5.1	0.0	3.1
Prop In Lane	1.00		0.08	1.00		0.18	0.19		0.25	0.39		0.13
Lane Grp Cap(c), veh/h	427	0	679	244	0	640	646	0	567	526	0	584
V/C Ratio(X)	0.22	0.00	0.67	0.13	0.00	0.49	0.50	0.00	0.54	0.45	0.00	0.45
Avail Cap(c_a), veh/h	427	0	679	244	0	640	646	0	567	526	0	584
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.82	0.00	0.82	0.68	0.00	0.68
Uniform Delay (d), s/veh	16.3	0.0	17.7	9.8	0.0	2.8	2.8	0.0	2.8	2.7	0.0	2.7
Incr Delay (d2), s/veh	1.2	0.0	5.2	1.0	0.0	2.5	2.3	0.0	3.0	1.9	0.0	1.7
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	1.5	0.0	8.8	0.5	0.0	1.7	1.7	0.0	1.7	1.1	0.0	1.3
LnGrp Delay(d),s/veh	17.4	0.0	22.9	10.8	0.0	5.3	5.1	0.0	5.8	4.6	0.0	4.5
LnGrp LOS	B		C	B		A	A		A	A		A
Approach Vol, veh/h		549			342			629			504	
Approach Delay, s/veh		22.0			5.8			5.4			4.5	
Approach LOS		C			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		40.0		40.0		40.0		40.0
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6
Max Green Setting (Gmax), s		35.4		35.4		35.4		35.4
Max Q Clear Time (g_c+I1), s		20.8		6.2		22.9		7.1
Green Ext Time (p_c), s		2.4		3.0		1.2		2.5

Intersection Summary	
HCM 2010 Ctrl Delay	9.8
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	360	190	70	180	0	0	0	0	50	1133	140
Future Volume (vph)	0	360	190	70	180	0	0	0	0	50	1133	140
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		4.2			4.2						4.6	4.6
Lane Util. Factor		1.00			1.00						0.91	1.00
Frpb, ped/bikes		0.99			1.00						1.00	0.95
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1700			1773						4164	1147
Flt Permitted		1.00			0.66						1.00	1.00
Satd. Flow (perm)		1700			1178						4164	1147
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	375	198	73	188	0	0	0	0	52	1180	146
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	564	0	0	261	0	0	0	0	0	1232	146
Confl. Peds. (#/hr)	12		12	12		12			12	12		7
Confl. Bikes (#/hr)			6			4			2			2
Parking (#/hr)											2	2
Turn Type		NA		Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases				8						2		5
Actuated Green, G (s)		39.8			39.8						31.4	24.4
Effective Green, g (s)		39.8			39.8						31.4	24.4
Actuated g/C Ratio		0.50			0.50						0.39	0.30
Clearance Time (s)		4.2			4.2						4.6	4.6
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		845			586						1634	349
v/s Ratio Prot		c0.33										
v/s Ratio Perm					0.22						0.30	0.13
v/c Ratio		0.67			0.45						0.75	0.42
Uniform Delay, d1		15.1			13.0						21.0	22.1
Progression Factor		0.34			0.99						0.68	0.75
Incremental Delay, d2		3.9			1.9						1.7	1.9
Delay (s)		8.9			14.7						16.0	18.5
Level of Service		A			B						B	B
Approach Delay (s)		8.9			14.7			0.0			16.2	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	160	0	0	140	120	100	1555	20	0	0	0
Future Volume (veh/h)	270	160	0	0	140	120	100	1555	20	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1620	1588	1620			
Adj Flow Rate, veh/h	281	167	0	0	146	121	104	1620	19			
Adj No. of Lanes	1	1	0	0	1	0	0	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	365	683	0	0	296	245	117	1951	24			
Arrive On Green	0.72	0.72	0.00	0.00	0.43	0.43	0.15	0.15	0.15			
Sat Flow, veh/h	993	1588	0	0	688	570	258	4288	52			
Grp Volume(v), veh/h	281	167	0	0	0	267	635	530	578			
Grp Sat Flow(s),veh/h/ln	993	1588	0	0	0	1258	1575	1445	1577			
Q Serve(g_s), s	22.1	2.9	0.0	0.0	0.0	12.3	31.6	28.4	28.4			
Cycle Q Clear(g_c), s	34.4	2.9	0.0	0.0	0.0	12.3	31.6	28.4	28.4			
Prop In Lane	1.00		0.00	0.00		0.45	0.16		0.03			
Lane Grp Cap(c), veh/h	365	683	0	0	0	541	717	658	717			
V/C Ratio(X)	0.77	0.24	0.00	0.00	0.00	0.49	0.89	0.81	0.81			
Avail Cap(c_a), veh/h	365	683	0	0	0	541	717	658	717			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.69	0.69	0.00	0.00	0.00	1.00	0.48	0.48	0.48			
Uniform Delay (d), s/veh	17.7	6.8	0.0	0.0	0.0	16.5	32.0	30.6	30.6			
Incr Delay (d2), s/veh	6.9	0.1	0.0	0.0	0.0	0.7	8.1	5.2	4.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.8	1.3	0.0	0.0	0.0	4.3	15.4	12.3	13.3			
LnGrp Delay(d),s/veh	24.5	7.0	0.0	0.0	0.0	17.2	40.1	35.7	35.3			
LnGrp LOS	C	A				B	D	D	D			
Approach Vol, veh/h		448			267			1743				
Approach Delay, s/veh		18.0			17.2			37.2				
Approach LOS		B			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		39.0		41.0		39.0		
Change Period (Y+Rc), s		4.6		4.6		4.6		
Max Green Setting (Gmax), s		34.4		36.4		34.4		
Max Q Clear Time (g_c+I1), s		36.4		33.6		14.3		
Green Ext Time (p_c), s		0.0		2.1		1.1		

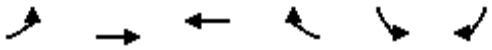
Intersection Summary	
HCM 2010 Ctrl Delay	31.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	245	40	115	280	155	30	431	90	50	311	70
Future Volume (veh/h)	50	245	40	115	280	155	30	431	90	50	311	70
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	0.97		0.90	0.93		0.83	0.97		0.83
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	1588	1525	1620	1588	1588	1620	1620	1588	1555	1620	1588	1555
Adj Flow Rate, veh/h	52	255	34	120	292	135	31	449	73	52	324	52
Adj No. of Lanes	1	1	0	1	1	0	0	2	0	0	2	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	647	86	446	493	228	83	934	147	122	720	125
Arrive On Green	0.50	0.50	0.50	0.16	0.16	0.16	0.13	0.13	0.13	0.80	0.80	0.80
Sat Flow, veh/h	861	1300	173	949	991	458	84	2351	370	167	1810	315
Grp Volume(v), veh/h	52	0	289	120	0	427	298	0	255	210	0	218
Grp Sat Flow(s),veh/h/ln	861	0	1473	949	0	1450	1513	0	1291	975	0	1316
Q Serve(g_s), s	4.0	0.0	9.8	9.3	0.0	21.8	0.0	0.0	14.7	4.4	0.0	4.1
Cycle Q Clear(g_c), s	25.8	0.0	9.8	19.1	0.0	21.8	13.9	0.0	14.7	19.1	0.0	4.1
Prop In Lane	1.00		0.12	1.00		0.32	0.10		0.29	0.25		0.24
Lane Grp Cap(c), veh/h	284	0	733	446	0	721	651	0	513	444	0	523
V/C Ratio(X)	0.18	0.00	0.39	0.27	0.00	0.59	0.46	0.00	0.50	0.47	0.00	0.42
Avail Cap(c_a), veh/h	284	0	733	446	0	721	651	0	513	444	0	523
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.93	0.00	0.93	0.80	0.00	0.80	0.80	0.00	0.80
Uniform Delay (d), s/veh	25.6	0.0	12.6	29.3	0.0	25.9	27.0	0.0	27.3	6.7	0.0	5.4
Incr Delay (d2), s/veh	1.4	0.0	1.6	1.4	0.0	3.3	1.8	0.0	2.7	2.9	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	4.3	2.6	0.0	9.4	6.5	0.0	5.6	1.6	0.0	1.6
LnGrp Delay(d),s/veh	27.0	0.0	14.2	30.6	0.0	29.2	28.8	0.0	30.0	9.5	0.0	7.3
LnGrp LOS	C		B	C		C	C		C	A		A
Approach Vol, veh/h		341			547			553			428	
Approach Delay, s/veh		16.1			29.5			29.4			8.4	
Approach LOS		B			C			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		44.0		36.0		44.0		36.0
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		* 4.2
Max Green Setting (Gmax), s		* 40		* 32		* 40		* 32
Max Q Clear Time (g_c+I1), s		27.8		16.7		23.8		21.1
Green Ext Time (p_c), s		2.3		4.3		4.8		2.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.2
HCM 2010 LOS	C

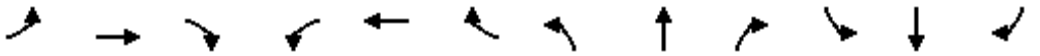
Notes



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↱
Traffic Volume (vph)	0	465	440	0	0	120
Future Volume (vph)	0	465	440	0	0	120
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0			5.6
Lane Util. Factor		1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00			0.78
Flpb, ped/bikes		1.00	1.00			1.00
Frt		1.00	1.00			0.86
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		1588	1588			1074
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		1588	1588			1074
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	484	458	0	0	125
RTOR Reduction (vph)	0	0	0	0	0	104
Lane Group Flow (vph)	0	484	458	0	0	21
Confl. Peds. (#/hr)				59		78
Confl. Bikes (#/hr)				14		
Turn Type		NA	NA			Perm
Protected Phases		2 8	4 6			
Permitted Phases						8
Actuated Green, G (s)		54.9	55.1			13.3
Effective Green, g (s)		54.9	55.1			13.3
Actuated g/C Ratio		0.69	0.69			0.17
Clearance Time (s)						5.6
Vehicle Extension (s)						3.0
Lane Grp Cap (vph)		1089	1093			178
v/s Ratio Prot		c0.30	c0.29			
v/s Ratio Perm						0.02
v/c Ratio		0.44	0.42			0.12
Uniform Delay, d1		5.7	5.4			28.4
Progression Factor		0.95	0.15			1.00
Incremental Delay, d2		0.3	0.2			0.3
Delay (s)		5.7	1.0			28.6
Level of Service		A	A			C
Approach Delay (s)		5.7	1.0		28.6	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	285	190	80	260	0	0	0	0	135	1053	205
Future Volume (vph)	0	285	190	80	260	0	0	0	0	135	1053	205
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	13	10	15	11	12	12	12	12	12	12	12
Total Lost time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Lane Util. Factor		1.00	1.00	1.00	1.00						0.91	1.00
Frpb, ped/bikes		1.00	0.93	1.00	1.00						1.00	0.92
Flpb, ped/bikes		1.00	1.00	0.97	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.99	1.00
Satd. Flow (prot)		1641	1172	1609	1535						4143	1102
Flt Permitted		1.00	1.00	0.47	1.00						0.99	1.00
Satd. Flow (perm)		1641	1172	792	1535						4143	1102
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	297	198	83	271	0	0	0	0	141	1097	214
RTOR Reduction (vph)	0	0	36	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	297	162	83	271	0	0	0	0	0	1238	214
Confl. Peds. (#/hr)			51	51		28			11	11		19
Confl. Bikes (#/hr)			10			16			1			1
Parking (#/hr)											2	2
Turn Type		NA	Perm	Perm	NA					Perm	NA	custom
Protected Phases		4			8						2	
Permitted Phases			4	8						2		5
Actuated Green, G (s)		29.8	29.8	29.8	29.8						41.4	34.4
Effective Green, g (s)		29.8	29.8	29.8	29.8						41.4	34.4
Actuated g/C Ratio		0.37	0.37	0.37	0.37						0.52	0.43
Clearance Time (s)		4.2	4.2	4.2	4.2						4.6	4.6
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		611	436	295	571						2144	473
v/s Ratio Prot		c0.18			0.18							
v/s Ratio Perm			0.14	0.10							0.30	0.19
v/c Ratio		0.49	0.37	0.28	0.47						0.58	0.45
Uniform Delay, d1		19.2	18.3	17.6	19.1						13.3	16.1
Progression Factor		0.56	0.40	0.93	0.95						0.36	0.49
Incremental Delay, d2		2.5	2.2	2.2	2.6						0.8	2.1
Delay (s)		13.3	9.5	18.5	20.7						5.5	10.0
Level of Service		B	A	B	C						A	B
Approach Delay (s)		11.8			20.2			0.0			6.2	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	230	0	0	210	90	120	1410	170	0	0	0
Future Volume (veh/h)	180	230	0	0	210	90	120	1410	170	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.95	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1588	1588	0	0	1588	1620	1525	1588	1620			
Adj Flow Rate, veh/h	188	240	0	0	219	83	125	1469	157			
Adj No. of Lanes	1	1	0	0	1	0	1	3	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	262	631	0	0	374	142	722	1977	211			
Arrive On Green	0.13	0.13	0.00	0.00	0.13	0.13	0.16	0.16	0.16			
Sat Flow, veh/h	963	1588	0	0	941	356	1452	3973	424			
Grp Volume(v), veh/h	188	240	0	0	0	302	125	1068	558			
Grp Sat Flow(s),veh/h/ln	963	1588	0	0	0	1297	1452	1445	1507			
Q Serve(g_s), s	14.3	11.1	0.0	0.0	0.0	17.5	5.9	28.2	28.2			
Cycle Q Clear(g_c), s	31.8	11.1	0.0	0.0	0.0	17.5	5.9	28.2	28.2			
Prop In Lane	1.00		0.00	0.00		0.27	1.00		0.28			
Lane Grp Cap(c), veh/h	262	631	0	0	0	516	722	1438	750			
V/C Ratio(X)	0.72	0.38	0.00	0.00	0.00	0.59	0.17	0.74	0.74			
Avail Cap(c_a), veh/h	262	631	0	0	0	516	722	1438	750			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.00	1.00	0.35	0.35	0.35			
Uniform Delay (d), s/veh	44.1	25.7	0.0	0.0	0.0	28.6	19.3	28.6	28.6			
Incr Delay (d2), s/veh	13.7	1.5	0.0	0.0	0.0	4.8	0.2	1.2	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			
%ile BackOfQ(50%),veh/ln	5.2	5.1	0.0	0.0	0.0	7.0	2.4	11.5	12.3			
LnGrp Delay(d),s/veh	57.9	27.3	0.0	0.0	0.0	33.4	19.5	29.8	30.9			
LnGrp LOS	E	C				C	B	C	C			
Approach Vol, veh/h		428			302			1751				
Approach Delay, s/veh		40.7			33.4			29.4				
Approach LOS		D			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		36.0		44.0		36.0		
Change Period (Y+Rc), s		* 4.2		* 4.2		* 4.2		
Max Green Setting (Gmax), s		* 32		* 40		* 32		
Max Q Clear Time (g_c+I1), s		33.8		30.2		19.5		
Green Ext Time (p_c), s		0.0		6.0		1.0		

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	335	1591	0	0	0	0	0	300	60
Future Volume (veh/h)	0	0	0	335	1591	0	0	0	0	0	300	60
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.94
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.82
Adj Sat Flow, veh/h/ln				1530	1500	0				0	1500	1530
Adj Flow Rate, veh/h				349	1657	0				0	312	43
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				509	2184	0				0	462	63
Arrive On Green				0.23	0.23	0.00				0.00	0.20	0.20
Sat Flow, veh/h				644	3302	0				0	2352	309
Grp Volume(v), veh/h				725	1281	0				0	193	162
Grp Sat Flow(s),veh/h/ln				1339	1242	0				0	1425	1161
Q Serve(g_s), s				40.8	38.4	0.0				0.0	10.0	10.3
Cycle Q Clear(g_c), s				40.8	38.4	0.0				0.0	10.0	10.3
Prop In Lane				0.48		0.00				0.00		0.27
Lane Grp Cap(c), veh/h				986	1707	0				0	289	236
V/C Ratio(X)				0.74	0.75	0.00				0.00	0.67	0.69
Avail Cap(c_a), veh/h				986	1707	0				0	417	339
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.45	0.45	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				25.5	24.5	0.0				0.0	29.4	29.5
Incr Delay (d2), s/veh				2.2	1.4	0.0				0.0	2.7	3.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.8	13.6	0.0				0.0	4.1	3.5
LnGrp Delay(d),s/veh				27.7	26.0	0.0				0.0	32.1	33.0
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					2006						355	
Approach Delay, s/veh					26.6						32.5	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		59.2		20.8				
Change Period (Y+Rc), s		* 4.2		4.6				
Max Green Setting (Gmax), s		* 48		23.4				
Max Q Clear Time (g_c+I1), s		42.8		12.3				
Green Ext Time (p_c), s		3.9		1.1				

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1786	160	150	330	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1786	160	150	330	0	0	0	0
Number				5	2	12	7	4	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				0	1412	1412	1440	1412	0			
Adj Flow Rate, veh/h				0	1860	133	156	344	0			
Adj No. of Lanes				0	3	1	0	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2481	757	247	442	0			
Arrive On Green				0.00	0.21	0.21	0.08	0.08	0.00			
Sat Flow, veh/h				0	3981	1175	700	1822	0			
Grp Volume(v), veh/h				0	1860	133	270	230	0			
Grp Sat Flow(s),veh/h/ln				0	1285	1175	1237	1220	0			
Q Serve(g_s), s				0.0	36.2	7.4	16.9	14.7	0.0			
Cycle Q Clear(g_c), s				0.0	36.2	7.4	17.3	14.7	0.0			
Prop In Lane				0.00		1.00	0.58		0.00			
Lane Grp Cap(c), veh/h				0	2481	757	382	307	0			
V/C Ratio(X)				0.00	0.75	0.18	0.71	0.75	0.00			
Avail Cap(c_a), veh/h				0	2481	757	408	333	0			
HCM Platoon Ratio				1.00	0.33	0.33	0.33	0.33	1.00			
Upstream Filter(I)				0.00	0.27	0.27	0.74	0.74	0.00			
Uniform Delay (d), s/veh				0.0	25.5	14.1	35.4	34.2	0.0			
Incr Delay (d2), s/veh				0.0	0.6	0.1	3.9	6.3	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	13.0	2.4	6.3	5.5	0.0			
LnGrp Delay(d),s/veh				0.0	26.1	14.3	39.3	40.6	0.0			
LnGrp LOS					C	B	D	D				
Approach Vol, veh/h					1993			500				
Approach Delay, s/veh					25.3			39.9				
Approach LOS					C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		55.7		24.3				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 50		* 22				
Max Q Clear Time (g_c+I1), s		38.2		19.3				
Green Ext Time (p_c), s		8.0		0.6				

Intersection Summary	
HCM 2010 Ctrl Delay	28.2
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	1851	0	0	0	0	0	290	100
Future Volume (veh/h)	0	0	0	195	1851	0	0	0	0	0	290	100
Number				5	2	12				7	4	14
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.85
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1440	1412	0				0	1412	1440
Adj Flow Rate, veh/h				203	1928	0				0	302	95
Adj No. of Lanes				0	3	0				0	2	0
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				272	2176	0				0	446	134
Arrive On Green				0.22	0.22	0.00				0.00	0.24	0.24
Sat Flow, veh/h				330	3453	0				0	1904	552
Grp Volume(v), veh/h				787	1344	0				0	217	180
Grp Sat Flow(s),veh/h/ln				1329	1169	0				0	1341	1044
Q Serve(g_s), s				44.3	44.6	0.0				0.0	11.7	12.6
Cycle Q Clear(g_c), s				46.2	44.6	0.0				0.0	11.7	12.6
Prop In Lane				0.26		0.00				0.00		0.53
Lane Grp Cap(c), veh/h				923	1524	0				0	326	254
V/C Ratio(X)				0.85	0.88	0.00				0.00	0.67	0.71
Avail Cap(c_a), veh/h				923	1524	0				0	389	303
HCM Platoon Ratio				0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)				0.46	0.46	0.00				0.00	1.00	1.00
Uniform Delay (d), s/veh				29.0	28.4	0.0				0.0	27.3	27.7
Incr Delay (d2), s/veh				4.8	3.8	0.0				0.0	3.3	6.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				18.2	15.3	0.0				0.0	4.6	4.0
LnGrp Delay(d),s/veh				33.8	32.2	0.0				0.0	30.7	33.7
LnGrp LOS				C	C						C	C
Approach Vol, veh/h					2131						397	
Approach Delay, s/veh					32.8						32.0	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		56.4		23.6				
Change Period (Y+Rc), s		* 4.2		* 4.2				
Max Green Setting (Gmax), s		* 48		* 23				
Max Q Clear Time (g_c+I1), s		48.2		14.6				
Green Ext Time (p_c), s		0.2		1.1				

