Faria/Southwest Hills Annexation Project

SCH#2017032027

Partially Recirculated Draft Environmental Impact Report

Prepared for
The City of Pittsburg

October 2019

Prepared by

RANEY PLANNING & MANAGEMENT, INC. 20 years
1501 Sports Drive, Suite A, Sacramento, CA 95834

Partially Recirculated Draft Environmental Impact Report
Faria/Southwest Hills Annexation Project

SCH# 2017032027

Lead Agency:

City of Pittsburg
65 Civic Avenue
Pittsburg, CA 94565

Prepared By:

Raney Planning and Management, Inc.
1501 Sports Drive, Suite A
Sacramento, CA 95834
(916) 372-6100

Contact:
Cindy Gnos, AICP
Senior Vice President

Rod Stinson
Division Manager / Air Quality Specialist

October 2019

TABLE OF CONTENTS

TABLE OF CONTENTS

CHAPTER **PAGE**

1. INTRODUCTION TO THE PARTIALLY RECIRCULATED DRAFT EIR 1-1

4. EXISTING ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

4.12 RECIRCULATED TRANSPORTATION, TRAFFIC, AND CIRCULATION CHAPTER 4.12-1

4.12.1 Introduction 4.12-1
4.12.2 Existing Environmental Setting 4.12-1
4.12.3 Regulatory Context 4.12-29
4.12.4 Impacts and Mitigation Measures 4.12-36

APPENDIX

Appendix A: Traffic Impact Study – Kimley-Horn and Associates, Inc

LIST OF FIGURES

FIGURE **PAGE**

4.12. RECIRCULATED TRANSPORTATION, TRAFFIC, AND CIRCULATION CHAPTER

4.12-1 Study Intersections 4.12-7
4.12-2 Existing Bicycle Network 4.12-26
4.12-3 Project Trip Distribution 4.12-43

LIST OF TABLES

TABLE **PAGE**

4.12. RECIRCULATED TRANSPORTATION, TRAFFIC, AND CIRCULATION CHAPTER

4.12-1 Intersection LOS Definitions 4.12-11
4.12-2 Freeway and Ramp LOS Definitions 4.12-12
4.12-3 Intersection LOS – Existing Conditions 4.12-13
4.12-4 Freeway Segment LOS – Existing Conditions 4.12-17
4.12-5 Freeway Ramp LOS – Existing Conditions 4.12-21
4.12-6 East County MTSOs 4.12-21
4.12-7 Central County MTSOs 4.12-22
4.12-8 Delay Index Summary – Existing Conditions 4.12-22
4.12-9 MTSO Summary – Existing Conditions 4.12-23
4.12-10 HOV Lane Summary – SR 4 – Existing Conditions 4.12-24
4.12-11 Project Trip Generation 4.12-41
4.12-12 Intersection LOS – Existing Plus Project Conditions 4.12-48
4.12-13 Intersection LOS – Existing Plus Project Conditions with Mitigation 4.12-57
4.12-14 HOV Lane Summary – SR 4 – Existing Plus Project Conditions 4.12-67
4.12-15 Delay Index Summary – Existing Plus Project Conditions 4.12-68
4.12-16 MTSO Summary – Existing Plus Project Conditions 4.12-69
4.12-17 Freeway Segment LOS – Existing Plus Project Conditions 4.12-74
4.12-18 Freeway Ramp LOS – Existing Plus Project Conditions 4.12-77
4.12-19 Intersection LOS – Long-Term (2035) Plus Project Conditions 4.12-81
4.12-20 Intersection LOS – Long-Term (2035) Plus Project Conditions with Mitigation 4.12-84
4.12-21 Delay Index Summary – Long-Term (2035) Plus Project Conditions 4.12-99
4.12-22 MTSO Summary – Long-Term (2035) Plus Project Conditions 4.12-101
4.12-23 HOV Lane Summary – SR 4 – Long-Term (2035) Plus Project Conditions 4.12-102
4.12-24 Freeway Segment LOS – Long-Term (2035) Plus Project Conditions 4.12-106
4.12-25 Freeway Ramp LOS – Long-Term (2035) Plus Project Conditions 4.12-110

1. INTRODUCTION TO THE PARTIALLY RECIRCULATED DRAFT EIR

1 INTRODUCTION TO THE PARTIALLY RECIRCULATED DRAFT EIR

INTRODUCTION

This Partially Recirculated Draft Environmental Impact Report (EIR) is prepared to provide further environmental impact review for the proposed Faria/Southwest Hills Annexation Project (proposed project). As discussed in the "Background" section below, an EIR was previously circulated for this project.

Based on comments received regarding the Draft EIR, the City determined that recirculation of Chapter 4.12 of the Draft EIR, pertaining to Transportation, Traffic, and Circulation was necessary to comply with CEQA Guidelines Section 15088.5. Revisions to the Transportation, Traffic, and Circulation chapter include a change to conclusions and, thus, meet the criteria for CEQA Guidelines Section 15088.5.

PROJECT DESCRIPTION

The project description for the proposed project is unchanged from 2018 Draft EIR (see Draft EIR Chapter 3 – Project Description).

BACKGROUND

The City's Evaluation of the Project

The EIR process began with the decision by the lead agency in 2010 to prepare an Initial Study/Mitigated Negative Declaration for the proposed project, which was released for public review. Extensive comments were received by the City, requesting further analysis in an EIR. The City determined that an EIR should be prepared and, thus, a subsequent Initial Study was prepared to focus the EIR, which was released with the Notice of Preparation (NOP) on March 10, 2014 for a 30-day review. During the NOP review period, 13 written comments were received regarding the scope of the EIR. In addition, a public scoping meeting was held on April 3, 2014 to receive verbal comments.

Following the initial public review period and scoping meeting, refinements were made to the proposed project that altered the scope of the EIR. Such refinements included the preparation of a Draft Master Plan and an associated Land Use Map. The purpose of the Draft Master Plan is to define the potential development of the 606-acre project site as part of the request for annexation and prezoning of the site. Consequently, the City determined that preparation of a new NOP was necessary in order to address changes made to the project and how such changes would be reflected in the EIR. A second NOP for the Draft EIR was released for a 30-day review period from March 9, 2017 to April 8, 2017. The City held a public scoping meeting on April 4, 2017 to receive public comments regarding the scope of the Draft EIR.

The City prepared and released the Draft EIR on October 10, 2018 for a 45-day public review period to present the proposed project to the public, answer questions about the proposed project, and to receive public comments on the Draft EIR. The 45-day public review period ended on November 30, 2018. As required by CEQA Guidelines Section 15087, a Notice of Availability (NOA) of the Draft EIR was distributed on October 10, 2018 to the applicable public agencies and interested individuals, and the Draft EIR was made available for public review. Copies of the document were made available at the City of Pittsburg Planning Department located at 65 Civic Avenue in Pittsburg, California, the Pittsburg Library located at 80 Power Avenue in Pittsburg, and on the City's website at http://www.ci.pittsburg.ca.us.