Intersection Summary	
HCM 2010 Ctrl Delay	32.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	80	1696	100	260	175	0	0	180	50
Future Volume (veh/h)	0	0	0	80	1696	100	260	175	0	0	180	50
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				83	1767	97	271	182	0	0	188	38
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				108	2451	139	315	666	0	0	275	56
Arrive On Green				0.53	0.53	0.53	0.03	0.12	0.00	0.00	0.21	0.21
Sat Flow, veh/h				203	4587	259	1765	1853	0	0	1308	264
Grp Volume(v), veh/h				718	598	632	271	182	0	0	0	226
Grp Sat Flow(s),veh/h/ln				1755	1606	1689	1765	1853	0	0	0	1572
Q Serve(g_s), s				25.8	22.1	22.3	5.3	7.2	0.0	0.0	0.0	10.6
Cycle Q Clear(g_c), s				25.8	22.1	22.3	5.3	7.2	0.0	0.0	0.0	10.6
Prop In Lane				0.12		0.15	1.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				937	858	902	315	666	0	0	0	330
V/C Ratio(X)				0.77	0.70	0.70	0.86	0.27	0.00	0.00	0.00	0.68
Avail Cap(c_a), veh/h				937	858	902	327	718	0	0	0	364
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.73	0.73	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				14.7	13.8	13.9	35.8	25.7	0.0	0.0	0.0	29.2
Incr Delay (d2), s/veh				5.9	4.7	4.5	16.4	0.3	0.0	0.0	0.0	6.7
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				13.9	10.7	11.3	7.4	3.7	0.0	0.0	0.0	5.2
LnGrp Delay(d),s/veh				20.6	18.5	18.4	52.2	26.1	0.0	0.0	0.0	35.9
LnGrp LOS				C	B	B	D	C				D
Approach Vol, veh/h					1947			453			226	
Approach Delay, s/veh					19.2			41.7			35.9	
Approach LOS					B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			11.5	21.3		47.2		32.8
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			8.0	18.5		40.5		31.0
Max Q Clear Time (g_c+I1), s			7.3	12.6		27.8		9.2
Green Ext Time (p_c), s			0.1	0.8		11.1		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	24.5
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	40	94.2%	12.9	3.1	B
	Through	5	5	107.5%	12.9	13.1	B
	Right Turn						
	Subtotal	47	45	95.6%	13.3	2.6	B
SB	Left Turn						
	Through	15	13	84.5%	29.7	8.6	D
	Right Turn	10	7	65.3%	17.4	14.1	C
	Subtotal	25	19	76.8%	26.1	4.4	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	88	78	89.0%	2.8	0.2	A
	Through	1,829	1,782	97.4%	2.3	0.6	A
	Right Turn	10	10	96.0%	1.6	0.3	A
	Subtotal	1,927	1,870	97.0%	2.3	0.6	A
Total		1,999	1,934	96.8%	2.8	0.6	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	132	123	93.4%	31.7	2.2	C
	Through	20	27	134.4%	31.4	6.1	C
	Right Turn						
	Subtotal	152	150	98.8%	31.7	2.7	C
SB	Left Turn						
	Through	50	58	116.0%	30.0	6.0	C
	Right Turn	10	12	115.2%	18.4	11.3	B
	Subtotal	60	70	115.8%	28.6	5.5	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	256	105.8%	10.4	4.1	B
	Through	1,872	1,796	95.9%	6.7	1.5	A
	Right Turn	40	38	95.0%	6.2	2.4	A
	Subtotal	2,154	2,090	97.0%	7.1	1.7	A
Total		2,366	2,310	97.6%	9.4	1.7	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	110	1832	150	51	346	0	0	285	161
Future Volume (veh/h)	0	0	0	110	1832	150	51	346	0	0	285	161
Number				1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.98		1.00	1.00		0.82
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				1620	1588	1620	1620	1588	0	0	1525	1555
Adj Flow Rate, veh/h				115	1908	145	53	360	0	0	297	162
Adj No. of Lanes				0	3	0	0	2	0	0	2	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				131	2303	179	102	660	0	0	532	273
Arrive On Green				0.19	0.19	0.19	0.62	0.62	0.00	0.00	0.10	0.10
Sat Flow, veh/h				227	3989	311	145	2200	0	0	1791	881
Grp Volume(v), veh/h				800	666	702	201	212	0	0	248	211
Grp Sat Flow(s),veh/h/ln				1577	1445	1504	900	1373	0	0	1448	1148
Q Serve(g_s), s				39.5	35.2	35.7	4.0	6.8	0.0	0.0	13.0	14.1
Cycle Q Clear(g_c), s				39.5	35.2	35.7	18.0	6.8	0.0	0.0	13.0	14.1
Prop In Lane				0.14		0.21	0.26		0.00	0.00		0.77
Lane Grp Cap(c), veh/h				911	835	869	336	426	0	0	449	356
V/C Ratio(X)				0.88	0.80	0.81	0.60	0.50	0.00	0.00	0.55	0.59
Avail Cap(c_a), veh/h				936	858	893	336	426	0	0	449	356
HCM Platoon Ratio				0.33	0.33	0.33	2.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				0.28	0.28	0.28	1.00	1.00	0.00	0.00	0.88	0.88
Uniform Delay (d), s/veh				29.7	27.9	28.1	12.8	11.8	0.0	0.0	30.6	31.1
Incr Delay (d2), s/veh				2.9	1.5	1.6	7.7	4.1	0.0	0.0	4.3	6.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				18.0	14.5	15.3	2.9	3.0	0.0	0.0	5.8	5.1
LnGrp Delay(d),s/veh				32.6	29.4	29.7	20.5	15.9	0.0	0.0	34.9	37.4
LnGrp LOS				C	C	C	C	B			C	D
Approach Vol, veh/h					2168			413			459	
Approach Delay, s/veh					30.7			18.1			36.0	
Approach LOS					C			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.3		50.7		29.3
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				23.5		47.5		23.5
Max Q Clear Time (g_c+I1), s				20.0		41.5		16.1
Green Ext Time (p_c), s				0.6		4.7		1.3

Intersection Summary		
HCM 2010 Ctrl Delay		29.8
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	350	1952	50	125	55	0	0	0	0
Future Volume (vph)	0	0	0	350	1952	50	125	55	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1600	1600	1600	1600	1600	1800	1800	1600	1600
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)					11.6		7.6	7.6				
Lane Util. Factor					0.91		1.00	1.00				
Frpb, ped/bikes					1.00		1.00	1.00				
Flpb, ped/bikes					0.96		0.96	1.00				
Frt					1.00		1.00	1.00				
Flt Protected					0.99		0.95	1.00				
Satd. Flow (prot)					3669		1098	1249				
Flt Permitted					0.99		0.95	1.00				
Satd. Flow (perm)					3669		1098	1249				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	365	2033	52	130	57	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2447	0	130	57	0	0	0	0
Confl. Peds. (#/hr)			106	106		44	30		69			30
Confl. Bikes (#/hr)						2			3			8
Parking (#/hr)							3	3			3	3
Turn Type				Perm	NA		Perm	NA				
Protected Phases					6			4				
Permitted Phases				6			4					
Actuated Green, G (s)					51.6		19.2	19.2				
Effective Green, g (s)					51.6		19.2	19.2				
Actuated g/C Ratio					0.57		0.21	0.21				
Clearance Time (s)					11.6		7.6	7.6				
Vehicle Extension (s)					5.0		5.0	5.0				
Lane Grp Cap (vph)					2103		234	266				
v/s Ratio Prot								0.05				
v/s Ratio Perm					0.67		c0.12					
v/c Ratio					1.16		0.56	0.21				
Uniform Delay, d1					19.2		31.6	29.2				
Progression Factor					1.00		1.00	1.00				
Incremental Delay, d2					79.4		4.8	0.8				
Delay (s)					98.6		36.4	30.0				
Level of Service					F		D	C				
Approach Delay (s)		0.0			98.6			34.4			0.0	
Approach LOS		A			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	94.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	163.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	510	1739	0	0	0	0	0	725	598
Future Volume (veh/h)	0	0	0	510	1739	0	0	0	0	0	725	598
Number				1	6	16				3	8	18
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		0.86
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1560	1588	0				0	1588	1500
Adj Flow Rate, veh/h				531	1811	0				0	755	615
Adj No. of Lanes				1	3	0				0	3	1
Peak Hour Factor				0.96	0.96	0.96				0.96	0.96	0.96
Percent Heavy Veh, %				2	2	0				0	2	2
Cap, veh/h				717	2011	0				0	2018	509
Arrive On Green				0.14	0.14	0.00				0.00	0.15	0.15
Sat Flow, veh/h				1486	4765	0				0	4479	1093
Grp Volume(v), veh/h				531	1811	0				0	755	615
Grp Sat Flow(s),veh/h/ln				1486	1588	0				0	1445	1093
Q Serve(g_s), s				27.9	29.9	0.0				0.0	12.5	37.2
Cycle Q Clear(g_c), s				27.9	29.9	0.0				0.0	12.5	37.2
Prop In Lane				1.00		0.00				0.00		1.00
Lane Grp Cap(c), veh/h				717	2011	0				0	2018	509
V/C Ratio(X)				0.74	0.90	0.00				0.00	0.37	1.21
Avail Cap(c_a), veh/h				721	2025	0				0	2018	509
HCM Platoon Ratio				0.33	0.33	1.00				1.00	0.33	0.33
Upstream Filter(I)				0.09	0.09	0.00				0.00	0.82	0.82
Uniform Delay (d), s/veh				31.9	32.8	0.0				0.0	23.4	33.9
Incr Delay (d2), s/veh				0.4	0.6	0.0				0.0	0.4	108.7
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	13.3	0.0				0.0	5.1	26.6
LnGrp Delay(d),s/veh				32.3	33.4	0.0				0.0	23.8	142.6
LnGrp LOS				C	C						C	F
Approach Vol, veh/h					2342						1370	
Approach Delay, s/veh					33.1						77.1	
Approach LOS					C						E	

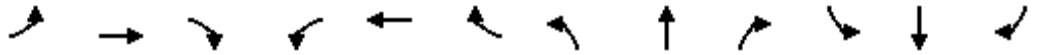
Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		8
Phs Duration (G+Y+Rc), s						37.8		42.2
Change Period (Y+Rc), s						4.0		5.0
Max Green Setting (Gmax), s						34.0		37.0
Max Q Clear Time (g_c+I1), s						31.9		39.2
Green Ext Time (p_c), s						1.8		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		49.4
HCM 2010 LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

User approved ignoring U-Turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1236	210	1008	1490	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1236	210	1008	1490	0	0	0	0
Number				1	6	16	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		0.93	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				0	1500	1500	1398	1398	0			
Adj Flow Rate, veh/h				0	1288	200	1134	1434	0			
Adj No. of Lanes				0	3	1	2	2	0			
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %				0	2	2	3	3	0			
Cap, veh/h				0	1254	363	1548	1625	0			
Arrive On Green				0.00	0.31	0.31	0.19	0.19	0.00			
Sat Flow, veh/h				0	4230	1184	2663	2796	0			
Grp Volume(v), veh/h				0	1288	200	1134	1434	0			
Grp Sat Flow(s),veh/h/ln				0	1365	1184	1331	1398	0			
Q Serve(g_s), s				0.0	24.5	11.3	32.0	39.9	0.0			
Cycle Q Clear(g_c), s				0.0	24.5	11.3	32.0	39.9	0.0			
Prop In Lane				0.00		1.00	1.00		0.00			
Lane Grp Cap(c), veh/h				0	1254	363	1548	1625	0			
V/C Ratio(X)				0.00	1.03	0.55	0.73	0.88	0.00			
Avail Cap(c_a), veh/h				0	1254	363	1548	1625	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	0.09	0.09	0.00			
Uniform Delay (d), s/veh				0.0	27.8	23.2	26.5	29.7	0.0			
Incr Delay (d2), s/veh				0.0	32.5	1.8	0.3	0.7	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				0.0	13.0	3.8	11.9	15.6	0.0			
LnGrp Delay(d),s/veh				0.0	60.3	25.0	26.8	30.4	0.0			
LnGrp LOS					F	C	C	C				
Approach Vol, veh/h					1488			2568				
Approach Delay, s/veh					55.5			28.8				
Approach LOS					E			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				51.0		29.0		
Change Period (Y+Rc), s				4.5		4.5		
Max Green Setting (Gmax), s				46.5		24.5		
Max Q Clear Time (g_c+I1), s				41.9		26.5		
Green Ext Time (p_c), s				4.1		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	38.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1627	110	0	0	0	0	0	435	185	470	0
Future Volume (veh/h)	0	1627	110	0	0	0	0	0	435	185	470	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.96	0.99		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	0	1676	1710				0	1588	1620	1765	1765	0
Adj Flow Rate, veh/h	0	1695	106				0	0	439	193	490	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	575	238	781	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.44	0.15	0.15	0.00
Sat Flow, veh/h		0					0	0	1300	933	1765	0
Grp Volume(v), veh/h		0.0					0	0	439	193	490	0
Grp Sat Flow(s),veh/h/ln							0	0	1300	933	1765	0
Q Serve(g_s), s							0.0	0.0	22.7	12.7	20.9	0.0
Cycle Q Clear(g_c), s							0.0	0.0	22.7	35.4	20.9	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	575	238	781	0
V/C Ratio(X)							0.00	0.00	0.76	0.81	0.63	0.00
Avail Cap(c_a), veh/h							0	0	575	238	781	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.74	0.74	0.00
Uniform Delay (d), s/veh							0.0	0.0	18.8	47.0	28.0	0.0
Incr Delay (d2), s/veh							0.0	0.0	5.4	13.7	0.9	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							0.0	0.0	8.9	5.2	10.4	0.0
LnGrp Delay(d),s/veh							0.0	0.0	24.2	60.7	28.9	0.0
LnGrp LOS									C	E	C	
Approach Vol, veh/h								439			683	
Approach Delay, s/veh								24.2			37.9	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				40.0				40.0
Change Period (Y+Rc), s				4.6				4.6
Max Green Setting (Gmax), s				35.4				35.4
Max Q Clear Time (g_c+I1), s				37.4				24.7
Green Ext Time (p_c), s				0.0				1.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	2052	0	0	0	0	0	260	120	0	0	0
Future Volume (veh/h)	200	2052	0	0	0	0	0	260	120	0	0	0
Number	1	6	16				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1440	1500	0				0	1500	1440			
Adj Flow Rate, veh/h	208	2138	0				0	271	118			
Adj No. of Lanes	0	3	0				0	2	0			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	299	2662	0				0	376	158			
Arrive On Green	0.23	0.23	0.00				0.00	0.19	0.19			
Sat Flow, veh/h	345	3798	0				0	1986	837			
Grp Volume(v), veh/h	819	1527	0				0	202	187			
Grp Sat Flow(s),veh/h/ln	1414	1365	0				0	1500	1324			
Q Serve(g_s), s	42.0	42.2	0.0				0.0	10.1	10.6			
Cycle Q Clear(g_c), s	44.0	42.2	0.0				0.0	10.1	10.6			
Prop In Lane	0.25		0.00				0.00		0.63			
Lane Grp Cap(c), veh/h	1047	1913	0				0	284	250			
V/C Ratio(X)	0.78	0.80	0.00				0.00	0.71	0.75			
Avail Cap(c_a), veh/h	1047	1913	0				0	390	344			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.37	0.37	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	26.1	25.4	0.0				0.0	30.4	30.6			
Incr Delay (d2), s/veh	2.2	1.3	0.0				0.0	7.2	9.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	17.9	16.4	0.0				0.0	4.7	4.6			
LnGrp Delay(d),s/veh	28.3	26.7	0.0				0.0	37.6	40.5			
LnGrp LOS	C	C						D	D			
Approach Vol, veh/h		2346						389				
Approach Delay, s/veh		27.3						39.0				
Approach LOS		C						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				19.3		60.7		
Change Period (Y+Rc), s				* 4.2		4.6		
Max Green Setting (Gmax), s				* 21		50.4		
Max Q Clear Time (g_c+I1), s				12.6		46.0		
Green Ext Time (p_c), s				2.0		4.2		

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2087	90	0	0	0	0	0	250	210	290	0
Future Volume (veh/h)	0	2087	90	0	0	0	0	0	250	210	290	0
Number	1	6	16				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.90	0.97		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	0	1500	1382				0	1588	1591	1560	1500	0
Adj Flow Rate, veh/h	0	2174	88				0	0	243	219	302	0
Adj No. of Lanes	0	3	0				0	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	0	0	0				0	0	359	205	441	0
Arrive On Green	0.00	0.00	0.00				0.00	0.00	0.29	0.10	0.10	0.00
Sat Flow, veh/h		0					0	0	1221	974	1500	0
Grp Volume(v), veh/h		0.0					0	0	243	219	302	0
Grp Sat Flow(s),veh/h/ln							0	0	1221	974	1500	0
Q Serve(g_s), s							0.0	0.0	14.0	9.5	15.6	0.0
Cycle Q Clear(g_c), s							0.0	0.0	14.0	23.5	15.6	0.0
Prop In Lane							0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h							0	0	359	205	441	0
V/C Ratio(X)							0.00	0.00	0.68	1.07	0.69	0.00
Avail Cap(c_a), veh/h							0	0	359	205	441	0
HCM Platoon Ratio							1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)							0.00	0.00	1.00	0.68	0.68	0.00
Uniform Delay (d), s/veh							0.0	0.0	24.9	45.2	32.5	0.0
Incr Delay (d2), s/veh							0.0	0.0	4.2	70.9	2.5	0.0
Initial Q Delay(d3),s/veh							0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln							0.0	0.0	5.1	8.6	6.8	0.0
LnGrp Delay(d),s/veh							0.0	0.0	29.1	116.1	35.1	0.0
LnGrp LOS									C	F	D	
Approach Vol, veh/h								243			521	
Approach Delay, s/veh								29.1			69.1	
Approach LOS								C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4				8
Phs Duration (G+Y+Rc), s				28.0				28.0
Change Period (Y+Rc), s				4.5				4.5
Max Green Setting (Gmax), s				23.5				23.5
Max Q Clear Time (g_c+I1), s				25.5				16.0
Green Ext Time (p_c), s				0.0				0.4

Intersection Summary	
HCM 2010 Ctrl Delay	56.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2252	185	0	0	0	0	335	30	120	140	0
Future Volume (veh/h)	110	2252	185	0	0	0	0	335	30	120	140	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.90	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	115	2346	182				0	349	23	125	146	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	134	2882	227				0	516	34	161	431	0
Arrive On Green	0.21	0.21	0.21				0.00	0.17	0.17	0.01	0.08	0.00
Sat Flow, veh/h	208	4484	352				0	3096	197	1597	1744	0
Grp Volume(v), veh/h	969	804	870				0	183	189	125	146	0
Grp Sat Flow(s),veh/h/ln	1754	1606	1684				0	1593	1616	1597	1744	0
Q Serve(g_s), s	42.6	37.8	39.2				0.0	8.6	8.8	0.0	6.3	0.0
Cycle Q Clear(g_c), s	42.6	37.8	39.2				0.0	8.6	8.8	0.0	6.3	0.0
Prop In Lane	0.12		0.21				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	1127	1032	1082				0	273	277	161	431	0
V/C Ratio(X)	0.86	0.78	0.80				0.00	0.67	0.68	0.77	0.34	0.00
Avail Cap(c_a), veh/h	1127	1032	1082				0	321	325	164	482	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.16	0.16	0.16				0.00	1.00	1.00	0.63	0.63	0.00
Uniform Delay (d), s/veh	28.0	26.2	26.7				0.0	31.0	31.1	38.4	30.6	0.0
Incr Delay (d2), s/veh	1.5	1.0	1.0				0.0	7.0	7.3	15.6	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.1	17.1	18.6				0.0	4.3	4.4	3.5	3.1	0.0
LnGrp Delay(d),s/veh	29.5	27.1	27.8				0.0	38.0	38.4	54.0	31.2	0.0
LnGrp LOS	C	C	C					D	D	D	C	
Approach Vol, veh/h		2643						372			271	
Approach Delay, s/veh		28.2						38.2			41.7	
Approach LOS		C						D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		56.0		24.0			6.1	17.9
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		49.1		* 22			* 2	* 16
Max Q Clear Time (g_c+I1), s		44.6		8.3			2.0	10.8
Green Ext Time (p_c), s		4.4		0.8			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Notes

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	115	101	88.2%	27.7	5.4	D
	Through						
	Right Turn						
	Subtotal	115	101	88.2%	27.7	5.4	D
EB	Left Turn	45	43	94.7%	3.3	0.6	A
	Through	2,392	2,383	99.6%	2.8	0.3	A
	Right Turn						
	Subtotal	2,437	2,426	99.6%	2.8	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,552	2,527	99.0%	3.8	0.5	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	91	80	88.2%	18.9	5.2	B
	Right Turn	433	402	92.9%	34.5	9.3	C
	Subtotal	524	482	92.0%	32.1	7.6	C
SB	Left Turn	117	114	97.5%	34.5	15.4	C
	Through	180	200	111.1%	23.2	4.5	C
	Right Turn						
	Subtotal	297	314	105.8%	27.0	7.6	C
EB	Left Turn	61	66	107.6%	18.4	3.4	B
	Through	2,372	2,327	98.1%	18.0	2.7	B
	Right Turn	44	38	87.3%	12.0	4.3	B
	Subtotal	2,477	2,431	98.2%	17.9	2.7	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,298	3,228	97.9%	21.0	2.6	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	2564	62	0	0	0	0	211	140	150	190	0
Future Volume (veh/h)	236	2564	62	0	0	0	0	211	140	150	190	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1412	1382	1355	0
Adj Flow Rate, veh/h	246	2671	44				0	220	134	156	198	0
Adj No. of Lanes	0	4	1				0	1	1	0	2	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	222	2598	657				0	473	389	246	408	0
Arrive On Green	0.18	0.18	0.18				0.00	0.34	0.34	0.67	0.67	0.00
Sat Flow, veh/h	396	4638	1172				0	1412	1161	475	1281	0
Grp Volume(v), veh/h	865	2052	44				0	220	134	169	185	0
Grp Sat Flow(s),veh/h/ln	1392	1214	1172				0	1412	1161	523	1172	0
Q Serve(g_s), s	44.8	44.8	2.5				0.0	9.8	6.9	15.9	6.1	0.0
Cycle Q Clear(g_c), s	44.8	44.8	2.5				0.0	9.8	6.9	25.8	6.1	0.0
Prop In Lane	0.28		1.00				0.00		1.00	0.92		0.00
Lane Grp Cap(c), veh/h	780	2040	657				0	473	389	262	393	0
V/C Ratio(X)	1.11	1.01	0.07				0.00	0.47	0.34	0.65	0.47	0.00
Avail Cap(c_a), veh/h	780	2040	657				0	473	389	262	393	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	32.6	15.4				0.0	21.0	20.0	17.5	9.8	0.0
Incr Delay (d2), s/veh	51.4	7.5	0.0				0.0	0.7	0.5	5.4	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.4	16.5	0.8				0.0	3.9	2.3	4.0	1.9	0.0
LnGrp Delay(d),s/veh	84.0	40.1	15.4				0.0	21.7	20.5	22.9	10.7	0.0
LnGrp LOS	F	F	B					C	C	C	B	
Approach Vol, veh/h		2961						354			354	
Approach Delay, s/veh		52.6						21.2			16.5	
Approach LOS		D						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		49.0		31.0				31.0
Change Period (Y+Rc), s		* 4.2		* 4.2				* 4.2
Max Green Setting (Gmax), s		* 45		* 27				* 27
Max Q Clear Time (g_c+I1), s		46.8		11.8				27.8
Green Ext Time (p_c), s		0.0		1.3				0.0

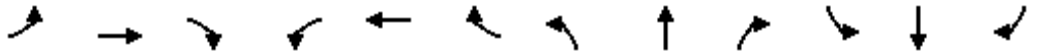
Intersection Summary	
HCM 2010 Ctrl Delay	46.1
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	2694	120	0	0	0	0	150	370	85	255	0
Future Volume (veh/h)	40	2694	120	0	0	0	0	150	370	85	255	0
Number	5	2	12				7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93				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
Adj Sat Flow, veh/h/ln	1440	1412	1412				0	1412	1468	1412	1412	0
Adj Flow Rate, veh/h	42	2806	80				0	156	351	89	266	0
Adj No. of Lanes	0	4	1				0	1	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	37	2621	587				0	439	379	250	439	0
Arrive On Green	0.17	0.17	0.17				0.00	0.31	0.31	0.62	0.62	0.00
Sat Flow, veh/h	70	4981	1116				0	1412	1217	710	1412	0
Grp Volume(v), veh/h	850	1998	80				0	156	351	89	266	0
Grp Sat Flow(s),veh/h/ln	1408	1214	1116				0	1412	1217	710	1412	0
Q Serve(g_s), s	42.1	42.1	4.9				0.0	6.8	22.3	7.3	9.1	0.0
Cycle Q Clear(g_c), s	42.1	42.1	4.9				0.0	6.8	22.3	14.2	9.1	0.0
Prop In Lane	0.05		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	741	1917	587				0	439	379	250	439	0
V/C Ratio(X)	1.15	1.04	0.14				0.00	0.35	0.93	0.36	0.61	0.00
Avail Cap(c_a), veh/h	741	1917	587				0	468	403	265	468	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.1	33.1	17.7				0.0	21.3	26.7	15.6	12.1	0.0
Incr Delay (d2), s/veh	67.6	21.1	0.0				0.0	0.5	26.6	0.9	2.0	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
%ile BackOfQ(50%),veh/ln	30.3	17.9	1.5				0.0	2.7	10.3	1.5	3.6	0.0
LnGrp Delay(d),s/veh	100.7	54.1	17.7				0.0	21.8	53.2	16.4	14.1	0.0
LnGrp LOS	F	F	B					C	D	B	B	
Approach Vol, veh/h		2928						507			355	
Approach Delay, s/veh		66.6						43.6			14.7	
Approach LOS		E						D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.6		31.4				31.4
Change Period (Y+Rc), s		6.5		6.5				6.5
Max Green Setting (Gmax), s		40.5		26.5				26.5
Max Q Clear Time (g_c+I1), s		44.1		24.3				16.2
Green Ext Time (p_c), s		0.0		0.6				1.3

Intersection Summary	
HCM 2010 Ctrl Delay	58.7
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1976	1168	0	0	0	0	0	0	390	845	0
Future Volume (veh/h)	0	1976	1168	0	0	0	0	0	0	390	845	0
Number	5	2	12							7	4	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	0	1500	1500							1500	1500	0
Adj Flow Rate, veh/h	0	2058	1186							406	880	0
Adj No. of Lanes	0	3	2							1	2	0
Peak Hour Factor	0.96	0.96	0.96							0.96	0.96	0.96
Percent Heavy Veh, %	0	2	2							2	2	0
Cap, veh/h	0	2303	1305							465	977	0
Arrive On Green	0.00	0.17	0.17							0.11	0.11	0.00
Sat Flow, veh/h	0	4500	2550							1429	3000	0
Grp Volume(v), veh/h	0	2058	1186							406	880	0
Grp Sat Flow(s),veh/h/ln	0	1500	1275							1429	1500	0
Q Serve(g_s), s	0.0	35.8	36.5							22.4	23.2	0.0
Cycle Q Clear(g_c), s	0.0	35.8	36.5							22.4	23.2	0.0
Prop In Lane	0.00		1.00							1.00		0.00
Lane Grp Cap(c), veh/h	0	2303	1305							465	977	0
V/C Ratio(X)	0.00	0.89	0.91							0.87	0.90	0.00
Avail Cap(c_a), veh/h	0	2303	1305							473	994	0
HCM Platoon Ratio	1.00	0.33	0.33							0.33	0.33	1.00
Upstream Filter(I)	0.00	0.09	0.09							0.87	0.87	0.00
Uniform Delay (d), s/veh	0.0	31.1	31.4							34.1	34.4	0.0
Incr Delay (d2), s/veh	0.0	0.6	1.2							14.4	9.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	15.0	13.1							10.7	11.0	0.0
LnGrp Delay(d),s/veh	0.0	31.7	32.6							48.5	44.2	0.0
LnGrp LOS		C	C							D	D	
Approach Vol, veh/h		3244									1286	
Approach Delay, s/veh		32.0									45.6	
Approach LOS		C									D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		49.4		30.6				
Change Period (Y+Rc), s		8.5		4.5				
Max Green Setting (Gmax), s		40.5		26.5				
Max Q Clear Time (g_c+I1), s		38.5		25.2				
Green Ext Time (p_c), s		1.9		0.9				

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1020	1396	0	0	0	0	0	1498	600	0	0	0
Future Volume (veh/h)	1020	1396	0	0	0	0	0	1498	600	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1468	1500	0				0	1412	1412			
Adj Flow Rate, veh/h	1099	1402	0				0	1658	542			
Adj No. of Lanes	2	2	0				0	3	1			
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	1501	1418	0				0	1736	480			
Arrive On Green	0.16	0.16	0.00				0.00	0.41	0.41			
Sat Flow, veh/h	2797	3000	0				0	4235	1172			
Grp Volume(v), veh/h	1099	1402	0				0	1658	542			
Grp Sat Flow(s),veh/h/ln	1398	1500	0				0	1412	1172			
Q Serve(g_s), s	30.5	37.3	0.0				0.0	30.4	32.8			
Cycle Q Clear(g_c), s	30.5	37.3	0.0				0.0	30.4	32.8			
Prop In Lane	1.00		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	1501	1418	0				0	1736	480			
V/C Ratio(X)	0.73	0.99	0.00				0.00	0.95	1.13			
Avail Cap(c_a), veh/h	1501	1418	0				0	1736	480			
HCM Platoon Ratio	0.33	0.33	1.00				1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	30.7	33.6	0.0				0.0	22.9	23.6			
Incr Delay (d2), s/veh	0.3	5.1	0.0				0.0	12.8	81.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	11.9	16.5	0.0				0.0	13.7	21.4			
LnGrp Delay(d),s/veh	31.0	38.6	0.0				0.0	35.7	104.8			
LnGrp LOS	C	D						D	F			
Approach Vol, veh/h		2501						2200				
Approach Delay, s/veh		35.3						52.7				
Approach LOS		D						D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		42.0		38.0				
Change Period (Y+Rc), s		* 4.2		* 5.2				
Max Green Setting (Gmax), s		* 38		* 33				
Max Q Clear Time (g_c+I1), s		39.3		34.8				
Green Ext Time (p_c), s		0.0		0.0				

Intersection Summary	
HCM 2010 Ctrl Delay	43.4
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	300	40	80	300	52	70	237	180	103	140	30
Future Volume (veh/h)	20	300	40	80	300	52	70	237	180	103	140	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		0.96	1.00		0.96	1.00		0.96	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	2039	2039	2000	1961	1961	2000	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	21	312	36	83	312	47	73	247	155	107	146	22
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	401	46	160	464	70	255	311	195	215	427	64
Arrive On Green	0.03	0.22	0.22	0.09	0.28	0.28	0.14	0.30	0.30	0.12	0.27	0.27
Sat Flow, veh/h	1942	1786	206	1867	1656	249	1774	1052	660	1774	1564	236
Grp Volume(v), veh/h	21	0	348	83	0	359	73	0	402	107	0	168
Grp Sat Flow(s),veh/h/ln	1942	0	1992	1867	0	1905	1774	0	1712	1774	0	1800
Q Serve(g_s), s	0.7	0.0	10.3	2.7	0.0	10.5	2.3	0.0	13.5	3.5	0.0	4.7
Cycle Q Clear(g_c), s	0.7	0.0	10.3	2.7	0.0	10.5	2.3	0.0	13.5	3.5	0.0	4.7
Prop In Lane	1.00		0.10	1.00		0.13	1.00		0.39	1.00		0.13
Lane Grp Cap(c), veh/h	57	0	447	160	0	534	255	0	506	215	0	492
V/C Ratio(X)	0.37	0.00	0.78	0.52	0.00	0.67	0.29	0.00	0.79	0.50	0.00	0.34
Avail Cap(c_a), veh/h	248	0	735	298	0	764	283	0	678	283	0	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.8	0.0	22.8	27.4	0.0	20.0	23.9	0.0	20.3	25.7	0.0	18.2
Incr Delay (d2), s/veh	1.5	0.0	3.0	1.0	0.0	1.5	0.2	0.0	4.7	0.7	0.0	0.4
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	0.4	0.0	6.0	1.4	0.0	5.7	1.1	0.0	7.0	1.8	0.0	2.4
LnGrp Delay(d),s/veh	31.3	0.0	25.8	28.4	0.0	21.4	24.2	0.0	25.0	26.4	0.0	18.6
LnGrp LOS	C		C	C		C	C		C	C		B
Approach Vol, veh/h		369			442			475			275	
Approach Delay, s/veh		26.1			22.7			24.9			21.6	
Approach LOS		C			C			C			C	

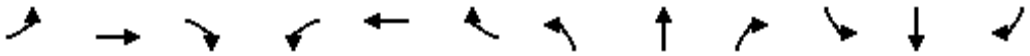
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	18.9	13.0	21.3	5.8	22.4	11.6	22.7
Change Period (Y+Rc), s	4.0	4.9	4.0	* 4.2	4.0	4.9	4.0	* 4.2
Max Green Setting (Gmax), s	10.0	23.1	10.0	* 25	8.0	25.1	10.0	* 25
Max Q Clear Time (g_c+I1), s	4.7	12.3	4.3	6.7	2.7	12.5	5.5	15.5
Green Ext Time (p_c), s	0.1	1.1	0.0	0.6	0.0	1.2	0.1	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	24.0
HCM 2010 LOS	C

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	520	60	0	685	0	0
Future Volume (vph)	520	60	0	685	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			3.0		
Lane Util. Factor	1.00			1.00		
Frpb, ped/bikes	0.99			1.00		
Flpb, ped/bikes	1.00			1.00		
Frt	0.99			1.00		
Flt Protected	1.00			1.00		
Satd. Flow (prot)	1557			1588		
Flt Permitted	1.00			1.00		
Satd. Flow (perm)	1557			1588		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	542	62	0	714	0	0
RTOR Reduction (vph)	5	0	0	0	0	0
Lane Group Flow (vph)	600	0	0	714	0	0
Confl. Peds. (#/hr)		10	10		10	
Turn Type	NA			NA		
Protected Phases	2			3 4 6		
Permitted Phases						
Actuated Green, G (s)	36.4			56.5		
Effective Green, g (s)	36.4			50.5		
Actuated g/C Ratio	0.45			0.63		
Clearance Time (s)	6.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	708			1002		
v/s Ratio Prot	c0.38			c0.45		
v/s Ratio Perm						
v/c Ratio	0.85			0.71		
Uniform Delay, d1	19.3			9.9		
Progression Factor	0.62			0.37		
Incremental Delay, d2	10.2			0.6		
Delay (s)	22.2			4.3		
Level of Service	C			A		
Approach Delay (s)	22.2			4.3	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

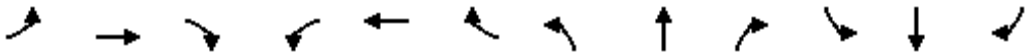


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	500	60	0	330	0	0	0	0	30	20	20
Future Volume (vph)	0	500	60	0	330	0	0	0	0	30	20	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0						6.0	
Lane Util. Factor		1.00			1.00						1.00	
Frpb, ped/bikes		0.99			1.00						0.99	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.99			1.00						0.96	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		1557			1588						1476	
Flt Permitted		1.00			1.00						0.98	
Satd. Flow (perm)		1557			1588						1476	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	521	62	0	344	0	0	0	0	31	21	21
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	580	0	0	344	0	0	0	0	0	54	0
Confl. Peds. (#/hr)	10		10	10		10	10					10
Turn Type		NA			NA					Perm	NA	
Protected Phases		2			4 6						8	
Permitted Phases										8		
Actuated Green, G (s)		42.7			58.9						9.1	
Effective Green, g (s)		42.7			58.9						9.1	
Actuated g/C Ratio		0.53			0.74						0.11	
Clearance Time (s)		6.0									6.0	
Vehicle Extension (s)		3.0									1.5	
Lane Grp Cap (vph)		831			1169						167	
v/s Ratio Prot		c0.37			c0.22							
v/s Ratio Perm											0.04	
v/c Ratio		0.70			0.29						0.33	
Uniform Delay, d1		13.9			3.6						32.6	
Progression Factor		0.66			0.06						0.64	
Incremental Delay, d2		3.6			0.0						0.3	
Delay (s)		12.7			0.3						21.3	
Level of Service		B			A						C	
Approach Delay (s)		12.7			0.3			0.0			21.3	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

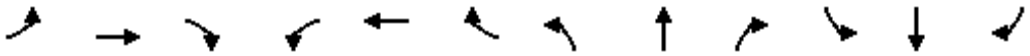
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	520	0	0	675	10	20
Future Volume (vph)	520	0	0	675	10	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0			6.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.91	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	1588			1588	1420	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	1588			1588	1420	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	542	0	0	703	10	21
RTOR Reduction (vph)	0	0	0	0	17	0
Lane Group Flow (vph)	542	0	0	703	14	0
Confl. Peds. (#/hr)		10				
Turn Type	NA			NA	Prot	
Protected Phases	2 8			6	3 4	
Permitted Phases						
Actuated Green, G (s)	54.3			36.4	14.1	
Effective Green, g (s)	48.7			36.4	14.1	
Actuated g/C Ratio	0.61			0.45	0.18	
Clearance Time (s)				6.0		
Vehicle Extension (s)				3.0		
Lane Grp Cap (vph)	966			722	250	
v/s Ratio Prot	c0.34			c0.44	c0.01	
v/s Ratio Perm						
v/c Ratio	0.56			0.97	0.05	
Uniform Delay, d1	9.3			21.3	27.4	
Progression Factor	0.22			1.04	1.94	
Incremental Delay, d2	0.4			22.3	0.0	
Delay (s)	2.4			44.5	53.1	
Level of Service	A			D	D	
Approach Delay (s)	2.4			44.5	53.1	
Approach LOS	A			D	D	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	530	0	0	310	10	20	20	20	0	0	0
Future Volume (vph)	0	530	0	0	310	10	20	20	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			1.00			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1580			1470				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1580			1470				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	552	0	0	323	10	21	21	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	552	0	0	332	0	0	45	0	0	0	0
Confl. Peds. (#/hr)	10		10			10			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		57.8			42.7			10.2				
Effective Green, g (s)		57.8			42.7			10.2				
Actuated g/C Ratio		0.72			0.53			0.13				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			1.5				
Lane Grp Cap (vph)		1147			843			187				
v/s Ratio Prot		c0.35			0.21			c0.03				
v/s Ratio Perm												
v/c Ratio		0.48			0.39			0.24				
Uniform Delay, d1		4.7			11.0			31.4				
Progression Factor		0.15			0.61			1.16				
Incremental Delay, d2		0.1			1.3			0.2				
Delay (s)		0.8			7.9			36.7				
Level of Service		A			A			D				
Approach Delay (s)		0.8			7.9			36.7			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	465	0	0	420	40	20	15	20	0	0	0
Future Volume (vph)	0	465	0	0	420	40	20	15	20	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		1.00			1.00			1.00				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1588			1546			1469				
Flt Permitted		1.00			1.00			0.98				
Satd. Flow (perm)		1588			1546			1469				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	484	0	0	438	42	21	16	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	484	0	0	476	0	0	41	0	0	0	0
Confl. Peds. (#/hr)	59		21			59			10			
Turn Type		NA			NA		Split	NA				
Protected Phases		2 8			6		4	4				
Permitted Phases												
Actuated Green, G (s)		54.9			35.6			13.5				
Effective Green, g (s)		54.9			35.6			13.5				
Actuated g/C Ratio		0.69			0.45			0.17				
Clearance Time (s)					6.0			6.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)		1089			687			247				
v/s Ratio Prot		c0.30			c0.31			c0.03				
v/s Ratio Perm												
v/c Ratio		0.44			0.69			0.16				
Uniform Delay, d1		5.7			17.8			28.4				
Progression Factor		0.18			0.63			1.01				
Incremental Delay, d2		0.3			5.1			0.2				
Delay (s)		1.3			16.3			29.0				
Level of Service		A			B			C				
Approach Delay (s)		1.3			16.3			29.0			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Left-Turn Lane Warrant Analysis @ 3rd Street/North Project Driveway
Cumulative Plus Project Conditions - AM Peak Hour

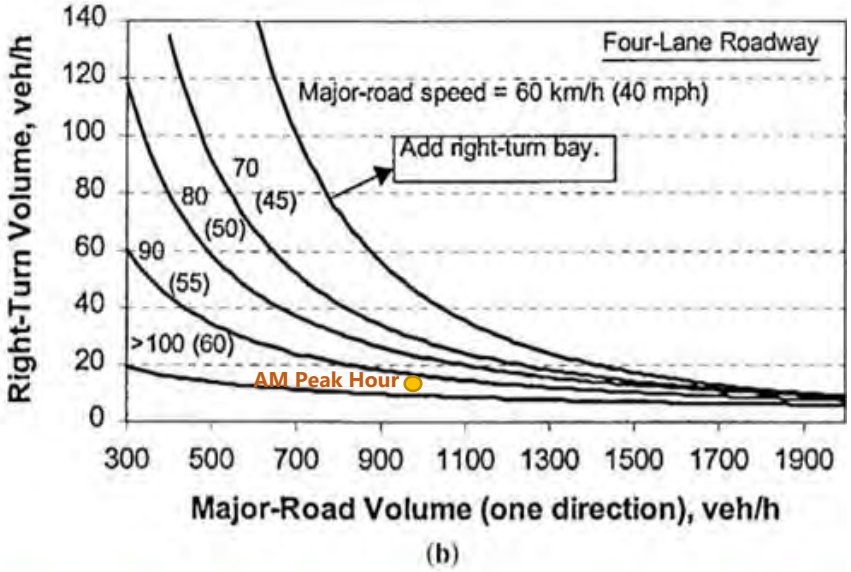


Figure 2-6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

Source: NCHRP 457 (TRB, 2001)

FEHR & PEERS

Major Street	2nd Street
Minor Street	Brooks Street

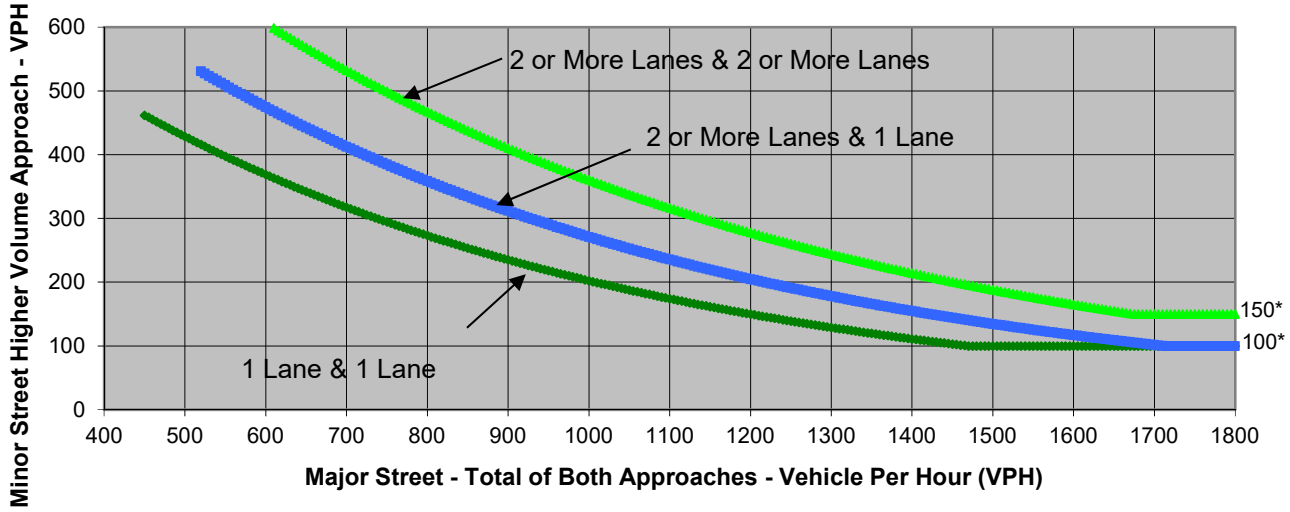
Project	999 3rd Street - BioMarin
Scenario	Cumulative Plus Project Buildout
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left		45	15	
Through		0	2,307	
Right		0	0	
Total	0	45	2,322	0