The Draft EIR contained the following technical chapters:

- Chapter 4.1, Aesthetics;
- Chapter 4.2, Agricultural Resources
- Chapter 4.3, Air Quality and Greenhouse Gas Emissions;
- Chapter 4.4, Biological Resources;
- Chapter 4.5, Cultural and Tribal Resources;
- Chapter 4.6, Geology, Soils, and Seismicity;
- Chapter 4.7, Hazards and Hazardous Materials;
- Chapter 4.8, Hydrology and Water Quality;
- Chapter 4.9, Land Use and Planning;
- Chapter 4.10, Noise;
- Chapter 4.11, Public Services and Utilities; and
- Chapter 4.12, Transportation, Traffic, and Circulation.

The Draft EIR also addressed alternatives to the proposed project and the proposed project's growth-inducing effects.

The City received both oral and written comments on the Draft EIR during the 45-day public review period, including during the public workshop held on November 15, 2018 to solicit public comments regarding the Draft EIR. Based on comments pertaining to the adequacy of the Draft EIR related to transportation, the City determined that recirculation of Chapter 4.12 was required.

Purpose of this Partially Recirculated EIR

This Partially Recirculated Draft EIR was prepared to comply with CEQA guidelines. Pursuant to CEQA Guidelines Section 15088.5, the City determined that recirculation of the EIR is necessary based on comments received; however, only the Transportation, Traffic, and Circulation chapter will be recirculated per CEQA Guidelines Section 15088.5(c). This Partially Recirculated DEIR is being circulated for a 45-day review period, consistent with the time periods set forth in the CEQA Guidelines. The 2018 Draft EIR is available online at the City's website (www.ci.pittsburg.ca.us) and in hard copy at the City Planning Department and the Pittsburg Library for background reference.

Upon completion of the 45-day public review period, the City will consider all comments received on the Partially Recirculated Draft EIR, respond to those comments, and identify any associated text changes that should be made in response to those comments. A Final EIR, including responses to comments on the 2018 Draft EIR and this Partially Recirculated Draft EIR, will then be prepared.

A Planning Commission hearing will then be held to decide to recommend to City Council whether to certify and approve the entire EIR (including the recirculated portion) for the proposed project. The Planning Commission recommendations will be presented to the City Council to aid in the Council's decision. The EIR for the Planning Commission's consideration of the proposed project will consist of the previously circulated EIR, plus the Partially Recirculated Draft EIR and the Final EIR.

Scope of the Partially Recirculated EIR and Scope of Comments

CEQA permits a lead agency to recirculate all or a portion of an EIR: "If the revision is limited to a few chapters or portions of the EIR, the lead agency need only recirculate the chapters or portions that have been modified" (CEQA Guidelines Section 15088.5(c)). Based on the comments received on the Draft EIR, which related the Transportation, Traffic, and Circulation Chapter of the EIR, the City of Pittsburg has exercised its discretion as lead agency to recirculate only the Transportation, Traffic and Circulation chapter for public review and comments.

Recirculation of an EIR, or a portion of an EIR as is the case here, requires public notice and a public review period pursuant to CEQA Guidelines Section 15087, and consultation with other agencies pursuant to Section 15086 (CEQA Guidelines Section 15088.5(d)).

The CEQA Guidelines specify that, when a portion of an EIR is being recirculated, the lead agency may request that reviewers limit their comments to the revised parts of the EIR that have been recirculated. Also, the CEQA Guidelines specify that the lead agency is not required to respond to comments on the recirculated EIR that do not relate to the portions of the EIR that have been revised and recirculated. CEQA Guidelines Section 15088.5(f)(2), provides:

> When the EIR is revised only in part and the lead agency is re-circulating only the revised chapters or portions of the EIR, the lead agency may request that reviewers limit their comments to the revised chapters or portions of the re-circulated EIR. The lead agency need only respond to (i) comments received during the initial circulation period that relate to chapters or portions of the document that were not revised and re-circulated, and (ii) comments received during the recirculation period that relate to the chapters or portions of the earlier EIR that were revised and re-circulated. The lead agency's request that reviewers limit the scope of their comments shall be included either within the text of the revised EIR or by an attachment to the revised EIR.

Pursuant to this provision, the City of Pittsburg requests that public comments be limited to the newly-circulated information contained in this document related to Transportation, Traffic, and Circulation.

CEQA does not require the City to respond to any new comments that are directed to the portions of the Draft EIR that were not revised and are not being recirculated in this document. The Final EIR for the proposed project will contain detailed responses to the 2018 Draft EIR, as well as all comments made on this Partially Recirculated Draft EIR that are properly limited to the appropriate subjects within the Recirculated Transportation, Traffic, and Circulation chapter. It should be noted that comments related to the previous Transportation, Traffic, and Circulation chapter will be addressed in the Recirculated chapter. Similar comments that still pertain to the Recirculated chapter must be submitted again to the City in order to be recognized.

ORGANIZATION OF THE PARTIALLY RECIRCULATED DRAFT EIR

This Partially Recirculated Draft EIR is organized as follows:

Chapter 1 – Introduction to the Partially Recirculated Draft EIR
Provides an introduction, background, and describes the layout and intended use of the Partially Recirculated Draft EIR and the review process.

Chapter 4.12 – Recirculated Transportation, Traffic, and Circulation Chapter
Contains a revised project-level and cumulative analysis of Transportation, Traffic, and Circulation issue areas associated with the proposed project. The chapter contains Introduction, Environmental Setting, Regulatory Context, and Impacts and Mitigation Measures sections. Revisions are presented as new text double underlined and deleted text as ~~struck-through~~. Where an entire Figure or Table has been revised, the Figure or Table title will be shown as double underlined. Where only portions of a figure or table have been revised, new text will be shown as double underlined and deleted text as ~~struck through.~~

Appendix
Appendix A includes the revised traffic study produced by Kimley-Horn and Associates, Inc.

4. EXISTING ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

4.12 RECIRCULATED TRANSPORTATION AND CIRCULATION CHAPTER

4.12 RECIRCULATED TRANSPORTATION, TRAFFIC, AND CIRCULATION CHAPTER

4.12.1 INTRODUCTION

The Transportation, Traffic, and Circulation chapter of the EIR addresses the existing and cumulative transportation and circulation conditions associated with the development of the proposed project. The analysis includes consideration of proposed project impacts on roadway capacity, transit impacts, bicycle impacts, and pedestrian impacts. The information contained within this chapter is based on the Traffic Impact Study (TIS) prepared for the proposed project by Kimley-Horn and Associates, Inc ~~(Appendix N)~~[1](Appendix A of the recirculated Draft EIR)[1] All technical calculations are included as an appendix to the TIS.

4.12.2 EXISTING ENVIRONMENTAL SETTING

The section below describes the transportation, traffic, and circulation study area and the physical and operational characteristics of the existing transportation system within the study area, including the surrounding roadway network, transit, bicycle and pedestrian facilities. In addition, a summary of existing funding mechanisms is provided.

Roadway Network

The principal roadways in the project vicinity include:

- State Route (SR) 4 – SR 4 is the primary east-west corridor in Contra Costa County (CCC). SR 4 connects Interstate (I) 80 in the west to the SR 4 Bypass in the east. SR 4 provides access to multiple freeways within the Bay Area, including I 80, I 680, SR 242, and SR 160. Within the study area, SR 4 is two lanes in each direction between I 680 and SR 242, and three to five lanes in each direction between SR 242 and Railroad Avenue. In addition, a high occupancy vehicle (HOV) lane exists in the peak direction only during the peak hour (i.e., from 5:00 to 9:00 AM in the westbound direction and 3:00 to 7:00 PM in the eastbound direction) from west of Port Chicago Highway to the eastern study limit near Railroad Avenue. Ramp metering is active during the peak hours in the peak directions for on-ramps on this study corridor. The speed limit on SR 4 is 65 miles per hour (mph).

- Alves Ranch Road – Alves Ranch Road is a two-lane local street with turn lanes serving residential areas south of W. Leland Road. The posted speed limit is 25 mph. It should be noted that Alves Ranch Road does not currently extend north of W. Leland Road, but is expected to in the future.

[1] Kimley Horn. *Traffic Impact Study, Faria Annexation Pittsburg, CA.* August 2019.

- Avila Road – Avila Road is a two-lane collector roadway without medians or turn lanes, and is a parallel arterial to SR 4. Avila Road serves industrial areas and provides access to Willow Pass Road. The posted speed limit is 40 mph. It should be noted that, in the future, Avila Road will be realigned and extended to connect to W. Leland Road.

- Babel Lane – Babel Lane is a two-lane roadway serving residential areas south of Clayton Road. The posted speed limit is 35 mph.

- Bailey Road – Bailey Road is a two- to four-lane major arterial roadway within the City of Pittsburg. Bailey Road has turn lanes and a raised median providing access to residential and commercial land uses. Further south in Concord, Bailey Road is a two-lane roadway between Clayton Road and Myrtle Drive. Bailey Road runs north-south within the project study area in Pittsburg from Willow Pass Road in the north to W. Leland Road in the south. Bailey Road runs northeast-southwest within the project study area in Concord from Myrtle Drive in the north to Clayton Road in the south. The posted speed limit is 30 to 35 mph along Bailey Road within the study area. Bailey Road would provide access to the project site at the southern portion of the site.

- Burton Avenue – Burton Avenue is a two-lane local street serving residential areas north and south of W. Leland Road. In addition, Burton Avenue provides access to Los Medanos Elementary School west of Burton Avenue. The posted speed limit is 25 mph.

- Canal Road – Canal Road is a two-lane roadway serving commercial areas and a church. To the west of Bailey Road, Canal Road turns into Alves Lane, and to the east of Bailey Road, Canal Road turns into Shooner Way. The posted speed limit is 35 mph.

- Chestnut Drive – Chestnut Drive is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

- Clayton Road – Clayton Road is a six-lane roadway with turn lanes and a raised median serving residential and commercial areas. To the west of Babel Lane, Clayton Road becomes two lanes in each direction with a two-way left turn lane (TWLTL). Clayton Road provides access to downtown Concord in the west and Ygnacio Valley Road in the east. The posted speed limit is 40 mph within the study area.

- Crestview Drive – Crestview Drive is a roadway with one lane in each direction and a TWLTL. Turn lanes exist at segments where a TWLT is lacking. Crestview Drive serves residential areas north and south of W. Leland Road. The posted speed limit is 30 mph.

- Concord Boulevard – Concord Boulevard is a two-lane roadway with turn lanes near Farm Bureau Road and a four-lane roadway with turn lanes near Bailey Road. Concord Boulevard provides access to residential land uses, Concord High School, and El Dorado Middle School between Farm Bureau Road and Bailey Road. To the west, Concord Boulevard provides access to downtown Concord. The posted speed limit is 35 mph along Concord Boulevard near Farm Bureau Road and Bailey Road.

- Cowell Road – Cowell Road is a four-lane roadway south of Treat Boulevard and a two-lane roadway north of Treat Boulevard near the study area. Cowell Road provides access to downtown Concord to the west and Ygnacio Valley Road to the east. The posted speed limit is 35 mph near the study area.

- Diamond Boulevard – Diamond Boulevard is a five-lane roadway with turn lanes and a raised median. Diamond Boulevard serves commercial uses to the north and south of Willow Pass Road.

- Dover Way – Dover Way is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

- Evora Road – Evora Road is a three-lane roadway with a TWLTL within the study area. Evora Road provides access to residential land uses north of SR 4 and west of Willow Pass Road. Evora Road also serves as a parallel roadway to SR 4 for commuters avoiding congestion on SR 4. The posted speed limit is 45 mph near the study area.

- Farm Bureau Road – Farm Bureau Road is a two-lane roadway serving residential areas within the study area. Farm Bureau Road becomes Olivera Road north of Willow Pass Road. The posted speed limit is 30 mph.

- Galindo Street – Galindo Street is a six-lane roadway serving residential areas within the study area. Galindo Street has turn lanes throughout and a raised median south of Oak Street. Galindo Street becomes Concord Avenue north of Salvio Street and becomes Monument Boulevard south of Cowell Road. The posted speed limit varies from 30 to 35 mph.

- Jacqueline Drive – Jacqueline Drive is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

- Kirker Pass Road – Kirker Pass Road is a six-lane roadway with turn lanes and a raised median serving residential and commercial uses from Clayton Road to Clearbrook Drive. It is a four-lane roadway without turn lanes or a median north of Clearbrook Drive. Kirker Pass Road turns into Ygnacio Valley Road south of Clayton Road, and to into Railroad Avenue north of Buchanan Road. The posted speed limit varies from 45 to 55 mph.

- West Leland Road – W. Leland Road is a four-lane major arterial roadway with turn lanes and a raised median from San Marco Boulevard to Woodhill Drive. East of Woodhill Drive, W. Leland Road is a four-lane major arterial roadway with turn lanes between Woodhill Drive and Railroad Avenue. The aforementioned segment does not include a raised median. W. Leland Road runs east-west within the study area and provides access to residential land uses. W. Leland Road is parallel to SR 4 on the south side and can provide an alternate route for commuters when SR 4 is congested. The posted speed limit is 35 to 45 mph on W. Leland Road within the study area.

- Loftus Road – Loftus Road is a two-lane local street serving residential areas south of Willow Pass Road. The posted speed limit is 25 mph.

- Market Street – Market Street is a four-lane roadway with a TWLTL north of Willow Pass Road. South of Willow Pass Road, Market Street is a two-lane roadway and turns into Meadow Lane. Market Street runs parallel to SR-242 within the study area and provides access to commercial uses. The posted speed limit is 35 mph.