Major Street Direction

	North/South
x	East/West



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

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

	Major Street	Minor Street	Warrant Met
	2nd Street	Brooks Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**2,322**	**45**	

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

FEHR & PEERS

Major Street	2nd Street
Minor Street	Brooks Street

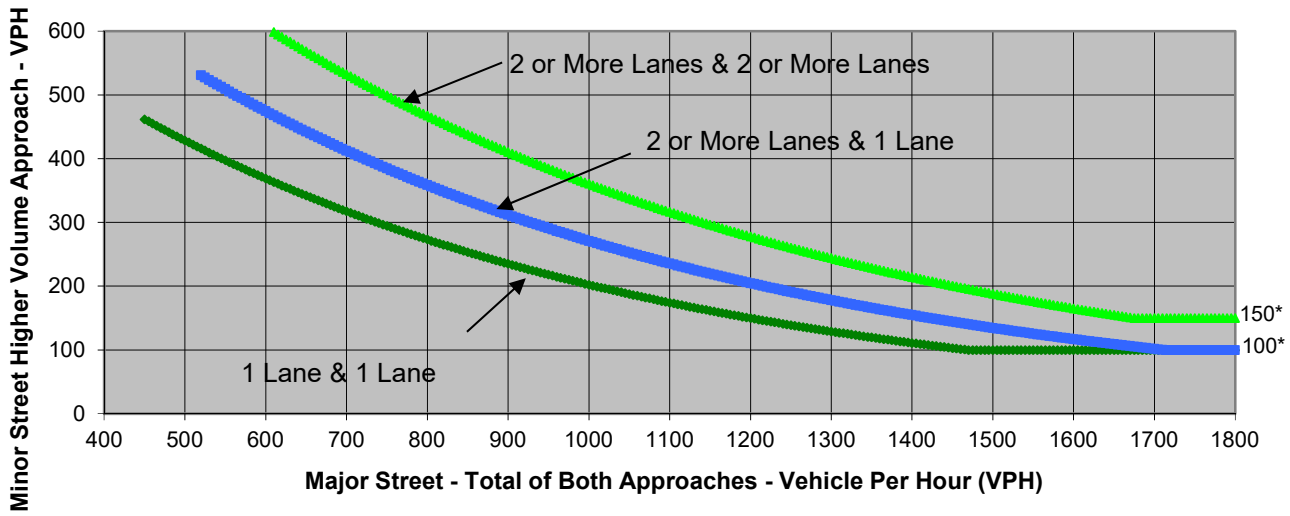
Project	999 3rd Street - BioMarin
Scenario	Cumulative Plus Project Buildout
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left		115	20	
Through			2,392	
Right			0	
Total	0	115	2,412	0

Major Street Direction

	North/South
x	East/West



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

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

	Major Street	Minor Street	Warrant Met
	2nd Street	Brooks Street	
Number of Approach Lanes	**3**	**1**	**YES**
Traffic Volume (VPH) *	**2,412**	**115**	

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

FEHR & PEERS

Major Street	3rd Street
Minor Street	Brooks Street

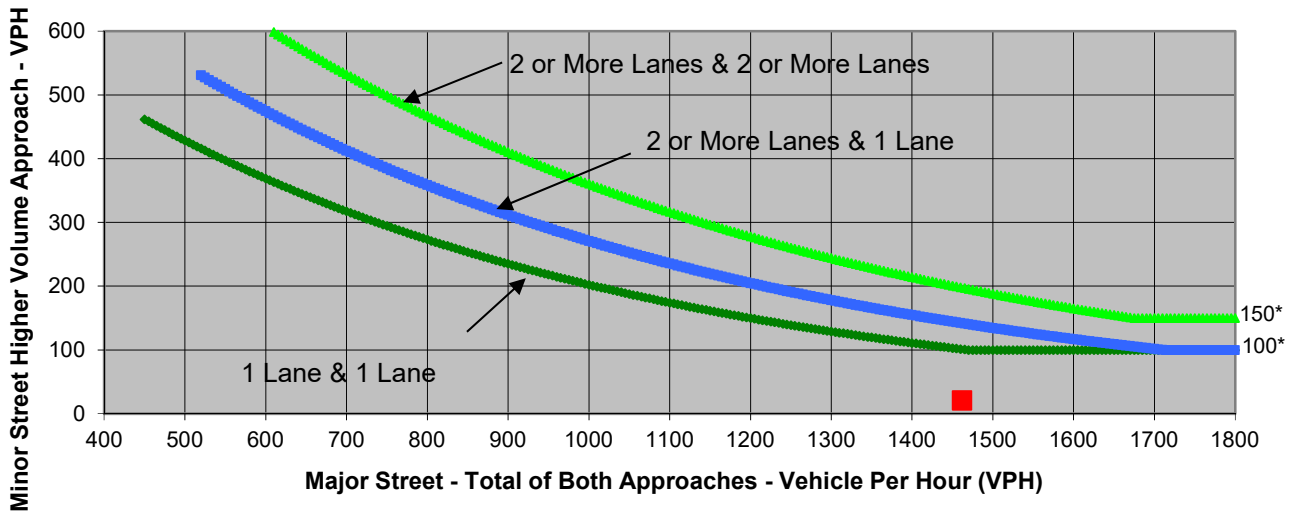
Project	999 3rd Street - BioMarin
Scenario	Cumulative Plus Project Buildout
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	21			10
Through	0			1,401
Right	0			51
Total	21	0	0	1,462

Major Street Direction

	North/South
x	East/West



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

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

	Major Street	Minor Street	Warrant Met
	3rd Street	Brooks Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**1,462**	**21**	

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

FEHR & PEERS

Major Street	3rd Street
Minor Street	Brooks Street

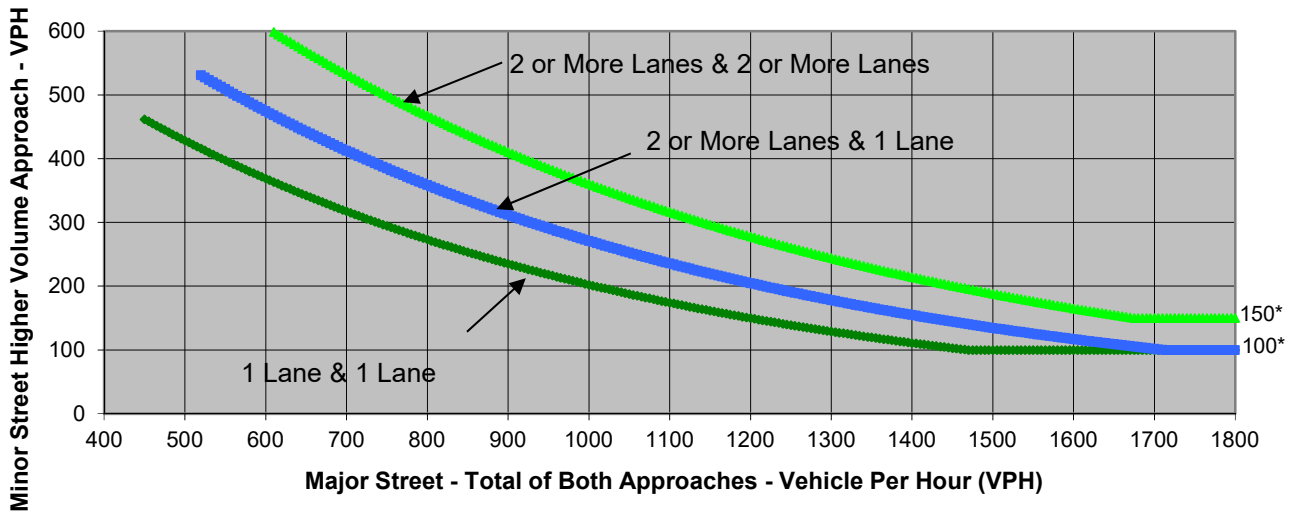
Project	999 3rd Street - BioMarin
Scenario	Cumulative Plus Project Buildout
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	42			88
Through				1,829
Right				10
Total	42	0	0	1,927

Major Street Direction

	North/South
x	East/West



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

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

	Major Street	Minor Street	Warrant Met
	3rd Street	Brooks Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**1,927**	**42**	

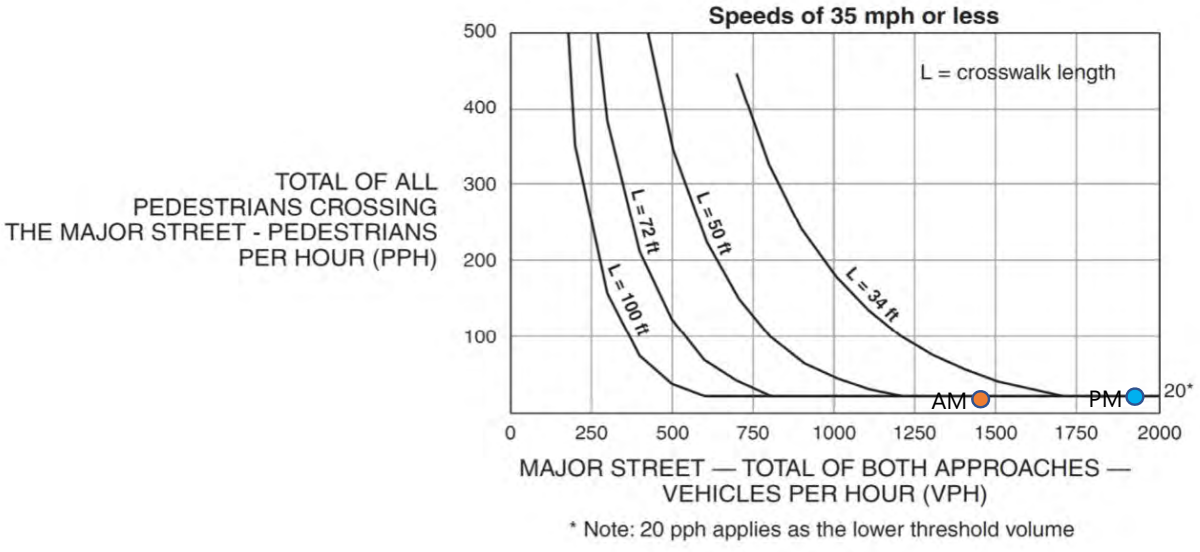
* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

---------- Pedestrian Hybrid Beacon ----------

California MUTCD 2014, Revision 3
Figures 4F-1 and 4F-2

Project: BioMarin 999 3rd Street TIS
Scenario: Cumulative + Full Buildout
Location: East leg of 3rd St/Brooks St
Date: 1/14/2019
Analyst: DM

	AM Peak Hour	PM Peak Hour
Roadway Speed (mph)	25	25
Crosswalk Length (ft)	42	42
Pedestrians Crossing the Major Street (PPH)	17	20
Major Street Approach 1 Volume (vph)	0	0
Major Street Approach 2 Volume (vph)	1462	1927
Total Major Street Volume (vph)	1462	1927
Warrant Met?	**No**	**Yes**



* Note: 20 pph applies as the lower threshold volume

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	23	110.4%	8.7	2.0	A
	Through	5	4	81.0%	16.5	15.9	C
	Right Turn						
	Subtotal	26	27	104.7%	11.0	3.0	B
SB	Left Turn						
	Through	5	4	73.6%	15.7	18.4	C
	Right Turn	10	13	125.1%	11.5	9.2	B
	Subtotal	15	16	107.9%	19.3	11.3	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	51	38	73.6%	2.5	0.3	A
	Through	1,401	1,353	96.6%	2.0	0.4	A
	Right Turn	10	6	62.6%	2.0	1.5	A
	Subtotal	1,462	1,397	95.5%	2.0	0.4	A
Total		1,503	1,440	95.8%	2.4	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	86	90	104.4%	21.8	4.9	C
	Through	10	11	106.7%	27.5	15.0	C
	Right Turn						
	Subtotal	96	100	104.7%	22.5	4.0	C
SB	Left Turn						
	Through	40	36	90.2%	48.0	12.8	D
	Right Turn	10	8	81.0%	9.0	7.6	A
	Subtotal	50	44	88.3%	41.0	9.3	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	446	93.6%	27.8	11.4	C
	Through	1,396	1,321	94.7%	8.3	3.3	A
	Right Turn	30	29	96.9%	8.0	3.0	A
	Subtotal	1,903	1,797	94.4%	13.2	5.4	B
Total		2,049	1,942	94.8%	14.3	5.1	B

Intersection 25 **Brooks St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	50	42	84.6%	31.5	8.9	C
	Through						
	Right Turn						
	Subtotal	50	42	84.6%	31.5	8.9	C
EB	Left Turn	25	28	111.9%	6.1	2.6	A
	Through	2,307	2,238	97.0%	6.0	1.1	A
	Right Turn						
	Subtotal	2,332	2,266	97.2%	6.0	1.1	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,382	2,308	96.9%	6.4	1.2	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	58	107.7%	15.7	4.1	B
	Right Turn	281	278	99.0%	23.7	4.9	C
	Subtotal	335	336	100.4%	22.5	4.5	C
SB	Left Turn	72	72	100.7%	38.7	2.0	D
	Through	442	404	91.3%	36.6	3.5	D
	Right Turn						
	Subtotal	514	476	92.6%	37.0	2.9	D
EB	Left Turn	42	44	104.3%	13.5	4.3	B
	Through	2,289	2,197	96.0%	12.1	1.3	B
	Right Turn	61	67	109.2%	9.3	1.7	A
	Subtotal	2,392	2,308	96.5%	12.1	1.3	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,241	3,120	96.3%	17.0	1.3	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	40	94.2%	18.9	8.0	C
	Through	5	5	99.8%	34.0	27.1	D
	Right Turn						
	Subtotal	47	45	94.8%	20.1	7.8	C
SB	Left Turn						
	Through	15	17	115.2%	28.4	11.8	D
	Right Turn	10	10	103.7%	14.1	8.9	B
	Subtotal	25	28	110.6%	21.9	5.8	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	88	78	89.0%	2.9	0.4	A
	Through	1,829	1,811	99.0%	2.3	0.4	A
	Right Turn	10	12	115.2%	2.2	1.0	A
	Subtotal	1,927	1,900	98.6%	2.3	0.3	A
Total		1,999	1,973	98.7%	3.1	0.3	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	132	118	89.0%	29.9	2.0	C
	Through	20	25	124.8%	33.2	7.8	C
	Right Turn						
	Subtotal	152	142	93.7%	30.4	2.5	C
SB	Left Turn						
	Through	50	53	106.0%	23.9	8.2	C
	Right Turn	10	12	122.9%	16.5	10.5	B
	Subtotal	60	65	108.8%	23.0	7.6	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	239	98.9%	9.1	1.6	A
	Through	1,872	1,834	98.0%	6.1	0.7	A
	Right Turn	40	46	114.2%	6.1	2.5	A
	Subtotal	2,154	2,119	98.4%	6.4	0.7	A
Total		2,366	2,327	98.3%	8.4	0.7	A

Intersection 25 **Brooks St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	115	101	87.8%	31.5	5.3	C
	Through						
	Right Turn						
	Subtotal	115	101	87.8%	31.5	5.3	C
EB	Left Turn	45	43	96.4%	6.1	3.0	A
	Through	2,392	2,408	100.7%	7.2	0.7	A
	Right Turn						
	Subtotal	2,437	2,452	100.6%	7.2	0.7	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,552	2,553	100.0%	8.1	0.8	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	91	80	87.8%	20.1	3.6	C
	Right Turn	433	423	97.6%	37.6	10.5	D
	Subtotal	524	503	95.9%	34.9	9.3	C
SB	Left Turn	117	108	92.6%	25.5	4.3	C
	Through	180	181	100.7%	17.6	3.4	B
	Right Turn						
	Subtotal	297	290	97.5%	20.5	3.1	C
EB	Left Turn	61	61	100.7%	17.7	3.4	B
	Through	2,372	2,347	98.9%	14.9	1.7	B
	Right Turn	44	40	91.6%	11.0	2.9	B
	Subtotal	2,477	2,449	98.9%	14.9	1.7	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,298	3,241	98.3%	18.5	2.3	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	71	1312	84	210	135	0	0	140	30
Future Volume (veh/h)	0	0	0	71	1312	84	210	135	0	0	140	30
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.93	0.96		1.00	1.00		0.92
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1748	1800	1835	1835	0	0	1835	1890
Adj Flow Rate, veh/h				77	1426	82	228	147	0	0	152	21
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	3	3	0	0	3	3
Cap, veh/h				127	2497	148	306	610	0	0	302	42
Arrive On Green				0.55	0.55	0.55	0.02	0.11	0.00	0.00	0.22	0.22
Sat Flow, veh/h				229	4507	268	1748	1835	0	0	1389	192
Grp Volume(v), veh/h				584	487	514	228	147	0	0	0	173
Grp Sat Flow(s),veh/h/ln				1736	1590	1677	1748	1835	0	0	0	1581
Q Serve(g_s), s				17.0	14.8	14.8	0.6	5.5	0.0	0.0	0.0	7.2
Cycle Q Clear(g_c), s				17.0	14.8	14.8	0.6	5.5	0.0	0.0	0.0	7.2
Prop In Lane				0.13		0.16	1.00		0.00	0.00		0.12
Lane Grp Cap(c), veh/h				962	881	929	306	610	0	0	0	344
V/C Ratio(X)				0.61	0.55	0.55	0.74	0.24	0.00	0.00	0.00	0.50
Avail Cap(c_a), veh/h				962	881	929	420	783	0	0	0	390
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.84	0.84	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				11.2	10.7	10.7	33.0	24.7	0.0	0.0	0.0	25.8
Incr Delay (d2), s/veh				2.8	2.5	2.4	6.9	0.4	0.0	0.0	0.0	2.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.7	7.0	7.3	5.3	2.9	0.0	0.0	0.0	3.4
LnGrp Delay(d),s/veh				14.1	13.2	13.1	39.9	25.1	0.0	0.0	0.0	28.2
LnGrp LOS				B	B	B	D	C				C
Approach Vol, veh/h					1585			375			173	
Approach Delay, s/veh					13.5			34.1			28.2	
Approach LOS					B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.1	20.8		46.1		28.9
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			9.0	18.5		34.5		32.0
Max Q Clear Time (g_c+I1), s			2.6	9.2		19.0		7.5
Green Ext Time (p_c), s			1.6	0.8		11.6		3.3

Intersection Summary	
HCM 2010 Ctrl Delay	18.3
HCM 2010 LOS	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	36	33	92.0%	10.6	2.0	B
	Through	5	6	110.4%	20.2	19.0	C
	Right Turn						
	Subtotal	41	39	94.2%	13.4	3.5	B
SB	Left Turn						
	Through						
	Right Turn	15	13	85.9%	13.6	5.9	B
	Subtotal	15	13	85.9%	13.6	5.9	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn						
	Through	1,416	1,362	96.2%	1.7	0.2	A
	Right Turn	10	10	103.0%	1.8	1.0	A
	Subtotal	1,426	1,373	96.3%	1.7	0.2	A
Total		1,482	1,424	96.1%	2.1	0.2	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	85	82	96.1%	23.4	5.4	C
	Through	10	9	88.3%	17.0	13.9	B
	Right Turn						
	Subtotal	95	91	95.3%	23.1	5.0	C
SB	Left Turn						
	Through	40	43	107.6%	43.4	8.2	D
	Right Turn	10	11	106.7%	21.5	13.8	C
	Subtotal	50	54	107.5%	40.0	7.2	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	491	438	89.3%	23.8	10.0	C
	Through	1,382	1,326	95.9%	7.6	2.0	A
	Right Turn	30	29	98.1%	7.3	2.6	A
	Subtotal	1,903	1,793	94.2%	11.6	4.0	B
Total		2,048	1,938	94.6%	13.0	3.8	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	2252	205	0	0	0	0	260	20	81	125	0
Future Volume (veh/h)	100	2252	205	0	0	0	0	260	20	81	125	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97				1.00		0.95	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1748	1800				0	1660	1710	1660	1660	0
Adj Flow Rate, veh/h	109	2448	209				0	283	13	88	136	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	0				0	3	3	3	3	0
Cap, veh/h	123	2912	251				0	448	20	163	373	0
Arrive On Green	0.22	0.22	0.22				0.00	0.15	0.15	0.01	0.07	0.00
Sat Flow, veh/h	187	4425	381				0	3147	140	1581	1660	0
Grp Volume(v), veh/h	1013	840	914				0	145	151	88	136	0
Grp Sat Flow(s),veh/h/ln	1738	1590	1665				0	1577	1627	1581	1660	0
Q Serve(g_s), s	42.4	37.5	39.3				0.0	6.5	6.6	0.0	5.8	0.0
Cycle Q Clear(g_c), s	42.4	37.5	39.3				0.0	6.5	6.6	0.0	5.8	0.0
Prop In Lane	0.11		0.23				0.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	1144	1047	1096				0	231	238	163	373	0
V/C Ratio(X)	0.89	0.80	0.83				0.00	0.63	0.64	0.54	0.36	0.00
Avail Cap(c_a), veh/h	1144	1047	1096				0	336	347	170	487	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	0.09	0.09	0.09				0.00	1.00	1.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	26.6	24.7	25.4				0.0	30.1	30.1	36.0	29.6	0.0
Incr Delay (d2), s/veh	1.1	0.6	0.7				0.0	5.9	5.9	4.9	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.7	16.8	18.4				0.0	3.2	3.3	2.0	2.8	0.0
LnGrp Delay(d),s/veh	27.7	25.4	26.2				0.0	36.0	36.0	40.9	30.7	0.0
LnGrp LOS	C	C	C					D	D	D	C	
Approach Vol, veh/h		2766						296			224	
Approach Delay, s/veh		26.5						36.0			34.7	
Approach LOS		C						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		54.0		21.0			5.9	15.2
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		44.2		* 22			* 2	* 16
Max Q Clear Time (g_c+I1), s		44.4		7.8			2.0	8.6
Green Ext Time (p_c), s		0.0		1.4			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.9
HCM 2010 LOS	C