- Maylard Street – Maylard Street is a two-lane local street off of Bailey Road. The Oak Hills Center is on the west side of the intersection of Maylard Street and Bailey Road. The posted speed limit is 25 mph.

- Montevideo Drive – Montevideo Drive is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

- Myrtle Drive – Myrtle Drive is a two-lane roadway serving residential areas between Bailey Road and Kirker Pass Road. Myrtle Road provides access to Ayers Elementary School. The posted speed limit is 25 mph near Bailey Road.

- Olivera Road – Olivera Road is a two-lane roadway with in the study area, serving Willow Pass Community Park and residential areas north of Willow Pass Road. Further to the northwest, Olivera Road connects to SR-242 and SR-4. Olivera Road becomes Farm Bureau Road south of Willow Pass Road. The posted speed limit is 35 mph near Willow Pass Road.

- Port Chicago Highway – Port Chicago Highway is a minor arterial roadway with two lanes in the southbound direction and one lane in the northbound direction near the study area at Willow Pass Road. Port Chicago Highway runs north-south near Willow Pass Road, providing access to residential areas. The posted speed limit is 35 mph in the study area.

- Railroad Avenue – Railroad Avenue is a four-lane major arterial roadway with turn lanes and a raised median serving commercial land uses. Railroad Avenue becomes a two-lane roadway north of East 10th Street. Railroad Avenue runs north-south within the study area and provides access to downtown Pittsburg in the north and becomes Kirker Pass Road in the south. The posted speed limit is 35 mph within the study area.

- Range Road – Range Road is a two-lane roadway that is separated by SR-4. North of SR-4, Range Road provides access to residential areas and becomes Willow Pass Road near Parkside Drive. South of SR-4, Range Road is four-lane roadway near W. Leland Road. Range Road provides access to Rancho Medanos Junior High School. The posted speed limit is 35 mph near Willow Pass Road and 35 mph near W. Leland Road.

- Rio Verde Circle – Rio Verde Circle is a two-lane local street serving residential areas off of San Marco Boulevard. Rio Verde Circle also provides access to Delta View Elementary School. The posted speed limit is 25 mph.

- San Marco Boulevard – San Marco Boulevard is a four-lane major arterial roadway with turn lanes and a raised median serving residential areas. San Marco Boulevard does not include shoulders. San Marco Boulevard runs north-south, providing access to SR 4 in the north. San Marco Boulevard becomes Willow Pass Road north of SR 4. The posted speed limit is 40 mph. San Marco Boulevard would be extended and provide access to the proposed project.

- Santa Teresa Drive – Santa Teresa Drive is a two-lane local collector street with turn lanes and a raised median serving residential areas to the west of San Marco Boulevard. To the east of San Marco Boulevard, Santa Teresa Drive is a two-lane local street without turn lanes or raised medians. The posted speed limit is 25 mph east of San Marco Boulevard and 30 mph west of San Marco Boulevard.

- Southwood Drive – Southwood Drive is a two-lane local street serving residential areas south of W. Leland Road. The posted speed limit is 25 mph.

- Treat Boulevard – Treat Boulevard is a four-lane roadway with turn lanes and a raised median serving residential and commercial areas. Treat Boulevard provides access to De La Salle High School, downtown Concord, and I 680 in the west. The posted speed limit is 40 mph within the study area.

- Willow Pass Road – Willow Pass Road is separated into two different segments: south of SR 4 and north of SR 4. The portion of Willow Pass Road south of SR 4 is a four-lane roadway within the study area between Avila Road and SR 4 ramps. South of Avila Road, Willow Pass Road becomes a two lane roadway until the City of Concord city limits, where the road opens up to two lanes in each direction again. Willow Pass Road provides access to SR 4 in the north and the City of Concord and SR 242 in the south. The posted speed limit is 55 mph near SR 4 and 35 mph near Farm Bureau Road.

  The portion of Willow Pass Road north of SR 4 is a six-lane roadway within the study area between the SR 4 ramps and Port Chicago Highway. Willow Pass Road becomes two lanes in each direction with a center TWLTL between Port Chicago Highway and Bailey Road. Willow Pass Road becomes one lane in each direction with a TWLTL between Bailey Road and Range Road. Willow Pass Road provides access to SR 4 in the west and Railroad Avenue in the east, where the road becomes Parkside Drive. The posted speed limit is 40 mph between SR 4 and Port Chicago Highway, 35 mph between Port Chicago Highway and Bailey Road, and 30 to 35 mph between Bailey Road and Range Road.

- Woodhill Drive – Woodhill Drive is a two-lane local street serving residential areas south of W. Leland Road. The posted speed limit is 25 mph.

- Ygnacio Valley Road – Ygnacio Valley Road is a six-lane roadway with turn lanes and a raised median within out study area. It is a four-lane roadway without turn lanes or a raised median south of Michigan Boulevard. To the north of Clayton Road, Ygnacio Valley Road becomes Kirker Pass Road. The posted speed limit is 45 mph.

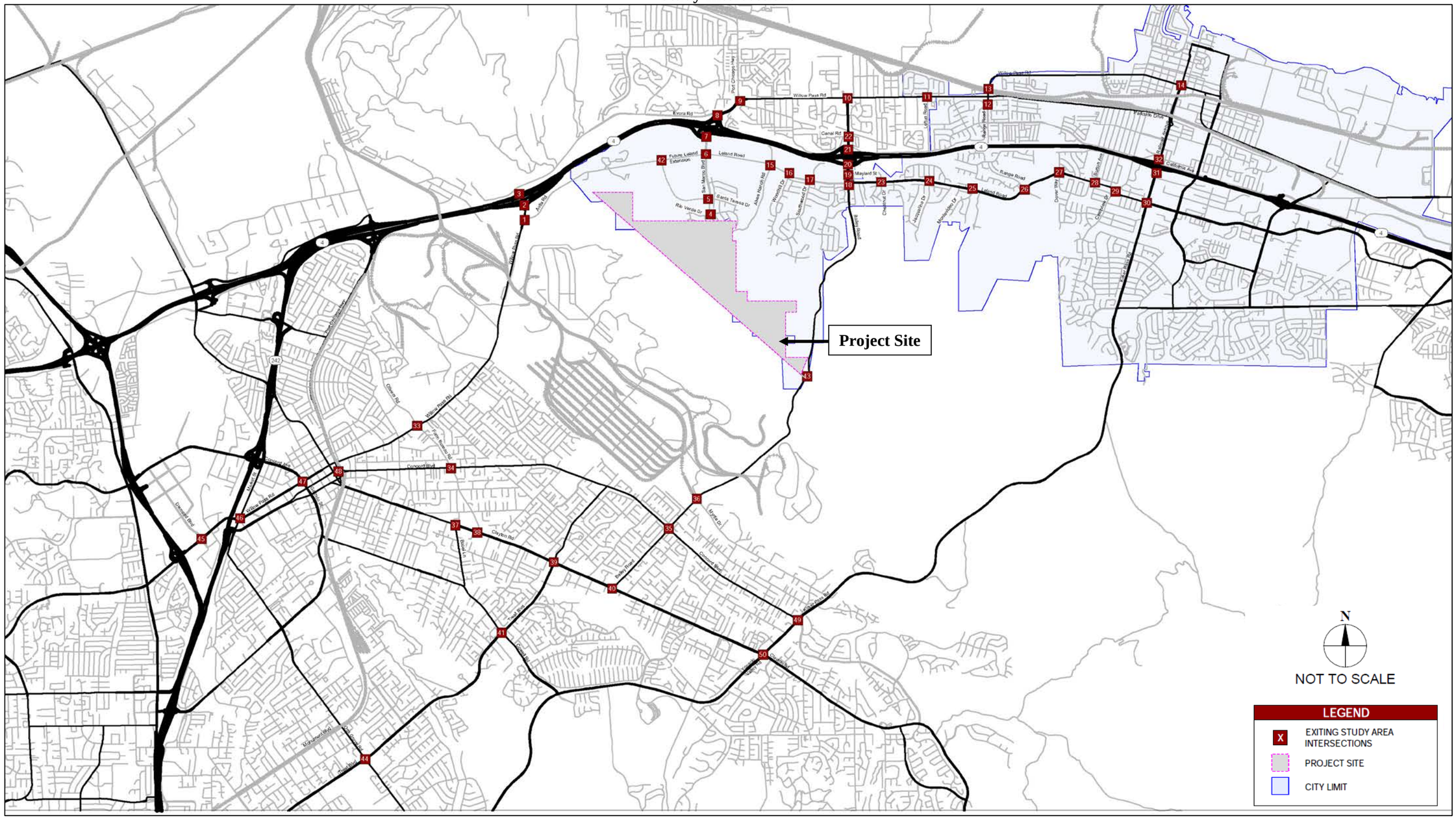
Additional roadway descriptions can be found in the TIS.

Study Intersections

Based on the project's trip generation and the potential for traffic impacts, the following 50 intersections were selected to be included in the study area (see Figure 4.12-1):

1. Avila Road/Willow Pass Road;
2. Eastbound (EB) SR 4 Ramps/Willow Pass Road;
3. Westbound (WB) SR 4 Ramps/Willow Pass Road;
4. Rio Verde Circle/San Marco Boulevard;
5. Santa Teresa Drive/San Marco Boulevard;
6. W. Leland Road/San Marco Boulevard;
7. EB SR 4 Ramps/San Marco Boulevard;
8. WB SR 4 Ramp/San Marco Boulevard;
9. Willow Pass Road/Port Chicago Highway;
10. Willow Pass Road/Bailey Road;
11. Willow Pass Road/Loftus Road;
12. EB Willow Pass Road/Range Road;
13. WB Willow Pass Road/Range Road;
14. Willow Pass Road/Railroad Avenue;
15. W. Leland Road/Alves Ranch Road;
16. W. Leland Road/Woodhill Drive;
17. W. Leland Road/Southwood Drive;
18. W. Leland Road/Bailey Road;
19. Maylard Street/Bailey Road;
20. EB SR 4 Ramps/Bailey Road;
21. WB SR 4 Ramp/Bailey Road;
22. Canal Road/Bailey Road;
23. W. Leland Road/Chestnut Drive;
24. W. Leland Road/Jacqueline Drive;
25. W. Leland Road/Montevideo Drive;
26. W. Leland Road/Range Road;
27. W. Leland Road/Dover Way;
28. W. Leland Road/Burton Avenue;
29. W. Leland Road/Crestview Drive;
30. W. Leland Road/Railroad Avenue;
31. EB SR 4 Ramps/Railroad Avenue;
32. WB SR 4 Ramp/Railroad Avenue;
33. Willow Pass Road/Olivera Road;
34. Concord Boulevard/Farm Bureau Road;
35. Concord Boulevard/Bailey Road;
36. Bailey Road/Myrtle Drive;
37. Clayton Road/Babel Lane;
38. Clayton Road/Farm Bureau Road;
39. Clayton Road/Treat Boulevard;

Figure 4.12-1
Study Intersections



Source: Kimley-Horn and Associates, Inc., 2017.

40. Clayton Road/Bailey Road;
41. Cowell Road/Treat Boulevard;
42. W. Leland Road/Santa Teresa Drive (future intersection);
43. Bailey Road/Project Entrance (future intersection);
44. Treat Boulevard/Oak Grove Road;
45. Willow Pass Road/Diamond Boulevard;
46. Willow Pass Road/Market Street;
47. Willow Pass Road/Galindo Street;
48. Concord Boulevard/Port Chicago Highway;
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard; and
50. Ygnacio Valley Road/Clayton Road.

Study Freeway Segments

Based on the project's trip generation and the potential for traffic impacts, the following ~~24~~51 freeway segments were selected to be included in the study area:

Northbound

~~1. SR 242 between I 680 and Clayton Road;~~
~~2. SR 242 between Clayton Road and Concord Avenue;~~
~~3. SR 242 between Concord Avenue and Grant Street;~~
~~4. SR 242 between Grant Street and Olivera Road; and~~
~~5. SR 242 between Olivera Road and SR 4.~~

1. SR-242 between I-680 and Clayton Road off-ramp;
2. SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp;
3. SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-ramp;
4. SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp;
5. SR-242 between Grant Street off-ramp and Grant Street on-ramp;
6. SR-242 between Grant Street on-ramp and Olivera Road off-ramp; and
7. SR-242 between Olivera Road off-ramp and SR-4 off-ramp.

Southbound

~~6. SR 242 between SR 4 and Olivera Road;~~
~~7. SR 242 between Olivera Road and Grant Street;~~
~~8. SR 242 between Grant Street and Concord Avenue;~~
~~9. SR 242 between Concord Avenue and Clayton Road; and~~
~~10. SR 242 between Clayton Road and I 680.~~

8. SR-242 between SR-4 on-ramp and Olivera Road on-ramp;
9. SR-242 between Olivera Road on-ramp and Solano Way off-ramp;
10. SR-242 between Solano Way off-ramp and Solano Way on-ramp;
11. SR-242 between Solano Way on-ramp and Concord Avenue off-ramp;
12. SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp;

13. SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp; and
14. SR-242 between Clayton Road on-ramp and I-680.

Eastbound

~~11. SR-4 between I-680 and Solano Way;~~
~~12. SR-4 between Solano Way and SR-242;~~
~~13. SR-4 between SR-242 and Port Chicago Highway;~~
~~14. SR-4 between Port Chicago Highway and Willow Pass Road;~~
~~15. SR-4 between Willow Pass Road and San Marco Boulevard;~~
~~16. SR-4 between San Marco Boulevard and Bailey Road; and~~
~~17. SR-4 between Bailey Road and Railroad Avenue.~~

15. SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp;
16. SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp;
17. SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp;
18. SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp;
19. SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp;
20. SR-4 between SR-242 on-ramp and HOV Lane Begins;
21. SR-4 between HOV Lane Begins and Lane Drop;
22. SR-4 between Lane Drop and Port Chicago Highway on-ramp;
23. SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp;
24. SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp;
25. SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp;
26. SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp;
27. SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp;
28. SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane;
29. SR-4 between Add Lane and Bailey Road Diagonal off-ramp;
30. SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp;
31. SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp;
32. SR-4 between Bailey Road Diagonal on-ramp and Add Lane; and
33. SR-4 between Add Lane and Railroad Avenue off-ramp.