Notes

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

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn	25	24	95.7%	2.9	0.6	A
	Through	2,338	2,275	97.3%	2.7	0.2	A
	Right Turn						
	Subtotal	2,363	2,299	97.3%	2.7	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,363	2,299	97.3%	2.7	0.2	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	50	92.7%	15.9	5.6	B
	Right Turn	281	276	98.4%	19.0	6.6	B
	Subtotal	335	326	97.4%	18.7	6.3	B
SB	Left Turn	86	84	97.6%	38.2	5.3	D
	Through	443	391	88.3%	34.6	4.3	C
	Right Turn						
	Subtotal	529	475	89.8%	35.3	4.1	D
EB	Left Turn	42	41	98.1%	14.9	3.8	B
	Through	2,271	2,189	96.4%	14.3	2.4	B
	Right Turn	60	60	100.6%	12.6	4.6	B
	Subtotal	2,373	2,291	96.5%	14.3	2.4	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,237	3,092	95.5%	18.0	2.5	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	189	1696	106	260	175	0	0	180	50
Future Volume (veh/h)	0	0	0	189	1696	106	260	175	0	0	180	50
Number				1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.91	0.96		1.00	1.00		0.91
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Adj Sat Flow, veh/h/ln				1800	1765	1800	1853	1853	0	0	1853	1890
Adj Flow Rate, veh/h				197	1767	103	271	182	0	0	188	38
Adj No. of Lanes				0	3	0	1	1	0	0	1	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				243	2323	139	310	661	0	0	275	56
Arrive On Green				0.54	0.54	0.54	0.15	0.60	0.00	0.00	0.21	0.21
Sat Flow, veh/h				452	4327	259	1765	1853	0	0	1308	264
Grp Volume(v), veh/h				759	635	673	271	182	0	0	0	226
Grp Sat Flow(s),veh/h/ln				1742	1606	1690	1765	1853	0	0	0	1572
Q Serve(g_s), s				28.6	24.2	24.5	4.8	3.8	0.0	0.0	0.0	10.6
Cycle Q Clear(g_c), s				28.6	24.2	24.5	4.8	3.8	0.0	0.0	0.0	10.6
Prop In Lane				0.26		0.15	1.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				935	862	907	310	661	0	0	0	330
V/C Ratio(X)				0.81	0.74	0.74	0.87	0.28	0.00	0.00	0.00	0.68
Avail Cap(c_a), veh/h				935	862	907	327	718	0	0	0	364
HCM Platoon Ratio				1.00	1.00	1.00	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	0.73	0.73	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				15.2	14.2	14.3	31.1	11.2	0.0	0.0	0.0	29.2
Incr Delay (d2), s/veh				7.6	5.6	5.4	17.9	0.3	0.0	0.0	0.0	6.7
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				15.5	11.9	12.8	7.2	2.0	0.0	0.0	0.0	5.2
LnGrp Delay(d),s/veh				22.8	19.8	19.7	49.0	11.5	0.0	0.0	0.0	35.9
LnGrp LOS				C	B	B	D	B				D
Approach Vol, veh/h					2067			453			226	
Approach Delay, s/veh					20.8			34.0			35.9	
Approach LOS					C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			11.2	21.3		47.5		32.5
Change Period (Y+Rc), s			4.0	4.5		4.5		4.0
Max Green Setting (Gmax), s			8.0	18.5		40.5		31.0
Max Q Clear Time (g_c+I1), s			6.8	12.6		30.6		5.8
Green Ext Time (p_c), s			0.4	0.8		9.0		4.2

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	77	76	99.2%	22.2	12.8	C
	Through	5	6	115.2%	20.2	17.1	C
	Right Turn						
	Subtotal	82	82	100.2%	22.6	12.8	C
SB	Left Turn						
	Through						
	Right Turn	25	24	95.2%	22.4	13.6	C
	Subtotal	25	24	95.2%	22.4	13.6	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn						
	Through	1,861	1,823	97.9%	2.9	1.1	A
	Right Turn	10	10	103.7%	1.9	0.8	A
	Subtotal	1,871	1,833	98.0%	2.9	1.1	A
Total		1,978	1,939	98.0%	3.9	1.5	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	132	119	90.2%	30.2	2.0	C
	Through	20	18	88.3%	29.2	9.3	C
	Right Turn						
	Subtotal	152	137	89.9%	30.2	2.4	C
SB	Left Turn						
	Through	50	53	106.0%	32.0	5.5	C
	Right Turn	10	9	92.2%	22.5	9.6	C
	Subtotal	60	62	103.7%	30.8	4.7	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	275	257	93.3%	9.8	2.7	A
	Through	1,839	1,793	97.5%	6.2	0.7	A
	Right Turn	40	42	105.6%	6.1	2.1	A
	Subtotal	2,154	2,092	97.1%	6.6	0.9	A
Total		2,366	2,291	96.8%	8.7	0.9	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	2252	185	0	0	0	0	335	30	226	143	0
Future Volume (veh/h)	110	2252	185	0	0	0	0	335	30	226	143	0
Number	5	2	12				3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96				1.00		0.90	0.96		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	1800	1765	1800				0	1676	1710	1676	1744	0
Adj Flow Rate, veh/h	115	2346	182				0	349	23	235	149	0
Adj No. of Lanes	0	3	0				0	2	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	2	0				0	2	2	2	2	0
Cap, veh/h	123	2651	208				0	515	34	243	521	0
Arrive On Green	0.20	0.20	0.20				0.00	0.17	0.17	0.13	0.50	0.00
Sat Flow, veh/h	208	4483	352				0	3096	197	1597	1744	0
Grp Volume(v), veh/h	969	804	869				0	183	189	235	149	0
Grp Sat Flow(s),veh/h/ln	1754	1606	1683				0	1593	1616	1597	1744	0
Q Serve(g_s), s	43.5	38.6	40.1				0.0	8.6	8.8	5.4	4.0	0.0
Cycle Q Clear(g_c), s	43.5	38.6	40.1				0.0	8.6	8.8	5.4	4.0	0.0
Prop In Lane	0.12		0.21				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	1037	950	995				0	273	277	243	521	0
V/C Ratio(X)	0.93	0.85	0.87				0.00	0.67	0.68	0.97	0.29	0.00
Avail Cap(c_a), veh/h	1037	950	995				0	319	323	243	567	0
HCM Platoon Ratio	0.33	0.33	0.33				1.00	1.00	1.00	1.67	1.67	1.00
Upstream Filter(I)	0.16	0.16	0.16				0.00	1.00	1.00	0.63	0.63	0.00
Uniform Delay (d), s/veh	30.7	28.7	29.3				0.0	31.1	31.1	33.1	15.1	0.0
Incr Delay (d2), s/veh	3.4	1.6	1.9				0.0	7.0	7.3	37.1	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	22.1	17.6	19.2				0.0	4.3	4.5	7.6	2.0	0.0
LnGrp Delay(d),s/veh	34.1	30.3	31.2				0.0	38.1	38.4	70.2	15.5	0.0
LnGrp LOS	C	C	C					D	D	E	B	
Approach Vol, veh/h		2643						372			384	
Approach Delay, s/veh		32.0						38.3			49.0	
Approach LOS		C						D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		51.9		28.1			10.2	17.9
Change Period (Y+Rc), s		4.6		* 4.2			* 4.2	* 4.2
Max Green Setting (Gmax), s		45.2		* 26			* 6	* 16
Max Q Clear Time (g_c+I1), s		45.5		6.0			7.4	10.8
Green Ext Time (p_c), s		0.0		3.2			0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.6
HCM 2010 LOS	C

Notes
User approved ignoring U-Turning movement.

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn	45	47	105.0%	3.0	0.3	A
	Through	2,465	2,383	96.7%	2.7	0.2	A
	Right Turn						
	Subtotal	2,510	2,430	96.8%	2.7	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,510	2,430	96.8%	2.7	0.2	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	91	84	92.4%	18.6	3.5	B
	Right Turn	433	414	95.6%	30.1	9.7	C
	Subtotal	524	498	95.0%	28.3	7.7	C
SB	Left Turn	149	138	92.5%	26.0	8.5	C
	Through	180	172	95.6%	18.9	4.3	B
	Right Turn						
	Subtotal	329	310	94.2%	22.2	5.9	C
EB	Left Turn	60	52	87.0%	17.0	4.6	B
	Through	2,334	2,242	96.0%	15.9	1.9	B
	Right Turn	41	46	111.5%	12.2	3.8	B
	Subtotal	2,435	2,340	96.1%	15.9	1.8	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,288	3,148	95.7%	18.5	1.9	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	19	89.4%	9.9	4.7	A
	Through	5	6	110.4%	16.2	12.6	C
	Right Turn						
	Subtotal	26	24	93.4%	11.7	4.6	B
SB	Left Turn						
	Through	5	3	58.9%	10.1	13.0	B
	Right Turn	10	9	92.0%	8.4	6.2	A
	Subtotal	15	12	81.0%	10.9	7.1	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	51	52	101.0%	3.3	0.9	A
	Through	1,401	1,331	95.0%	3.4	0.8	A
	Right Turn	10	9	88.3%	3.1	0.8	A
	Subtotal	1,462	1,391	95.2%	3.4	0.9	A
Total		1,503	1,428	95.0%	3.7	0.8	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	86	77	89.9%	23.3	7.1	C
	Through	10	10	103.0%	31.3	18.3	C
	Right Turn						
	Subtotal	96	88	91.2%	24.4	6.6	C
SB	Left Turn						
	Through	40	43	108.6%	46.4	12.0	D
	Right Turn	10	13	125.1%	27.5	10.1	C
	Subtotal	50	56	111.9%	41.7	11.1	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	436	91.5%	21.7	10.3	C
	Through	1,396	1,333	95.5%	7.1	1.7	A
	Right Turn	30	30	99.4%	6.2	2.2	A
	Subtotal	1,903	1,799	94.5%	10.7	3.9	B
Total		2,049	1,943	94.8%	12.3	3.4	B

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	50	52	103.0%	27.1	4.1	D
	Through						
	Right Turn						
	Subtotal	50	52	103.0%	27.1	4.1	D
EB	Left Turn	25	22	89.8%	2.9	0.6	A
	Through	2,307	2,254	97.7%	2.6	0.2	A
	Right Turn						
	Subtotal	2,332	2,277	97.6%	2.6	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,382	2,328	97.7%	3.1	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	55	102.2%	15.9	5.2	B
	Right Turn	281	277	98.5%	20.9	5.5	C
	Subtotal	335	332	99.1%	20.0	4.8	C
SB	Left Turn	72	65	90.5%	40.0	5.9	D
	Through	442	412	93.2%	35.6	3.6	D
	Right Turn						
	Subtotal	514	477	92.8%	36.2	3.5	D
EB	Left Turn	42	34	81.5%	15.3	5.6	B
	Through	2,289	2,228	97.3%	15.4	3.4	B
	Right Turn	61	72	118.2%	15.3	3.7	B
	Subtotal	2,392	2,335	97.6%	15.4	3.4	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,241	3,143	97.0%	19.1	2.6	B

SimTraffic Post-Processor **BioMarin**

Average Results from 10 Runs Conditions (With PHB on east leg at 3rd/Brooks, w/ WBLT Pocket at 3rd/Brooks)

Volume and Delay by Movement **PM Peak Hour**

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	46	108.8%	16.9	6.8	C
	Through	5	5	99.8%	10.4	9.2	B
	Right Turn						
	Subtotal	47	51	107.8%	16.6	6.6	C
SB	Left Turn						
	Through	15	15	97.3%	29.8	16.3	D
	Right Turn	10	11	111.4%	16.1	9.0	C
	Subtotal	25	26	102.9%	24.9	11.4	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	88	83	93.8%	6.8	1.8	A
	Through	1,829	1,798	98.3%	7.1	2.0	A
	Right Turn	10	10	96.0%	7.0	2.9	A
	Subtotal	1,927	1,890	98.1%	7.1	1.9	A
Total		1,999	1,966	98.4%	7.6	2.0	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	132	123	93.4%	31.1	2.9	C
	Through	20	19	94.1%	26.9	8.3	C
	Right Turn						
	Subtotal	152	142	93.5%	30.8	2.6	C
SB	Left Turn						
	Through	50	57	114.4%	27.6	4.5	C
	Right Turn	10	10	96.0%	15.1	11.4	B
	Subtotal	60	67	111.4%	26.4	4.9	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	227	93.6%	8.9	1.0	A
	Through	1,872	1,842	98.4%	5.9	0.4	A
	Right Turn	40	38	96.0%	6.1	1.6	A
	Subtotal	2,154	2,107	97.8%	6.2	0.4	A
Total		2,366	2,316	97.9%	8.3	0.4	A

SimTraffic Post-Processor **BioMarin**

Average Results from 10 Runs Conditions (With PHB on east leg at 3rd/Brooks, w/ WBLT Pocket at 3rd/Brooks)

Volume and Delay by Movement **PM Peak Hour**

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	115	116	100.8%	30.8	4.5	D
	Through						
	Right Turn						
	Subtotal	115	116	100.8%	30.8	4.5	D
EB	Left Turn	45	48	106.7%	3.3	0.5	A
	Through	2,392	2,410	100.8%	2.8	0.2	A
	Right Turn						
	Subtotal	2,437	2,458	100.9%	2.8	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,552	2,574	100.9%	4.1	0.4	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	91	86	94.9%	21.9	6.0	C
	Right Turn	433	402	92.9%	36.1	16.7	D
	Subtotal	524	488	93.2%	33.7	15.0	C
SB	Left Turn	117	113	96.2%	28.3	9.2	C
	Through	180	168	93.2%	19.1	3.2	B
	Right Turn						
	Subtotal	297	280	94.4%	22.9	5.9	C
EB	Left Turn	61	52	85.6%	19.5	4.1	B
	Through	2,372	2,371	100.0%	18.8	2.3	B
	Right Turn	44	41	94.3%	13.1	5.0	B
	Subtotal	2,477	2,465	99.5%	18.7	2.4	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,298	3,233	98.0%	21.5	3.4	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	41	97.7%	10.4	4.7	B
	Through	5	5	98.8%	13.7	19.5	B
	Right Turn						
	Subtotal	47	46	97.8%	11.8	5.5	B
SB	Left Turn						
	Through	5	6	114.0%	33.6	20.4	D
	Right Turn	10	12	121.6%	19.7	13.4	C
	Subtotal	15	18	119.1%	25.6	12.4	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	81	68	84.4%	3.2	0.5	A
	Through	1,643	1,604	97.6%	3.0	0.5	A
	Right Turn	10	10	102.6%	2.8	0.4	A
	Subtotal	1,734	1,682	97.0%	3.0	0.5	A
Total		1,796	1,746	97.2%	3.5	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	120	113	94.1%	34.6	3.8	C
	Through	20	23	114.0%	30.0	6.3	C
	Right Turn						
	Subtotal	140	136	96.9%	33.7	4.0	C
SB	Left Turn						
	Through	40	41	103.6%	29.3	7.9	C
	Right Turn	10	10	98.8%	15.7	13.7	B
	Subtotal	50	51	102.6%	27.4	8.2	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	343	310	90.4%	9.1	2.8	A
	Through	1,636	1,588	97.0%	6.2	0.9	A
	Right Turn	50	42	83.6%	5.3	1.5	A
	Subtotal	2,029	1,940	95.6%	6.6	1.1	A
Total		2,219	2,126	95.8%	8.9	1.0	A

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	88	75	85.1%	27.6	4.2	D
	Through						
	Right Turn						
	Subtotal	88	75	85.1%	27.6	4.2	D
EB	Left Turn	45	44	97.1%	2.9	0.4	A
	Through	2,034	2,066	101.6%	2.2	0.2	A
	Right Turn						
	Subtotal	2,079	2,110	101.5%	2.2	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,167	2,185	100.8%	3.0	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	87	89	101.8%	18.6	3.3	B
	Right Turn	293	293	99.9%	21.3	2.6	C
	Subtotal	380	381	100.3%	20.8	1.8	C
SB	Left Turn	110	103	93.3%	27.9	4.7	C
	Through	273	251	92.0%	20.5	2.2	C
	Right Turn						
	Subtotal	383	354	92.4%	22.8	2.0	C
EB	Left Turn	53	49	92.5%	17.4	5.4	B
	Through	2,030	2,054	101.2%	14.7	1.7	B
	Right Turn	59	59	99.8%	10.5	3.7	B
	Subtotal	2,142	2,162	100.9%	14.6	1.7	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,905	2,897	99.7%	16.5	1.3	B

Intersection 15 **Brooks St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	20	92.9%	30.4	14.0	C
	Through	5	7	139.8%	22.9	25.4	C
	Right Turn						
	Subtotal	26	26	101.9%	30.9	7.7	C
SB	Left Turn						
	Through	5	4	88.3%	15.1	15.7	B
	Right Turn	10	12	117.8%	10.9	10.8	B
	Subtotal	15	16	107.9%	14.0	10.4	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	51	47	92.4%	6.4	1.5	A
	Through	1,401	1,345	96.0%	5.9	0.8	A
	Right Turn	10	12	117.8%	4.7	2.5	A
	Subtotal	1,462	1,404	96.0%	5.9	0.8	A
Total		1,503	1,446	96.2%	6.5	0.8	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	86	83	96.3%	22.0	7.0	C
	Through	10	11	106.7%	26.5	23.7	C
	Right Turn						
	Subtotal	96	93	97.4%	21.9	6.6	C
SB	Left Turn						
	Through	40	41	102.1%	37.6	13.4	D
	Right Turn	10	11	106.7%	27.4	26.3	C
	Subtotal	50	52	103.0%	35.4	13.3	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	427	89.6%	26.9	12.6	C
	Through	1,396	1,337	95.7%	8.3	2.8	A
	Right Turn	30	26	88.3%	7.1	2.1	A
	Subtotal	1,903	1,790	94.1%	12.8	5.2	B
Total		2,049	1,935	94.5%	13.9	5.0	B

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	50	42	84.6%	19.0	5.1	C
	Through						
	Right Turn						
	Subtotal	50	42	84.6%	19.0	5.1	C
EB	Left Turn	25	26	103.0%	3.1	0.7	A
	Through	2,307	2,283	99.0%	2.6	0.2	A
	Right Turn						
	Subtotal	2,332	2,309	99.0%	2.6	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,382	2,351	98.7%	2.9	0.2	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	53	98.8%	15.1	4.9	B
	Right Turn	281	273	97.2%	20.3	4.5	C
	Subtotal	335	326	97.4%	19.5	4.1	B
SB	Left Turn	72	64	88.9%	39.9	5.1	D
	Through	442	403	91.1%	36.5	5.0	D
	Right Turn						
	Subtotal	514	467	90.8%	37.0	4.8	D
EB	Left Turn	42	43	101.6%	13.5	3.0	B
	Through	2,289	2,244	98.0%	14.5	1.6	B
	Right Turn	61	58	95.3%	14.3	3.0	B
	Subtotal	2,392	2,345	98.0%	14.5	1.5	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,241	3,138	96.8%	18.4	2.0	B

Intersection 15 **Brooks St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	40	94.2%	26.8	8.4	C
	Through	5	5	99.8%	29.0	27.9	C
	Right Turn						
	Subtotal	47	45	94.8%	26.9	7.6	C
SB	Left Turn						
	Through	15	15	97.3%	25.2	10.0	C
	Right Turn	10	8	84.5%	12.6	11.6	B
	Subtotal	25	23	92.2%	22.8	8.1	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	88	80	91.2%	5.3	0.9	A
	Through	1,829	1,827	99.9%	4.3	1.1	A
	Right Turn	10	7	73.0%	6.1	7.6	A
	Subtotal	1,927	1,914	99.3%	4.3	1.1	A
Total		1,999	1,982	99.1%	5.0	1.1	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	132	122	92.8%	31.5	2.7	C
	Through	20	14	71.0%	29.3	6.9	C
	Right Turn						
	Subtotal	152	137	89.9%	31.6	2.4	C
SB	Left Turn						
	Through	50	53	106.8%	28.3	6.9	C
	Right Turn	10	8	84.5%	10.3	8.5	B
	Subtotal	60	62	103.0%	26.8	6.5	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	229	94.7%	10.1	1.1	B
	Through	1,872	1,844	98.5%	6.6	0.9	A
	Right Turn	40	44	110.4%	6.3	2.4	A
	Subtotal	2,154	2,118	98.3%	6.9	0.9	A
Total		2,366	2,316	97.9%	8.9	0.8	A