Westbound

~~18. SR-4 between Railroad Avenue and Bailey Road;~~
~~19. SR-4 between Bailey Road and San Marco Boulevard;~~
~~20. SR-4 between San Marco Boulevard and Willow Pass Road;~~
~~21. SR-4 between Willow Pass Road and Port Chicago Highway;~~
~~22. SR-4 between Port Chicago Highway and SR-242;~~
~~23. SR-4 between SR-242 and Solano Way; and~~
~~24. SR-4 between Solano Way and I-680.~~

34. SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp;
35. SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp;
36. SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp;

37. SR-4 between Bailey Road on-ramp and Lane Drop;
38. SR-4 between Lane Drop and San Marco Boulevard off-ramp;
39. SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp;
40. SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp;
41. SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp;
42. SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp;
43. SR-4 between Willow Pass Road on-ramp and HOV Lane Add;
44. SR-4 between HOV Lane Add and Add Lane;
45. SR-4 between Add Lane and Port Chicago Highway off-ramp;
46. SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp;
47. SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp;
48. SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp;
49. SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp;
50. SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp; and
51. SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp.

Study Freeway Ramps

Based on the project's trip generation and the potential for traffic impacts, the following 16 freeway ramps were selected to be included in the study area:

Eastbound SR 4

1. Willow Pass Road Off-ramp;
2. Willow Pass Road On-ramp;
3. San Marco Boulevard Off-ramp;
4. SB San Marco Boulevard Loop On-ramp;
5. NB San Marco Boulevard Diagonal On-ramp;
6. SB Bailey Road Diagonal Off-ramp;
7. NB Bailey Road Loop Off-ramp; and
8. Bailey Road On-ramp.

Westbound SR4

9. NB Bailey Road Diagonal Off-ramp;
10. SB Bailey Road Loop Off-ramp;
11. Bailey Road On-ramp;
12. San Marco Boulevard Off-ramp;
13. NB San Marco Boulevard Loop On-ramp;
14. SB San Marco Boulevard Diagonal On-ramp;
15. Willow Pass Road Off-ramp; and
16. Willow Pass Road On-ramp.

Common Traffic Analysis Terms

Level of service (LOS) is a qualitative measure of traffic operating conditions, whereby a letter grade, from A to F is assigned, based on quantitative measurements of delay per vehicle. The grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions, and LOS F represents severe delay under stop-and-go conditions.

Levels of Service

Table 4.12-1 summarizes the relationship between delay and LOS for signalized and unsignalized intersections. The delay ranges for unsignalized intersections are lower than for signalized intersections as drivers expect less delay at unsignalized intersections.

Table 4.12-1
Intersection LOS Definitions

LOS	Description of Operations	Signalized Average Control Delay per Vehicle (in seconds)	Unsignalized Average Control Delay per Vehicle (in seconds)
A	Free flow without delays. Users are virtually unaffected by others in the traffic stream.	≤ 10	≤ 10
B	Stable Traffic. Traffic flows smoothly with few delays.	> 10 to 20	> 10 to 15
C	Stable flow, but the operation of individual users becomes affected by other vehicles. Modest delays occur.	> 20 to 35	> 15 to 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other users. Delays may be more than one cycle during peak hours.	> 35 to 55	> 25 to 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing occurs.	> 55 to 80	> 35 to 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing occurs.	> 80	> 50

Source: Kimley-Horn and Associates, Inc., 2017.

Table 4.12-2 relates the operational characteristics associated with each LOS category for freeway segments and ramps.

Central and East County Routes of Regional Significance

The Contra Costa Transportation Authority (CCTA) and the Regional Transportation Planning Committees following the CCTA have set various standards on specific roadways, called Multi-Modal Transportation Service Objectives (MTSOs). The MTSOs are specific to each region and regulate the Routes of Regional Significance.

The study area incorporates facilities in the Central and East County. Bailey Road, Leland Road, Railroad Avenue, and Willow Pass Road are all Routes of Regional Significance in East County. In Central County, SR 242 is a route of regional significance. SR 4 is a route of regional significance in both Central and East County.

Table 4.12-2
Freeway and Ramp LOS Definitions

LOS	Description of Operations	Freeway Segment Density (pcpmpl)	Freeway Ramp Density (pcpmpl)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream.	≤ 11	≤ 10
B	Stable traffic. Traffic slows smoothly with few delays.	11 to 18	10 to 20
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	18 to 26	20 to 28
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles.	26 to 35	28 to 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	35 to 45	35
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	> 45	Demand exceeds capacity

Note: pcpmpl = passenger cars per mile per lane

Source: Kimley-Horn and Associates, Inc., 2017.

Existing Intersection Conditions

The primary basis of the analysis is the peak hour LOS for the key intersections. The hours identified as the "peak" hours are generally between 7:00 AM and 9:00 AM and 4:00 PM and 6:00 PM for all of the transportation facilities described. Throughout this chapter, the peak hours are identified as the AM and PM peak hours, respectively. The City of Pittsburg's General Plan identifies the following LOS Standards for the City's Planning Area:[2]

- Major arterials are to operate at LOS D or better;
- Intersections on Bailey Road between W. Leland Road and State Route 4 are to operate at LOS E or better; and
- Unsignalized intersections to operate at LOS E or better.

For roadways in the City of Concord, the intersections and roadway segments are to operate at LOS D or better, as specified in the City of Concord General Plan. However, in the Downtown area (as generally defined by Port Chicago Highway to the east, Mt. Diablo High School to the north, Cowell Road to the south, and Market Street to the west), and along the City's transit routes,

[2] City of Pittsburg. *General Plan Pittsburg 2020: A Vision for the 21st Century* [pg. 7-7]. Adopted November 16, 2001.

LOS E is acceptable. Table 4.12-3 shows the existing delay and LOS at the study intersections for weekday peak hour conditions.

Table 4.12-3
Intersection LOS – Existing Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
1. Avila Road/Willow Pass Road	SSSC	~~E~~D	A	0.1	0.37	A	0.5	0.47
Worst Approach			*B*	*10.5*	*0.03*	*C*	*23.8*	*0.13*
2. EB SR 4 Ramps/Willow Pass Road	AWSC	E	~~F~~E	~~**117.5**~~ 38.5		~~F~~E	~~**201.1**~~ 42.9	
3. WB SR 4 Ramps/Willow Pass Road	AWSC	E	**F**	**143.6**		C	19.2	
4. Rio Verde Circle/San Marco Boulevard	AWSC	E	B	11.9		A	8.2	
5. Santa Teresa Drive/San Marco Boulevard	AWSC	D	C	**28.3**		B	15.9	
6. W. Leland Road/San Marco Boulevard	Signal	D	~~D~~**F**	~~**39.7**~~ **245.0**		C	~~25.9~~ 32.3	
7. EB SR 4 Ramps/San Marco Boulevard	Signal	D	A	9.5		B	13.7	
8. WB SR 4 Ramp/San Marco Boulevard	Signal	D	~~C~~**E**	~~26.9~~ **168.2**		B	18.5	
9. Willow Pass Road/Port Chicago Highway	Signal	D	B	15.8		B	11.0	
10. Willow Pass Road/Bailey Road	Signal	D	C	27.9		D	39.8	
11. Willow Pass Road/Loftus Road	Signal	D	**F**	**107.2**		C	24.5	
12. EB Willow Pass Road/Range Road	SSSC	E	A	5.5		A	6.6	
Worst Approach			*B*	*11.1*		*B*	*11.5*	
13. WB Willow Pass Road/Range Road	SSSC	E	A	0.2		A	0.5	
Worst Approach			*A*	*0.8*		*A*	*0.8*	
14. Willow Pass Road/Railroad Avenue	Signal	D	C	23.1		C	20.6	
15. W. Leland Road/Alves Ranch Road	Signal	D	B	11.8		A	9.7	
16. W. Leland Road/Woodhill Drive	Signal	D	A	8.2		A	7.8	
17. W. Leland Road/Southwood Drive	Signal	D	B	18.4		C	21.2	
18. W. Leland Road/Bailey Road	Signal	E	**F**	**97.6**		D	52.3	
19. Maylard Street/Bailey Road	Signal	E	B	11.6		B	18.1	
20. EB SR 4 Ramps/Bailey Road	Signal	E	C	22.4		D	35.2	

(Continued on next page)

Table 4.12-3
Intersection LOS – Existing Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
21. WB SR 4 Ramp/Bailey Road	Signal	E	C	25.2		B	19.3	
22. Canal Road/Bailey Road	Signal	D	B	13.5		B	10.9	
23. W. Leland Road/Chestnut Drive	Signal	D	**F**	**112.9**		C	27.8	
24. W. Leland Road/Jacqueline Drive	Signal	D	**E**	**75.2**		C	34.2	
25. W. Leland Road/Montevideo Drive	Signal	D	A	6.4		A	6.5	
26. W. Leland Road/Range Road	Signal	D	C	31.8		D	46.2	
27. W. Leland Road/Dover Way	Signal	D	C	28.9		C	33.1	
28. W. Leland Road/Burton Avenue	Signal	D	B	16.9		C	30.9	
29. W. Leland Road/Crestview Drive	Signal	D	**F**	**111.8**		D	39.0	
30. W. Leland Road/Railroad Avenue	Signal	D	D	52.1		D	45.3	
31. EB SR 4 Ramps/Railroad Avenue	Signal	D	C	25.4		**E**	**63.1**	
32. WB SR 4 Ramp/Railroad Avenue	Signal	D	D	41.3		C	30.9	
33. Willow Pass Road/Olivera Road	Signal	~~D~~E	B	16.7	0.62	D	47.2	0.89
34. Concord Boulevard/Farm Bureau Road	Signal	D	C	25.4	0.73	C	26.5	0.74
35. Concord Boulevard/Bailey Road	Signal	D	**E**	**64.5**	**0.94**	**E**	**65.0**	**0.86**
36. Bailey Road/Myrtle Drive	SSSC	~~E~~D	A	5.0	0.24	A	1.9	0.43
Worst Approach			***F***	***62.2***	***0.57***	*C*	*19.8*	*0.30*
37. Clayton Road/Babel Lane	Signal	~~D~~E	C	25.4	0.74	C	30.9	0.78
38. Clayton Road/Farm Bureau Road	Signal	~~D~~E	C	24	0.77	B	16.0	0.60
39. Clayton Road/Treat Boulevard	Signal	~~D~~E	D	46	0.82	E	55.2	0.84
40. Clayton Road/Bailey Road	Signal	~~D~~E	C	32.4	0.77	C	32.5	0.66
41. Cowell Road/Treat Boulevard	Signal	D	**E**	**73.2**	**0.94**	**F**	**89.0**	**1.09**
42. W. Leland Road/Santa Teresa Drive	Signal	D	Future Intersection					
43. Bailey Road/Project Entrance	Signal	D	Future Intersection with Project					
44. Treat Boulevard/Oak Grove Road	Signal	~~D~~E	E	59.7	0.94	**F**	**93.5**	**0.97**

(Continued on next page)

Table 4.12-3
Intersection LOS – Existing Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	AM Peak Hour			PM Peak Hour		
			LOS	Delay	V/C	LOS	Delay	V/C
45. Willow Pass Road/Diamond Boulevard	Signal	~~D~~E	B	17.2	0.48	D	39.4	0.73
46. Willow Pass Road/Market Street	Signal	E	D	38.2	0.78	D	43.8	0.96
47. Willow Pass Road/Galindo Street	Signal	E	D	37.8	0.67	D	51.0	0.87
48. Concord Boulevard/Port Chicago Highway	Signal	E	E	61.5	0.79	C	23.6	0.52
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	Signal	D	**F**	**665.4**	**1.03**	**F**	**341.6**	**0.90**
50. Ygnacio Valley Road/Clayton Road	Signal	~~D~~E	D	39.3	0.67	D	47.1	0.73

Notes:
Locations that are operating below acceptable levels are shown in **BOLD**.
1. Each study intersection is controlled by a traffic signal, a side-street stop-control (SSSC), or an all-way stop-control (AWSC).
2. For all intersections, the LOS criteria is based on seconds of delay.

Source: Kimley-Horn and Associates, Inc., 201~~7~~9.