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	115	110	95.5%	28.9	4.5	D
	Through						
	Right Turn						
	Subtotal	115	110	95.5%	28.9	4.5	D
EB	Left Turn	45	41	92.2%	3.3	0.4	A
	Through	2,392	2,404	100.5%	2.8	0.2	A
	Right Turn						
	Subtotal	2,437	2,445	100.3%	2.8	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,552	2,555	100.1%	4.0	0.4	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	91	81	88.6%	19.2	4.4	B
	Right Turn	433	400	92.4%	27.0	7.4	C
	Subtotal	524	481	91.7%	25.7	6.3	C
SB	Left Turn	117	104	88.6%	25.7	4.9	C
	Through	180	181	100.5%	18.8	3.4	B
	Right Turn						
	Subtotal	297	285	95.8%	21.3	2.7	C
EB	Left Turn	61	60	97.6%	18.8	5.2	B
	Through	2,372	2,356	99.3%	18.3	2.2	B
	Right Turn	44	40	89.9%	14.0	2.8	B
	Subtotal	2,477	2,455	99.1%	18.2	2.2	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,298	3,221	97.7%	19.6	2.1	B

Intersection 15 **Brooks St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	39	92.3%	23.2	6.5	C
	Through	5	6	129.2%	13.0	16.0	B
	Right Turn						
	Subtotal	47	45	96.2%	22.8	6.1	C
SB	Left Turn						
	Through	5	4	83.6%	20.1	22.0	C
	Right Turn	10	10	102.6%	13.0	11.0	B
	Subtotal	15	14	96.3%	18.7	9.8	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	81	82	101.3%	4.4	0.9	A
	Through	1,643	1,568	95.4%	3.5	0.5	A
	Right Turn	10	9	87.4%	1.9	0.8	A
	Subtotal	1,734	1,659	95.7%	3.6	0.5	A
Total		1,796	1,718	95.7%	4.2	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	120	117	97.2%	33.0	4.0	C
	Through	20	22	112.1%	29.9	9.5	C
	Right Turn						
	Subtotal	140	139	99.3%	32.6	3.6	C
SB	Left Turn						
	Through	40	41	103.6%	31.1	9.3	C
	Right Turn	10	11	114.0%	10.5	8.9	B
	Subtotal	50	53	105.6%	27.9	8.8	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	343	316	92.2%	8.7	1.5	A
	Through	1,636	1,555	95.0%	5.6	0.3	A
	Right Turn	50	37	73.7%	6.1	2.4	A
	Subtotal	2,029	1,908	94.0%	6.2	0.4	A
Total		2,219	2,100	94.6%	8.5	0.8	A

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	88	86	97.6%	32.6	5.7	D
	Through						
	Right Turn						
	Subtotal	88	86	97.6%	32.6	5.7	D
EB	Left Turn	45	43	94.6%	3.4	0.4	A
	Through	2,034	2,060	101.3%	2.3	0.3	A
	Right Turn						
	Subtotal	2,079	2,103	101.1%	2.3	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,167	2,188	101.0%	3.5	0.5	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	87	88	100.9%	20.0	5.4	B
	Right Turn	293	301	102.6%	24.6	9.3	C
	Subtotal	380	388	102.2%	23.7	7.9	C
SB	Left Turn	110	103	93.6%	31.5	4.5	C
	Through	273	253	92.8%	22.1	2.2	C
	Right Turn						
	Subtotal	383	356	93.1%	24.9	2.1	C
EB	Left Turn	53	53	99.7%	18.7	7.4	B
	Through	2,030	2,041	100.5%	15.8	2.7	B
	Right Turn	59	67	113.4%	14.0	2.0	B
	Subtotal	2,142	2,161	100.9%	15.8	2.7	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,905	2,905	100.0%	18.0	2.7	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	21	98.1%	9.3	4.0	A
	Through	5	4	88.3%	15.0	13.0	C
	Right Turn						
	Subtotal	26	25	96.2%	10.9	4.6	B
SB	Left Turn						
	Through	5	4	81.0%	15.8	14.9	C
	Right Turn	10	10	95.7%	15.9	14.1	C
	Subtotal	15	14	90.8%	20.7	12.0	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	51	44	85.9%	2.6	0.3	A
	Through	1,401	1,357	96.8%	1.9	0.3	A
	Right Turn	10	9	88.3%	1.5	1.3	A
	Subtotal	1,462	1,409	96.4%	1.9	0.3	A
Total		1,503	1,448	96.3%	2.2	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	86	72	83.9%	29.4	4.0	C
	Through	10	9	88.3%	22.7	21.6	C
	Right Turn						
	Subtotal	96	81	84.3%	28.4	4.7	C
SB	Left Turn						
	Through	40	34	85.6%	37.3	9.2	D
	Right Turn	10	14	143.5%	28.8	30.0	C
	Subtotal	50	49	97.2%	33.0	10.3	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	427	89.5%	20.7	10.0	C
	Through	1,396	1,350	96.7%	7.1	2.0	A
	Right Turn	30	33	110.4%	6.0	2.1	A
	Subtotal	1,903	1,810	95.1%	10.4	4.0	B
Total		2,049	1,940	94.7%	11.7	4.0	B

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	50	44	87.6%	16.1	5.4	C
	Through						
	Right Turn						
	Subtotal	50	44	87.6%	16.1	5.4	C
EB	Left Turn	25	25	98.6%	2.9	0.3	A
	Through	2,307	2,266	98.2%	2.6	0.3	A
	Right Turn						
	Subtotal	2,332	2,291	98.2%	2.6	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,382	2,335	98.0%	2.9	0.4	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	48	89.3%	16.9	2.3	B
	Right Turn	281	268	95.3%	22.6	3.9	C
	Subtotal	335	316	94.4%	21.8	3.0	C
SB	Left Turn	72	61	85.4%	33.9	5.8	C
	Through	442	390	88.2%	34.7	4.6	C
	Right Turn						
	Subtotal	514	451	87.8%	34.6	4.2	C
EB	Left Turn	42	35	84.1%	14.6	4.2	B
	Through	2,289	2,229	97.4%	14.1	2.2	B
	Right Turn	61	57	94.1%	14.3	5.2	B
	Subtotal	2,392	2,321	97.0%	14.1	2.2	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,241	3,089	95.3%	17.9	1.9	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	39	93.3%	16.8	5.6	C
	Through	5	4	76.8%	11.7	13.4	B
	Right Turn						
	Subtotal	47	43	91.5%	17.5	6.0	C
SB	Left Turn						
	Through	15	12	79.4%	35.0	20.6	D
	Right Turn	10	13	134.4%	24.6	16.5	C
	Subtotal	25	25	101.4%	27.9	6.6	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	88	100	113.5%	3.0	0.4	A
	Through	1,829	1,842	100.7%	2.8	0.8	A
	Right Turn	10	9	92.2%	2.1	0.8	A
	Subtotal	1,927	1,951	101.3%	2.8	0.8	A
Total		1,999	2,019	101.0%	3.4	0.9	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	132	124	94.3%	30.6	2.7	C
	Through	20	23	113.3%	28.4	9.0	C
	Right Turn						
	Subtotal	152	147	96.8%	30.3	2.3	C
SB	Left Turn						
	Through	50	57	113.7%	26.3	4.5	C
	Right Turn	10	8	76.8%	18.4	13.7	B
	Subtotal	60	65	107.5%	25.5	4.5	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	226	93.5%	8.5	1.6	A
	Through	1,872	1,882	100.6%	6.3	0.7	A
	Right Turn	40	43	106.6%	5.3	1.5	A
	Subtotal	2,154	2,151	99.9%	6.5	0.8	A
Total		2,366	2,363	99.9%	8.5	0.9	A

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	115	119	103.8%	30.8	5.2	D
	Through						
	Right Turn						
	Subtotal	115	119	103.8%	30.8	5.2	D
EB	Left Turn	45	42	93.0%	3.3	0.8	A
	Through	2,392	2,401	100.4%	2.9	0.2	A
	Right Turn						
	Subtotal	2,437	2,443	100.2%	2.9	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,552	2,562	100.4%	4.2	0.5	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	91	91	99.6%	15.4	3.5	B
	Right Turn	433	415	96.0%	31.6	11.4	C
	Subtotal	524	506	96.6%	28.9	10.3	C
SB	Left Turn	117	105	89.9%	28.0	8.9	C
	Through	180	177	98.3%	19.8	4.0	B
	Right Turn						
	Subtotal	297	282	95.0%	22.6	5.0	C
EB	Left Turn	61	61	100.1%	20.3	2.8	C
	Through	2,372	2,351	99.1%	19.6	1.7	B
	Right Turn	44	45	103.0%	12.6	3.3	B
	Subtotal	2,477	2,458	99.2%	19.5	1.7	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,298	3,246	98.4%	21.3	1.9	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	37	88.7%	9.3	2.3	A
	Through	5	6	114.0%	15.2	17.9	C
	Right Turn						
	Subtotal	47	43	91.4%	10.4	3.1	B
SB	Left Turn						
	Through	5	5	91.2%	14.8	12.6	B
	Right Turn	10	12	117.8%	21.0	9.4	C
	Subtotal	15	16	108.9%	20.4	6.6	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	81	75	92.9%	1.6	0.2	A
	Through	1,643	1,598	97.2%	0.8	0.2	A
	Right Turn	10	11	106.4%	0.2	0.3	A
	Subtotal	1,734	1,683	97.1%	0.8	0.2	A
Total		1,796	1,743	97.0%	1.2	0.2	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	120	116	96.9%	36.5	4.1	D
	Through	20	26	131.1%	36.1	6.9	D
	Right Turn						
	Subtotal	140	143	101.8%	36.3	3.8	D
SB	Left Turn						
	Through	40	37	92.2%	24.0	8.3	C
	Right Turn	10	12	121.6%	16.9	12.4	B
	Subtotal	50	49	98.0%	22.8	8.3	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	343	322	93.8%	9.8	2.3	A
	Through	1,636	1,587	97.0%	6.2	0.9	A
	Right Turn	50	52	104.1%	6.0	1.3	A
	Subtotal	2,029	1,961	96.6%	6.8	1.0	A
Total		2,219	2,152	97.0%	9.1	1.0	A

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	88	78	88.5%	27.9	5.2	D
	Through						
	Right Turn						
	Subtotal	88	78	88.5%	27.9	5.2	D
EB	Left Turn	45	41	91.2%	3.0	0.4	A
	Through	2,034	2,049	100.7%	2.2	0.2	A
	Right Turn						
	Subtotal	2,079	2,090	100.5%	2.2	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,167	2,168	100.0%	3.2	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	87	86	98.3%	21.7	3.5	C
	Right Turn	293	293	100.0%	21.7	3.3	C
	Subtotal	380	378	99.6%	21.7	2.8	C
SB	Left Turn	110	107	97.1%	34.5	9.2	C
	Through	273	255	93.3%	21.5	2.7	C
	Right Turn						
	Subtotal	383	361	94.4%	25.5	3.1	C
EB	Left Turn	53	58	109.7%	15.1	2.5	B
	Through	2,030	2,022	99.6%	14.7	1.5	B
	Right Turn	59	57	96.6%	11.3	4.1	B
	Subtotal	2,142	2,138	99.8%	14.6	1.5	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,905	2,877	99.0%	16.9	1.2	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	18	84.1%	11.4	6.5	B
	Through	5	4	88.3%	17.1	17.0	C
	Right Turn						
	Subtotal	26	22	84.9%	12.9	5.7	B
SB	Left Turn						
	Through	5	2	44.2%	8.5	13.5	A
	Right Turn	10	11	106.7%	20.4	15.4	C
	Subtotal	15	13	85.9%	20.6	13.3	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	51	40	79.4%	3.4	0.8	A
	Through	1,401	1,340	95.6%	4.4	0.8	A
	Right Turn	10	12	117.8%	4.2	2.9	A
	Subtotal	1,462	1,392	95.2%	4.4	0.8	A
Total		1,503	1,427	95.0%	4.7	0.8	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	86	90	104.8%	29.4	3.2	C
	Through	10	9	88.3%	20.7	15.3	C
	Right Turn						
	Subtotal	96	99	103.1%	28.9	3.0	C
SB	Left Turn						
	Through	40	33	81.9%	77.8	58.4	E
	Right Turn	10	8	81.0%	43.8	49.7	D
	Subtotal	50	41	81.7%	72.1	54.3	E
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	433	90.7%	37.9	8.1	D
	Through	1,396	1,335	95.7%	28.2	8.1	C
	Right Turn	30	32	105.5%	30.3	10.2	C
	Subtotal	1,903	1,800	94.6%	30.6	7.8	C
Total		2,049	1,940	94.7%	31.3	7.4	C

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	50	40	81.0%	18.8	5.3	C
	Through						
	Right Turn						
	Subtotal	50	40	81.0%	18.8	5.3	C
EB	Left Turn	25	21	83.9%	3.0	0.4	A
	Through	2,307	2,248	97.4%	2.4	0.2	A
	Right Turn						
	Subtotal	2,332	2,269	97.3%	2.4	0.2	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,382	2,310	97.0%	2.7	0.1	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	57	105.6%	15.6	3.8	B
	Right Turn	281	278	98.9%	20.4	6.5	C
	Subtotal	335	335	100.0%	19.6	5.9	B
SB	Left Turn	72	64	88.9%	39.8	4.0	D
	Through	442	399	90.3%	38.5	2.8	D
	Right Turn						
	Subtotal	514	463	90.1%	38.7	2.8	D
EB	Left Turn	42	43	103.4%	13.5	3.7	B
	Through	2,289	2,204	96.3%	13.4	1.8	B
	Right Turn	61	58	95.3%	12.5	3.7	B
	Subtotal	2,392	2,306	96.4%	13.4	1.9	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,241	3,104	95.8%	17.9	1.7	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	41	96.9%	20.8	7.8	C
	Through	5	7	138.2%	29.5	19.6	D
	Right Turn						
	Subtotal	47	48	101.3%	22.8	7.7	C
SB	Left Turn						
	Through	15	15	99.8%	20.8	10.6	C
	Right Turn	10	10	96.0%	14.2	8.2	B
	Subtotal	25	25	98.3%	18.2	7.3	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	88	78	88.1%	3.6	0.2	A
	Through	1,829	1,764	96.5%	3.9	0.4	A
	Right Turn	10	9	92.2%	3.1	1.9	A
	Subtotal	1,927	1,851	96.1%	3.8	0.4	A
Total		1,999	1,923	96.2%	4.5	0.4	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	132	126	95.7%	23.1	2.9	C
	Through	20	19	96.0%	25.3	13.3	C
	Right Turn						
	Subtotal	152	146	95.7%	23.3	2.8	C
SB	Left Turn						
	Through	50	45	90.6%	25.9	4.4	C
	Right Turn	10	12	119.0%	22.8	7.9	C
	Subtotal	60	57	95.4%	25.4	3.9	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	237	97.9%	24.6	7.2	C
	Through	1,872	1,768	94.5%	22.4	6.2	C
	Right Turn	40	35	86.4%	18.7	5.8	B
	Subtotal	2,154	2,040	94.7%	22.6	6.2	C
Total		2,366	2,243	94.8%	22.7	5.7	C

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	115	101	87.5%	30.1	7.0	D
	Through						
	Right Turn						
	Subtotal	115	101	87.5%	30.1	7.0	D
EB	Left Turn	45	44	97.3%	3.4	0.6	A
	Through	2,392	2,347	98.1%	2.7	0.3	A
	Right Turn						
	Subtotal	2,437	2,390	98.1%	2.7	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,552	2,491	97.6%	3.8	0.4	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	91	86	94.9%	20.5	6.4	C
	Right Turn	433	398	92.0%	39.3	14.0	D
	Subtotal	524	485	92.5%	35.8	12.3	D
SB	Left Turn	117	111	94.5%	25.9	7.5	C
	Through	180	176	97.7%	17.9	3.6	B
	Right Turn						
	Subtotal	297	286	96.5%	20.8	4.4	C
EB	Left Turn	61	51	84.4%	17.4	2.8	B
	Through	2,372	2,316	97.6%	17.3	2.0	B
	Right Turn	44	40	90.8%	11.9	4.2	B
	Subtotal	2,477	2,407	97.2%	17.2	1.9	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,298	3,178	96.4%	20.3	2.8	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	37	88.7%	7.5	2.7	A
	Through	5	6	114.0%	10.3	14.4	B
	Right Turn						
	Subtotal	47	43	91.4%	8.3	2.5	A
SB	Left Turn						
	Through	5	5	98.8%	23.8	24.1	C
	Right Turn	10	11	114.0%	14.6	14.7	B
	Subtotal	15	16	108.9%	15.7	8.9	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	81	70	86.8%	1.6	0.2	A
	Through	1,668	1,516	90.9%	0.6	0.1	A
	Right Turn	10	10	102.6%	0.1	0.1	A
	Subtotal	1,759	1,596	90.8%	0.6	0.1	A
Total		1,821	1,656	90.9%	0.9	0.2	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	120	126	105.3%	32.1	3.2	C
	Through	20	23	116.0%	29.4	11.4	C
	Right Turn						
	Subtotal	140	150	106.9%	31.7	3.9	C
SB	Left Turn						
	Through	40	40	101.0%	40.4	7.9	D
	Right Turn	35	38	108.6%	28.4	10.8	C
	Subtotal	75	78	104.5%	34.4	6.9	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	343	291	84.8%	41.5	8.5	D
	Through	1,636	1544	94.4%	38.7	8.2	D
	Right Turn	70	64	92.0%	36.8	12.1	D
	Subtotal	2,049	1,899	92.7%	39.0	8.3	D
Total		2,264	2,127	93.9%	38.3	7.4	D

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	88	78	88.5%	32.3	3.5	D
	Through						
	Right Turn						
	Subtotal	88	78	88.5%	32.3	3.5	D
EB	Left Turn	45	41	90.4%	3.5	1.0	A
	Through	2,034	2,010	98.8%	2.3	0.3	A
	Right Turn						
	Subtotal	2,079	2,051	98.6%	2.3	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,167	2,129	98.2%	3.4	0.5	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	87	89	101.8%	20.3	3.7	C
	Right Turn	293	282	96.4%	20.7	5.5	C
	Subtotal	380	371	97.6%	20.7	4.7	C
SB	Left Turn	110	87	78.8%	24.3	5.0	C
	Through	273	229	83.9%	17.3	2.9	B
	Right Turn						
	Subtotal	383	316	82.4%	19.3	3.1	B
EB	Left Turn	53	55	104.0%	16.4	4.9	B
	Through	2,030	1,986	97.8%	14.4	4.8	B
	Right Turn	59	54	92.1%	8.9	4.4	A
	Subtotal	2,142	2,095	97.8%	14.4	4.8	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,905	2,782	95.8%	15.8	3.9	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	21	19	91.1%	11.1	4.1	B
	Through	5	4	81.0%	13.9	12.0	B
	Right Turn						
	Subtotal	26	23	89.2%	12.7	5.6	B
SB	Left Turn						
	Through	5	3	66.2%	20.1	24.6	C
	Right Turn	10	11	110.4%	23.9	17.7	C
	Subtotal	15	14	95.7%	29.7	19.2	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	56	49	87.4%	3.2	0.4	A
	Through	1,435	1,400	97.6%	4.3	1.1	A
	Right Turn	10	7	66.2%	3.7	3.2	A
	Subtotal	1,501	1,456	97.0%	4.2	1.1	A
Total		1,542	1,493	96.8%	4.6	1.1	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	96	98	102.4%	30.0	3.2	C
	Through						
	Right Turn						
	Subtotal	96	98	102.4%	30.0	3.2	C
SB	Left Turn						
	Through						
	Right Turn	49	48	98.4%	12.5	2.5	B
	Subtotal	49	48	98.4%	12.5	2.5	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	477	427	89.4%	29.9	6.0	C
	Through	1,426	1,379	96.7%	24.5	5.4	C
	Right Turn	55	46	84.3%	0.4	0.2	A
	Subtotal	1,958	1,852	94.6%	25.1	5.3	C
Total		2,103	1,998	95.0%	25.0	4.8	C

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	55	49	89.0%	21.5	4.4	C
	Through						
	Right Turn						
	Subtotal	55	49	89.0%	21.5	4.4	C
EB	Left Turn	25	24	94.2%	2.5	0.9	A
	Through	2,307	2,257	97.8%	2.6	0.3	A
	Right Turn						
	Subtotal	2,332	2,280	97.8%	2.6	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,387	2,329	97.6%	3.0	0.3	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	54	53	98.8%	16.6	3.9	B
	Right Turn	281	282	100.4%	25.4	8.6	C
	Subtotal	335	336	100.2%	24.3	7.6	C
SB	Left Turn	66	52	78.6%	37.2	9.8	D
	Through	408	365	89.6%	34.0	3.0	C
	Right Turn						
	Subtotal	474	417	88.0%	34.4	3.1	C
EB	Left Turn	42	45	107.8%	16.8	6.3	B
	Through	2,294	2,219	96.7%	14.6	2.8	B
	Right Turn	61	58	95.3%	11.7	4.5	B
	Subtotal	2,397	2,323	96.9%	14.6	2.8	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,206	3,076	95.9%	18.3	2.8	B

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	46	108.8%	20.9	6.4	C
	Through	5	3	69.1%	28.3	27.2	D
	Right Turn						
	Subtotal	47	49	104.6%	21.9	7.3	C
SB	Left Turn						
	Through	15	18	120.3%	21.0	8.3	C
	Right Turn	10	11	111.4%	23.6	12.6	C
	Subtotal	25	29	116.7%	23.4	5.6	C
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	104	85	82.0%	4.1	0.6	A
	Through	1,859	1,820	97.9%	4.7	0.9	A
	Right Turn	10	10	99.8%	3.9	1.5	A
	Subtotal	1,973	1,915	97.1%	4.7	0.9	A
Total		2,045	1,993	97.5%	5.4	0.9	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	152	147	96.5%	22.6	1.9	C
	Through						
	Right Turn						
	Subtotal	152	147	96.5%	22.6	1.9	C
SB	Left Turn						
	Through						
	Right Turn	81	80	99.1%	16.8	4.6	B
	Subtotal	81	80	99.1%	16.8	4.6	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	242	235	97.0%	28.7	5.4	C
	Through	1,912	1,821	95.2%	26.0	6.8	C
	Right Turn	170	163	96.0%	0.8	0.2	A
	Subtotal	2,324	2,218	95.5%	24.4	6.1	C
Total		2,557	2,445	95.6%	24.1	5.5	C

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	131	113	85.9%	31.0	5.3	D
	Through						
	Right Turn						
	Subtotal	131	113	85.9%	31.0	5.3	D
EB	Left Turn	45	45	99.0%	3.2	0.5	A
	Through	2,392	2,409	100.7%	2.9	0.3	A
	Right Turn						
	Subtotal	2,437	2,454	100.7%	2.9	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,568	2,566	99.9%	4.1	0.4	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	Total Delay (sec/veh) LOS
NB	Left Turn						
	Through	91	81	89.0%	19.2	4.6	B
	Right Turn	433	413	95.4%	43.4	16.9	D
	Subtotal	524	494	94.3%	39.4	14.7	D
SB	Left Turn	97	98	100.6%	20.2	20.7	C
	Through	150	141	94.2%	13.6	15.2	B
	Right Turn						
	Subtotal	247	239	96.7%	16.3	17.8	B
EB	Left Turn	61	61	100.1%	19.3	5.0	B
	Through	2,388	2,360	98.8%	19.5	3.0	B
	Right Turn	44	44	100.4%	15.9	5.5	B
	Subtotal	2,493	2,465	98.9%	19.5	3.1	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		3,264	3,198	98.0%	22.3	4.4	C

Intersection 15 **Brooks St/3rd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	42	48	114.9%	12.4	4.5	B
	Through	5	5	106.4%	18.3	20.8	C
	Right Turn						
	Subtotal	47	54	114.0%	13.8	6.7	B
SB	Left Turn						
	Through	5	3	53.2%	28.6	26.8	D
	Right Turn	10	8	83.6%	12.5	10.0	B
	Subtotal	15	11	73.5%	26.6	15.2	D
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	91	82	90.6%	1.6	0.2	A
	Through	1,698	1,575	92.7%	0.7	0.1	A
	Right Turn	10	11	110.2%	0.2	0.2	A
	Subtotal	1,799	1,668	92.7%	0.7	0.1	A
Total		1,861	1,733	93.1%	1.2	0.3	A

Intersection 16 **Lindaro St/3rd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	140	142	101.4%	33.4	4.2	C
	Through						
	Right Turn						
	Subtotal	140	142	101.4%	33.4	4.2	C
SB	Left Turn						
	Through						
	Right Turn	75	88	116.8%	13.9	2.5	B
	Subtotal	75	88	116.8%	13.9	2.5	B
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	343	305	88.9%	42.9	6.1	D
	Through	1,686	1633	96.9%	39.0	4.3	D
	Right Turn	90	90	100.0%	38.4	4.3	D
	Subtotal	2,119	2,028	95.7%	39.5	4.4	D
Total		2,334	2,258	96.7%	38.1	3.9	D

Intersection 25 **Brooks St/2nd St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	98	92	93.4%	34.1	8.1	D
	Through						
	Right Turn						
	Subtotal	98	92	93.4%	34.1	8.1	D
EB	Left Turn	45	49	109.8%	2.9	0.6	A
	Through	2,034	2,038	100.2%	2.2	0.3	A
	Right Turn						
	Subtotal	2,079	2,087	100.4%	2.2	0.3	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,177	2,179	100.1%	3.5	0.6	A

Intersection 26 **Lindaro St/2nd St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	87	84	96.1%	21.5	5.0	C
	Right Turn	293	291	99.2%	24.4	8.5	C
	Subtotal	380	374	98.5%	23.9	6.4	C
SB	Left Turn	100	84	84.0%	20.5	5.5	C
	Through	243	207	85.1%	9.7	3.8	A
	Right Turn						
	Subtotal	343	291	84.8%	12.9	2.6	B
EB	Left Turn	53	51	95.4%	15.5	7.8	B
	Through	2,040	2,026	99.3%	15.2	3.9	B
	Right Turn	59	62	104.3%	10.2	3.6	B
	Subtotal	2,152	2,138	99.3%	15.0	3.9	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,875	2,803	97.5%	16.0	3.4	B

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	36.1	54.2	0.07	4.5	F
C	IV	25	18.9	8.9	27.8	0.07	9.2	D
B	IV	25	17.9	30.9	48.8	0.07	5.0	F
A	IV	25	18.5	9.7	28.2	0.07	8.9	E
Lindaro	IV	25	25.3	41.9	67.2	0.14	7.5	E
Lincoln	IV	25	21.4	46.9	68.3	0.10	5.1	F
Francisco W.	IV	25	12.2	71.5	83.7	0.05	2.0	F
101 SBOn 2nd	IV	25	14.2	11.7	25.9	0.05	7.4	E
Total	IV		146.5	257.6	404.1	0.61	5.5	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	102.6	121.6	0.07	2.1	F
Tamalpais	IV	25	14.4	101.5	115.9	0.05	1.7	F
Lincoln	IV	25	13.2	77.0	90.2	0.05	2.0	F
Lindaro	IV	25	21.4	1.1	22.5	0.10	15.6	C
A	IV	25	19.5	10.1	29.6	0.07	8.9	E
B	IV	25	17.9	9.3	27.2	0.07	8.9	E
C	IV	25	19.0	3.6	22.6	0.07	11.4	D
D	IV	25	18.7	1.7	20.4	0.07	12.4	D
Total	IV		143.1	306.9	450.0	0.56	4.5	F

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	29	24.0	21.5	45.5	0.16	12.6	D
5th	IV	25	16.3	12.9	29.2	0.06	7.6	E
4th	IV	25	14.6	7.5	22.1	0.05	8.9	E
3rd	IV	25	17.7	7.5	25.2	0.07	9.5	D
2nd	IV	25	15.6	261.4	277.0	0.06	0.8	F
Total	IV		88.2	310.8	399.0	0.40	3.6	F

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	30	25.2	44.7	69.9	0.17	8.7	E
3rd St	IV	25	14.8	31.5	46.3	0.06	4.3	F
4th	IV	25	18.3	30.6	48.9	0.07	5.1	F
5th	IV	25	14.6	8.5	23.1	0.06	8.6	E
Mission	IV	25	15.7	6.9	22.6	0.06	9.4	D
Total	IV		88.6	122.2	210.8	0.41	7.0	F

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	15.7	44.2	0.16	12.9	D
Tamalpais	IV	25	16.0	52.8	68.8	0.06	3.2	F
Tamalpais	IV	25	3.1	2.9	6.0	0.01	7.0	E
Hetherton	IV	25	8.7	21.6	30.3	0.03	3.9	F
Irwin	IV	25	18.9	12.1	31.0	0.07	8.3	E
Total	IV		75.2	105.1	180.3	0.33	6.7	F

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	26.8	48.4	0.10	7.3	E
Hetherton	IV	25	18.9	36.1	55.0	0.07	4.7	F
Tamalpais	IV	25	8.7	82.6	91.3	0.03	1.3	F
Tamalpais	IV	25	3.1	3.7	6.8	0.01	6.2	F
Lincoln	IV	25	16.0	88.7	104.7	0.06	2.1	F
Total	IV		68.3	237.9	306.2	0.27	3.2	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	24.8	42.9	0.07	5.7	F
C	IV	25	18.9	8.5	27.4	0.07	9.4	D
B	IV	25	17.9	19.0	36.9	0.07	6.6	F
A	IV	25	18.5	9.7	28.2	0.07	8.9	E
Lindaro	IV	25	25.3	43.6	68.9	0.14	7.3	E
Lincoln	IV	25	21.4	26.7	48.1	0.10	7.3	E
Francisco W.	IV	25	12.2	89.5	101.7	0.05	1.6	F
101 SBOn Hetherton	IV	25	14.2	82.3	96.5	0.05	2.0	F
Total	IV		146.5	304.1	450.6	0.61	4.9	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	96.2	115.2	0.07	2.2	F
Tamalpais	IV	25	14.4	100.0	114.4	0.05	1.7	F
Lincoln	IV	25	13.2	18.9	32.1	0.05	5.6	F
Lindaro	IV	25	21.4	4.1	25.5	0.10	13.7	C
A	IV	25	19.5	11.1	30.6	0.07	8.6	E
B	IV	25	17.9	10.2	28.1	0.07	8.6	E
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		143.1	248.8	391.9	0.56	5.1	F

Arterial Level of Service: SB Hetherton

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Mission	IV	35	22.2	19.0	41.2	0.16	13.9	C
5th	IV	25	16.3	16.2	32.5	0.06	6.8	F
4th	IV	25	14.6	5.6	20.2	0.05	9.8	D
3rd	IV	25	17.7	21.9	39.6	0.07	6.1	F
2nd	IV	25	15.6	55.6	71.2	0.06	3.0	F
Total	IV		86.4	118.3	204.7	0.40	7.1	E

Arterial Level of Service: NB Irwin

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
2nd St	IV	38	19.3	99.1	118.4	0.17	5.1	F
3rd St	IV	25	14.8	14.0	28.8	0.06	7.0	F
4th	IV	25	18.9	12.0	30.9	0.07	8.3	E
5th	IV	25	14.0	14.3	28.3	0.05	6.7	F
Mission	IV	25	15.7	3.4	19.1	0.06	11.2	D
Total	IV		82.7	142.8	225.5	0.41	6.5	F

Arterial Level of Service: EB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lincoln	IV	25	28.5	12.8	41.3	0.16	13.8	C
Tamalpais	IV	25	16.1	24.0	40.1	0.06	5.5	F
Tamalpais	IV	25	4.3	2.3	6.6	0.02	8.9	E
Hetherton	IV	25	7.5	16.6	24.1	0.03	4.2	F
Irwin	IV	25	18.9	14.5	33.4	0.07	7.7	E
Total	IV		75.3	70.2	145.5	0.33	8.3	E

Arterial Level of Service: WB Mission

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Irwin	IV	25	21.6	28.4	50.0	0.10	7.1	E
Hetherton	IV	25	18.9	15.9	34.8	0.07	7.4	E
Tamalpais	IV	25	7.5	47.1	54.6	0.03	1.9	F
Tamalpais	IV	25	4.3	2.7	7.0	0.02	8.4	E
Lincoln	IV	25	16.1	88.2	104.3	0.06	2.1	F
Total	IV		68.4	182.3	250.7	0.27	3.9	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	36.1	54.2	0.07	4.5	F
C	IV	25	18.9	8.9	27.8	0.07	9.2	D
B	IV	25	17.9	30.9	48.8	0.07	5.0	F
A	IV	25	18.5	9.7	28.2	0.07	8.9	E
Brooks	IV	25	12.3	3.9	16.2	0.05	10.4	D
Lindaro	IV	25	20.6	44.5	65.1	0.09	5.2	F
Lincoln	IV	25	21.4	46.9	68.3	0.10	5.1	F
Francisco W.	IV	25	12.2	71.5	83.7	0.05	2.0	F
101 SBOn 2nd	IV	25	14.2	11.7	25.9	0.05	7.4	E
Total	IV		154.1	264.1	418.2	0.61	5.3	F

Arterial Level of Service: EB 2nd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
D	IV	25	18.1	24.8	42.9	0.07	5.7	F
C	IV	25	18.9	8.5	27.4	0.07	9.4	D
B	IV	25	17.9	19.0	36.9	0.07	6.6	F
A	IV	25	18.5	9.7	28.2	0.07	8.9	E
Brooks	IV	25	12.3	4.8	17.1	0.05	9.8	D
Lindaro	IV	25	20.6	44.6	65.2	0.09	5.2	F
Lincoln	IV	25	21.4	26.7	48.1	0.10	7.3	E
Francisco W.	IV	25	12.2	89.5	101.7	0.05	1.6	F
101 SBOn Hetherton	IV	25	14.2	82.3	96.5	0.05	2.0	F
Total	IV		154.1	309.9	464.0	0.61	4.8	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	102.2	121.2	0.07	2.1	F
Tamalpais	IV	25	14.4	101.5	115.9	0.05	1.7	F
Lincoln	IV	25	13.2	74.4	87.6	0.05	2.1	F
Lindaro	IV	25	21.4	1.1	22.5	0.10	15.6	C
A	IV	25	19.5	5.2	24.7	0.07	10.7	D
B	IV	25	17.9	5.4	23.3	0.07	10.4	D
C	IV	25	19.0	1.8	20.8	0.07	12.4	D
D	IV	25	18.7	2.3	21.0	0.07	12.1	D
Total	IV		143.1	293.9	437.0	0.56	4.6	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	96.2	115.2	0.07	2.2	F
Tamalpais	IV	25	14.4	100.0	114.4	0.05	1.7	F
Lincoln	IV	25	13.2	18.9	32.1	0.05	5.6	F
Lindaro	IV	25	21.4	4.1	25.5	0.10	13.7	C
A	IV	25	19.5	14.5	34.0	0.07	7.8	E
B	IV	25	17.9	8.8	26.7	0.07	9.1	D
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		143.1	250.8	393.9	0.56	5.1	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	102.2	121.2	0.07	2.1	F
Tamalpais	IV	25	14.4	101.5	115.9	0.05	1.7	F
Lincoln	IV	25	13.2	77.0	90.2	0.05	2.0	F
Lindaro	IV	25	21.4	1.1	22.5	0.10	15.6	C
Pedestrian Hybrid Be	IV	25	4.3	0.2	4.5	0.02	12.9	D
A	IV	25	15.2	6.2	21.4	0.06	9.7	D
B	IV	25	17.9	5.5	23.4	0.07	10.4	D
C	IV	25	19.0	1.8	20.8	0.07	12.4	D
D	IV	25	18.7	2.3	21.0	0.07	12.1	D
Total	IV		143.1	297.8	440.9	0.56	4.5	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	96.2	115.2	0.07	2.2	F
Tamalpais	IV	25	14.4	100.0	114.4	0.05	1.7	F
Lincoln	IV	25	13.2	18.9	32.1	0.05	5.6	F
Lindaro	IV	25	21.4	4.1	25.5	0.10	13.7	C
Pedestrian Hybrid Be	IV	25	4.3	2.1	6.4	0.02	9.1	D
A	IV	25	15.2	20.8	36.0	0.06	5.7	F
B	IV	25	17.9	10.3	28.2	0.07	8.6	E
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		143.1	260.7	403.8	0.56	5.0	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	102.2	121.2	0.07	2.1	F
Tamalpais	IV	25	14.4	101.5	115.9	0.05	1.7	F
Lincoln	IV	25	13.2	77.0	90.2	0.05	2.0	F
Lindaro	IV	25	21.4	1.1	22.5	0.10	15.6	C
Brooks	IV	25	6.7	1.3	8.0	0.03	11.4	D
A	IV	25	12.7	4.1	16.8	0.05	10.3	D
B	IV	25	17.9	5.5	23.4	0.07	10.4	D
C	IV	25	19.0	1.8	20.8	0.07	12.4	D
D	IV	25	18.7	2.3	21.0	0.07	12.1	D
Total	IV		143.0	296.8	439.8	0.56	4.6	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	96.2	115.2	0.07	2.2	F
Tamalpais	IV	25	14.4	100.0	114.4	0.05	1.7	F
Lincoln	IV	25	13.2	18.9	32.1	0.05	5.6	F
Lindaro	IV	25	21.4	4.1	25.5	0.10	13.7	C
Brooks	IV	25	6.7	1.0	7.7	0.03	11.9	D
A	IV	25	12.7	11.7	24.4	0.05	7.1	E
B	IV	25	17.9	10.2	28.1	0.07	8.6	E
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		143.0	250.4	393.4	0.56	5.1	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	102.2	121.2	0.07	2.1	F
Tamalpais	IV	25	14.4	101.5	115.9	0.05	1.7	F
Lincoln	IV	25	13.2	77.0	90.2	0.05	2.0	F
Lindaro	IV	25	21.4	1.0	22.4	0.10	15.6	C
A	IV	25	19.5	4.9	24.4	0.07	10.8	D
B	IV	25	17.9	5.5	23.4	0.07	10.4	D
C	IV	25	19.0	1.9	20.9	0.07	12.3	D
D	IV	25	18.7	2.4	21.1	0.07	12.0	D
Total	IV		143.1	296.4	439.5	0.56	4.6	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	96.2	115.2	0.07	2.2	F
Tamalpais	IV	25	14.4	100.0	114.4	0.05	1.7	F
Lincoln	IV	25	13.2	18.9	32.1	0.05	5.6	F
Lindaro	IV	25	21.4	3.8	25.2	0.10	13.9	C
A	IV	25	19.5	11.1	30.6	0.07	8.6	E
B	IV	25	17.9	10.2	28.1	0.07	8.6	E
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		143.1	248.5	391.6	0.56	5.1	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	102.2	121.2	0.07	2.1	F
Tamalpais	IV	25	14.4	101.5	115.9	0.05	1.7	F
Lincoln	IV	25	13.2	74.4	87.6	0.05	2.1	F
Lindaro	IV	25	21.4	6.8	28.2	0.10	12.4	D
Lootens	IV	25	5.1	1.0	6.1	0.02	11.4	D
A	IV	25	19.5	5.5	25.0	0.07	10.6	D
B	IV	25	17.9	6.2	24.1	0.07	10.1	D
C	IV	25	19.0	1.9	20.9	0.07	12.3	D
D	IV	25	18.7	2.4	21.1	0.07	12.0	D
Total	IV		148.2	301.9	450.1	0.58	4.6	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	96.2	115.2	0.07	2.2	F
Tamalpais	IV	25	14.4	100.0	114.4	0.05	1.7	F
Lincoln	IV	25	13.2	18.9	32.1	0.05	5.6	F
Lindaro	IV	25	21.4	24.9	46.3	0.10	7.6	E
Lootens	IV	25	5.1	1.8	6.9	0.02	10.1	D
A	IV	25	19.5	11.0	30.5	0.07	8.7	E
B	IV	25	17.9	10.4	28.3	0.07	8.6	E
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		148.2	271.5	419.7	0.58	4.9	F

Arterial Level of Service: WB 3rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	102.2	121.2	0.07	2.1	F
Tamalpais	IV	25	14.4	101.5	115.9	0.05	1.7	F
Lincoln	IV	25	13.2	85.2	98.4	0.05	1.8	F
Lindaro	IV	25	21.4	1.0	22.4	0.10	15.6	C
A	IV	25	19.5	5.4	24.9	0.07	10.6	D
B	IV	25	17.9	5.4	23.3	0.07	10.4	D
C	IV	25	19.0	1.8	20.8	0.07	12.4	D
D	IV	25	18.7	2.3	21.0	0.07	12.1	D
Total	IV		143.1	304.8	447.9	0.56	4.5	F

Arterial Level of Service: WB 3rd

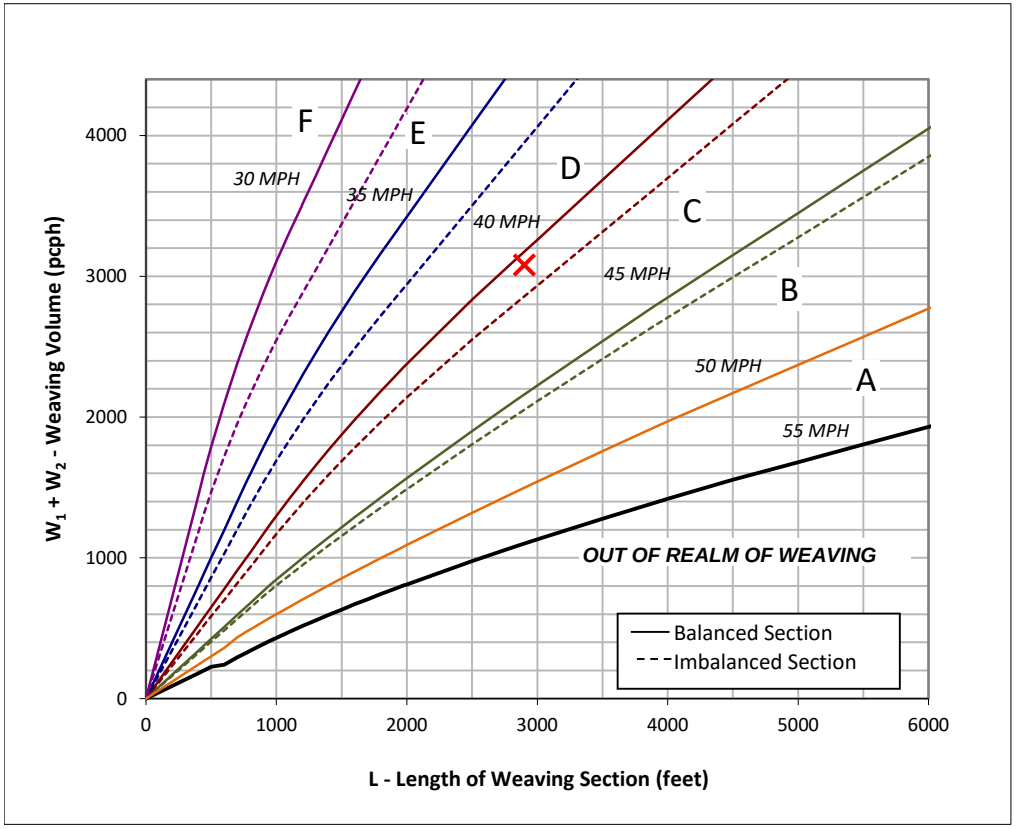
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Hetherton	IV	25	19.0	96.2	115.2	0.07	2.2	F
Tamalpais	IV	25	14.4	100.0	114.4	0.05	1.7	F
Lincoln	IV	25	13.2	18.9	32.1	0.05	5.6	F
Lindaro	IV	25	21.4	25.3	46.7	0.10	7.5	E
Lootens	IV	25	5.1	1.4	6.5	0.02	10.7	D
A	IV	25	19.5	12.4	31.9	0.07	8.3	E
B	IV	25	17.9	10.1	28.0	0.07	8.7	E
C	IV	25	19.0	4.4	23.4	0.07	11.0	D
D	IV	25	18.7	3.9	22.6	0.07	11.2	D
Total	IV		148.2	272.6	420.8	0.58	4.9	F

Leisch Method for Weaving Analysis

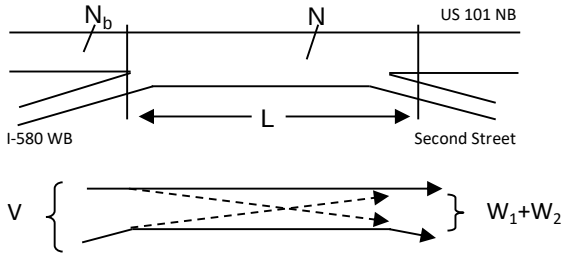
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Cumulative Plus Project AM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,045	Volume (vph)*	1,950	Volume (vph)*	1,004
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	4%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	6,311	Volume (pcph)	2,036	Volume (pcph)	1,045



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**40 MPH** and **45 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.6
4. Weaving Intensity Factor (k)	2.61
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,599
6. Level of Service (LOS)	D

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4150	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1520
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.66
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	25.3
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	820
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.50
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.8
Speed 2 (S_2), mi/h	0.2	Density (D_{ML}), pc/mi/ln	13.7
Speed 2 (S_3), mi/h	1.4	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6025	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.99	Flow Rate ($v_{p,GP}$), pc/h/ln	1712
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.74
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.8
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	28.6
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1039	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1246
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	58.3
Speed 2 (S_2), mi/h	1.7	Density (D_{ML}), pc/mi/ln	21.4
Speed 2 (S_3), mi/h	7.7	Level of Service (LOS)	C

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	6281	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	2270
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.99
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	51.9
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	43.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	3/17/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Volume (V_i), veh/h	6281	2047
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	4.40	3.72
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.958
Flow Rate (v_i), pc/h	6809	2323
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.99	1.11

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	111124.6	Density in Ramp Influence Area (D_R), pc/mi/ln	-
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2319
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.483	Outer Lanes Freeway Speed (S_O), mi/h	60.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	4490	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1317	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1440
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.87
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	44.8
Speed 2 (S_2), mi/h	3.0	Density (D_{ML}), pc/mi/ln	32.1
Speed 2 (S_3), mi/h	12.2	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	AM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	4234	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1583
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.69
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	26.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

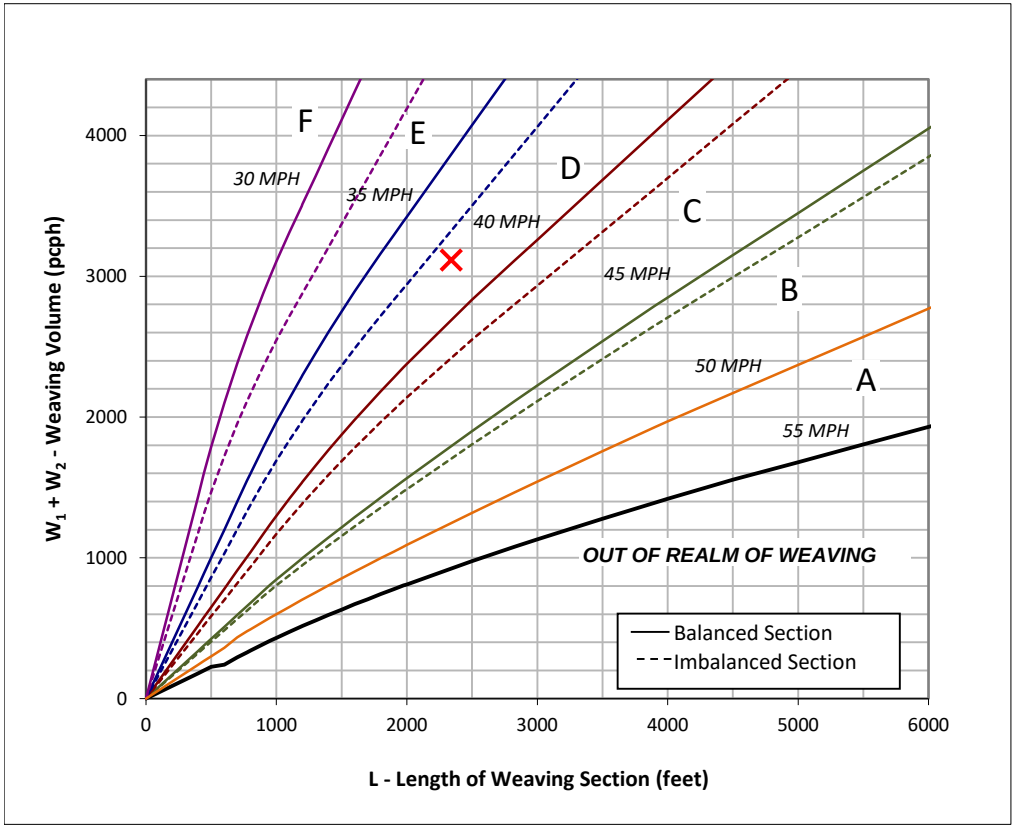
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	998	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.94	Flow Rate ($V_{p,ML}$), pc/h/ln	1104
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.0
Speed 2 (S_2), mi/h	1.0	Density (D_{ML}), pc/mi/ln	18.7
Speed 2 (S_3), mi/h	5.0	Level of Service (LOS)	C

Leisch Method for Weaving Analysis

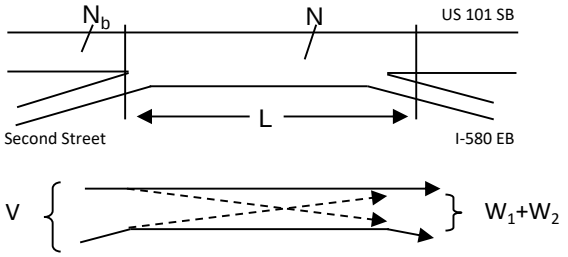
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Cumulative Plus Project AM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,727	Volume (vph)*	1,771	Volume (vph)*	1,226
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	2%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	7,023	Volume (pcph)	1,818	Volume (pcph)	1,299



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.2
4. Weaving Intensity Factor (k)	2.63
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	2,286
6. Level of Service (LOS)	F

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

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

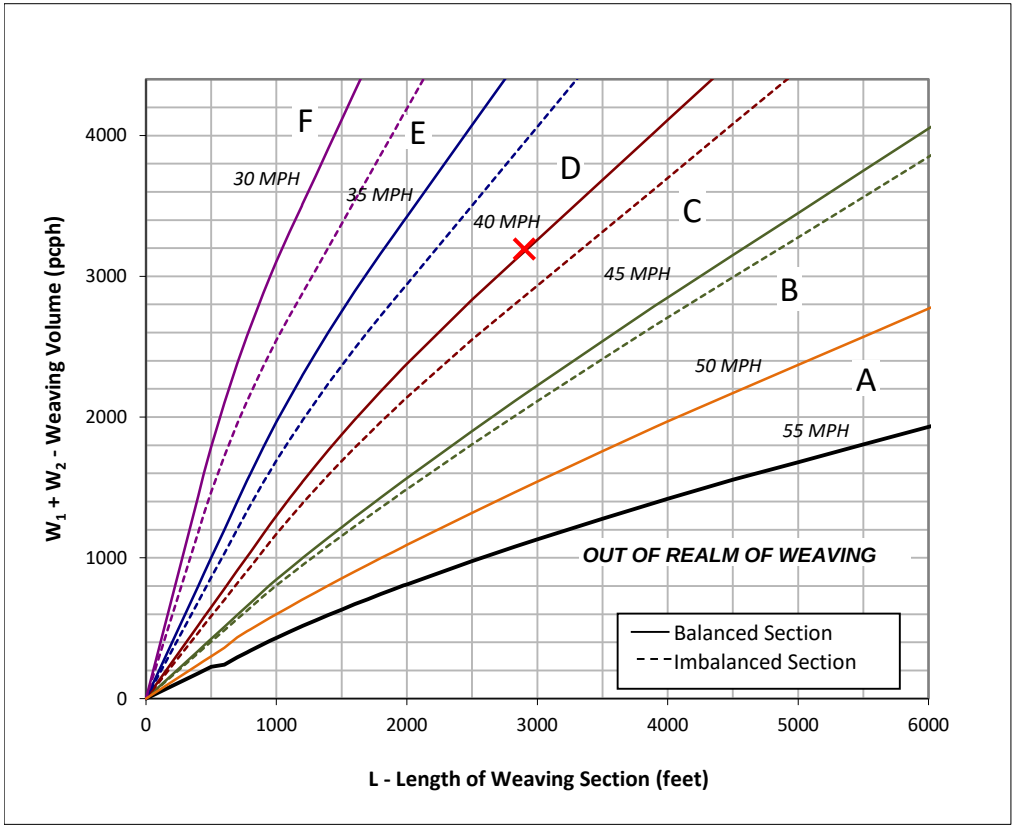
Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections* , Jack E. Leisch & Associates, September 1983 and *Highway Design Manual* , California Department of Transportation, 2014

Leisch Method for Weaving Analysis

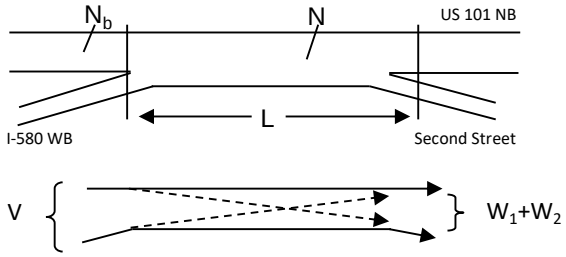
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,900

Project Information	
Project	BioMarin
Scenario	Cumulative Plus Project PM Peak Hour
Freeway	US 101 NB
On-ramp	I-580 WB
Off-ramp	Second Street

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	7,267	Volume (vph)*	1,662	Volume (vph)*	1,423
Truck Percentage	4%	Truck Percentage	4%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	2.0
Volume (pcph)	7,587	Volume (pcph)	1,735	Volume (pcph)	1,460



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	N
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	38.5
4. Weaving Intensity Factor (k)	2.62
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,989
6. Level of Service (LOS)	F

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

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

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

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative + Project Conditions
Project Description	BioMarin - US 101 NB Second Street to Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5170	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	1913
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.83
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	58.2
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	32.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	848	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	890
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.54
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.7
Speed 2 (S_2), mi/h	0.3	Density (D_{ML}), pc/mi/ln	14.9
Speed 2 (S_3), mi/h	2.1	Level of Service (LOS)	B

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	Cumulative + Project Conditions, PM Peak Hour
Project Description	BioMarin - US 101 NB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	4	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	2.86
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	1.02
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	7518	Heavy Vehicle Adjustment Factor (f_{HV})	0.889
Peak Hour Factor (PHF)	0.98	Flow Rate ($v_{p,GP}$), pc/h/ln	2157
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	3.840		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	54.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	39.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	2.86

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1217	Heavy Vehicle Adjustment Factor (f_{HV})	0.916
Peak Hour Factor	0.99	Flow Rate ($V_{p,ML}$), pc/h/ln	1342
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.81
Passenger Car Equivalent (E_T)	5.597		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	47.9
Speed 2 (S_2), mi/h	2.3	Density (D_{ML}), pc/mi/ln	28.0
Speed 2 (S_3), mi/h	9.8	Level of Service (LOS)	D

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 SB north of Mission Avenue		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Specific Grade
Segment Length (L), ft	-	Percent Grade, %	-2.44
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	0.77
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	5449	Heavy Vehicle Adjustment Factor (f_{HV})	0.951
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1969
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	66	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.86
Passenger Car Equivalent (E_T)	2.180		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	57.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	34.2
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1377	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1555
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	56.0
Speed 2 (S_2), mi/h	4.0	Density (D_{ML}), pc/mi/ln	27.8
Speed 2 (S_3), mi/h	15.4	Level of Service (LOS)	D

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	4/24/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 Mission Ave Slip Off-Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	3	1
Free-Flow Speed (FFS), mi/h	60.0	50.0
Segment Length (L) / Deceleration Length (L_D), ft	1500	170
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	-2.44	-1.80
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

	Freeway	Ramp
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

	Freeway	Ramp
Volume (V_i), veh/h	5449	2080
Peak Hour Factor (PHF)	0.97	0.96
Total Trucks, %	4.40	2.00
Single-Unit Trucks (SUT), %	66	66
Tractor-Trailers (TT), %	34	34
Heavy Vehicle Adjustment Factor (f_{HV})	0.951	0.973
Flow Rate (v_i), pc/h	5907	2227
Capacity (c), pc/h	6900	2100
Volume-to-Capacity Ratio (v/c)	0.86	1.06

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	150865.8	Density in Ramp Influence Area (D_R), pc/mi/ln	-
Distance to Upstream Ramp (L_{UP}), ft	10000	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1803
Distance to Downstream Ramp (L_{DOWN}), ft	10000	Off-Ramp Influence Area Speed (S_R), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.510	Outer Lanes Freeway Speed (S_O), mi/h	62.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	4104	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Specific Grade
Managed Lane Length, ft	5280	Percent Grade, %	-2.44
Managed Lane Adjustment Factors			
Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	1380	Heavy Vehicle Adjustment Factor (f_{HV})	0.973
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1559
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	66	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	34	Volume-to-Capacity Ratio (v/c)	0.94
Passenger Car Equivalent (E_T)	2.390		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	1
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	40.4
Speed 2 (S_2), mi/h	4.1	Density (D_{ML}), pc/mi/ln	38.6
Speed 2 (S_3), mi/h	15.5	Level of Service (LOS)	E

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	3/16/2018
Agency		Analysis Year	2018
Jurisdiction	San Rafael, Caltrans District 4	Time Period Analyzed	PM Peak Hour, Cumulative Plus Project Conditions
Project Description	BioMarin - US 101 SB Mission Avenue to Second Street		

General Purpose Geometric Data

Number of General Purpose Lanes, ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

General Purpose Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

General Purpose Demand and Capacity

Volume (V), veh/h	3369	Heavy Vehicle Adjustment Factor (f_{HV})	0.919
Peak Hour Factor (PHF)	0.97	Flow Rate ($v_{p,GP}$), pc/h/ln	1260
Total Trucks, %	4.40	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.55
Passenger Car Equivalent (E_T)	3.000		

General Purpose Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D_{GP}), pc/mi/ln	21.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

Managed Lane Geometric Data

Managed Lane Type	Continuous Access	Free-Flow Speed (FFS), mi/h	60.0
Number of Managed Lanes, ln	1	Terrain Type	Rolling
Managed Lane Length, ft	5280	Percent Grade, %	-

Managed Lane Adjustment Factors

Driver Population	All Familiar	Driver Population CAF	1.000
Weather Type	Non-Severe Weather	Weather Type CAF	1.000
Driver Population SAF	1.000	Final Speed Adjustment Factor (SAF)	1.000

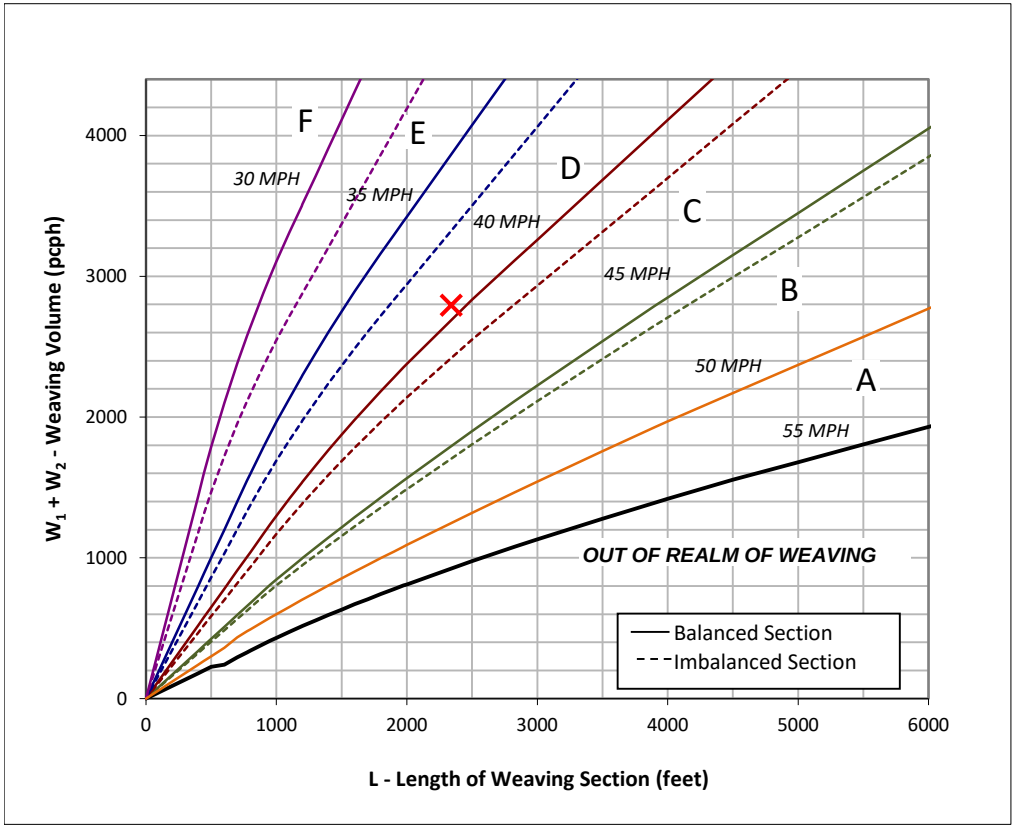
Weather Type SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Demand Adjustment Factor (DAF)	1.000		
Managed Lane Demand and Capacity			
Volume (V_{ML}), veh/h	918	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor	0.91	Flow Rate ($V_{p,ML}$), pc/h/ln	1049
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1650
Single-Unit Trucks (SUT), %	-	Adjusted Cpacity (c_{adj}), pc/h/ln	1650
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.64
Passenger Car Equivalent (E_T)	3.000		
Managed Lane Speed and Density			
Breakpoint (BP_{ML})	501	Indicator Variable	0
Speed 1 (S_1), mi/h	60.0	Average Speed (S_{ML}), mi/h	59.2
Speed 2 (S_2), mi/h	0.8	Density (D_{ML}), pc/mi/ln	17.7
Speed 2 (S_3), mi/h	4.2	Level of Service (LOS)	B

Leisch Method for Weaving Analysis

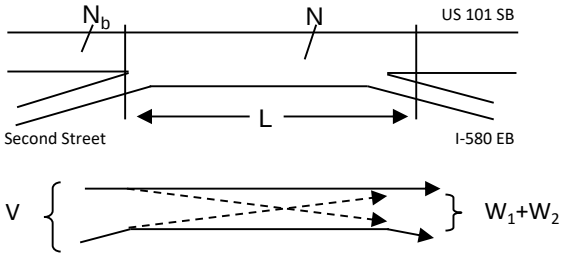
Data Input		
Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,340

Project Information	
Project	BioMarin
Scenario	Cumulative Plus Project PM Peak Hour
Freeway	US 101 SB
On-ramp	Second Street
Off-ramp	I-580 EB

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,441	Volume (vph)*	1,185	Volume (vph)*	1,442
Truck Percentage	4%	Truck Percentage	3%	Truck Percentage	3%
PCE for Trucks	2.0	PCE for Trucks	2.0	PCE for Trucks	4.1
Volume (pcph)	5,680	Volume (pcph)	1,215	Volume (pcph)	1,582



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)?	Y
If optional exit lane, then "Y". Otherwise "N".	
2. In the chart to the left, which two speed curves is the red "x" between?	**35 MPH** and **40 MPH**
If left of the 30 MPH curve, LOS is F. Select "-".	
If below the 55 MPH curve, out of the realm of weaving.	
3. Interpolated Weaving Speed (S_w, mph)	39.6
4. Weaving Intensity Factor (k)	2.55
5. Service Volume (SV, pcph)	
SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]	1,890
6. Level of Service (LOS)	E

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

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

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