As shown in the table, all the study intersections operate at acceptable levels per the City of Pittsburg and City of Concord General Plans during the Existing Conditions without the proposed project, except for the following intersections:

- ~~#2 – EB SR-4 Ramps and Willow Pass Road (AM and PM peak hours);~~
- #3 – WB SR-4 Ramps and Willow Pass Road (AM peak hour);
- #6 – W. Leland Road and San Marco Boulevard (AM peak hour);
- #8 – WB SR-4 Ramps and San Marco Boulevard (AM peak hour);
- #11 – Willow Pass Road and Loftus Road (AM peak hour);
- #18 – W. Leland Road and Bailey Road (AM peak hour);
- #23 – W. Leland Road and Chestnut Drive (AM peak hour);
- #24 – W. Leland Road and Jacqueline Drive (AM peak hour);
- #29 – W. Leland Road and Crestview Drive (AM peak hour);
- #31 – EB SR-4 Ramps and Railroad Avenue (PM peak hour);
- #35 – Concord Boulevard and Bailey Road (AM and PM peak hours);
- #36 – Bailey Road and Myrtle Drive (AM peak hour);
- ~~#39 – Clayton Road and Treat Boulevard (PM peak hour);~~
- #41 – Cowell Road and Treat Boulevard (AM and PM peak hours);
- #44 – Treat Boulevard and Oak Grove Road (~~AM and~~ PM peak hour~~s~~);
- ~~#48 – Concord Boulevard and Port Chicago Highway (AM peak hour);~~ and
- #49 – Kirker Pass Road and Oakhurst Drive (AM and PM peak hours).

Existing Freeway Segment Conditions

Traffic operations were evaluated at the study freeway segments under existing traffic conditions. Table 4.12-4 shows the peak hour LOS and density for each freeway section in the study area. As shown in Table 4.12-4, all freeway segments currently operate at acceptable levels, except for the following: ~~during the Existing Conditions per the LOS standards established in the Draft 2017 Update of the CCTA Contra Costa Congestion Management Program.~~

- NB SR-242 between the Clayton Road off-ramp and SR-4 in the PM peak hour;
- EB SR-4 between I-680 and the SR-242 off-ramp in the PM peak hour; and
- WB SR-4 between the SR-242 off-ramp and the I-680.

Existing Freeway Ramp Conditions

Traffic operations were evaluated at the study freeway ramps under existing traffic conditions. Table 4.12-5 shows the peak hour LOS and density for each freeway ramp in the study area. As shown in Table 4.12-5, all freeway ramps currently operate at acceptable levels during the Existing Conditions per the LOS standards established in the Draft 2017 Update of the CCTA Contra Costa Congestion Management Program.

Existing East and Central County Routes of Regional Significance Conditions

In CCC, action plans exist for each region (East County and Central County) that describe the MTSOs that are needed to be analyzed. For Routes of Regional Significance within the project area, the MTSOs include delay index (DI), roadway average speed, roadway average stopped delay, roadway segment LOS, roadway volume to capacity ratio (V/C), and persons in vehicles in the HOV lane. As outlined in the East County Action Plan for Routes of Regional Significance, SR 4 is evaluated for DI and HOV lane usage, while study intersections are evaluated based on signalized intersection LOS (see Table 4.12-6).

Table 4.12-4
Freeway Segment LOS – Existing Conditions

Freeway Section	Criteria LOS	AM Peak Hour		PM Peak Hour	
		LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)
Northbound					
SR 242 between I-680 and Clayton Road	E	A	5.1	D	26.6
SR 242 between Clayton Road and Concord Avenue	E	A	4.1	C	21.1
SR 242 between Concord Avenue and Grant Street	E	A	4.5	C	22.9
SR 242 between Grant Street and Olivera Road	E	A	4.5	C	23.0
SR 242 between Olivera Road and SR 4	E	A	5.5	D	29.5
Southbound					
SR 242 between SR 4 and Olivera Road	F	D	30.3	B	16.8
SR 242 between Olivera Road and Grant Street	F	C	23.6	B	13.7
SR 242 between Grant Street and Concord Avenue	F	C	23.8	B	13.8
SR 242 between Concord Avenue and Clayton Road	F	C	21.7	B	12.7
SR 242 between Clayton Road and I-680	F	D	28.2	B	15.9
Eastbound					
SR 4 between I-680 and Solano Way	E	A	6.0	D	33.0
SR 4 between Solano Way and SR 242	E	A	5.9	D	32.2
SR 4 between SR 242 and Port Chicago Highway	F	A	2.8	B	15.6
SR 4 between Port Chicago Highway and Willow Pass Road	F	A	6.1	F	46.3
SR 4 between Willow Pass Road and San Marco Boulevard	F	A	6.0	D	27.7
SR 4 between San Marco Boulevard and Bailey Road	F	A	5.2	D	34.3
SR 4 between Bailey Road and Railroad Avenue	F	A	4.9	D	31.3
Westbound					
SR 4 between Railroad Avenue and Bailey Road	F	D	28.1	B	15.5
SR 4 between Bailey Road and San Marco Boulevard	F	D	30.5	B	16.5
SR 4 between San Marco Boulevard and Willow Pass Road	F	C	25.2	C	18.9
SR 4 between Willow Pass Road and Port Chicago Highway	F	E	37.4	C	19.2
SR 4 between Port Chicago Highway and SR 242	F	B	16.9	A	8.7
SR 4 between SR 242 and Solano Way	E	E	35.2	C	18.6
SR 4 between Solano Way and I-680	E	E	36.0	C	18.8

Notes:
Locations that are operating below acceptable levels are shown in **BOLD**.
[1] pcpmpl = passenger cars per mile per lane.

Source: Kimley-Horn and Associates, Inc., 2017.

Table 4.12-4
Freeway Segment LOS – Existing Conditions

Freeway Section	Criteria LOS	AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
Northbound							
SR-242 between I-680 and Clayton Road off-ramp	E	A	0.10	3.1	C	0.67	24.5
SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp	E	A	0.10	3.4	**F**	0.70	**47.3**
SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-ramp	E	A	0.08	2.4	**F**	0.52	**81.7**
SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp	E	C	0.75	21.2	**F**	0.80	**83.2**
SR-242 between Grant Street off-ramp and Grant Street on-ramp	E	A	0.24	8.0	**F**	0.82	**83.6**
SR-242 between Grant Street on-ramp and Olivera Road off-ramp	E	A	0.37	8.6	**F**	0.73	**102.9**
SR-242 between Olivera Road off-ramp and SR-4 off-ramp	E	A	0.17	6.6	**F**	1.26	**14.0**
Southbound							
SR-242 between SR-4 on-ramp and Olivera Road on-ramp	F	D	0.89	28.2	B	0.49	13.9
SR-242 between Olivera Road on-ramp and Solano Way off-ramp	F	C	0.77	25.0	B	0.46	13.1
SR-242 between Solano Way off-ramp and Solano Way on-ramp	F	B	0.65	18.0	A	0.36	10.4
SR-242 between Solano Way on-ramp and Concord Avenue off-ramp	F	F	0.85	52.0	B	0.78	15.8
SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp	F	F	0.72	78.5	A	0.35	10.1
SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp	F	F	0.75	96.6	B	0.37	11.4
SR-242 between Clayton Road on-ramp and I-680	F	F	1.17	22.3	B	0.50	15.6
Eastbound							
SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp	E	C	0.77	27.1	**F**	**1.27**	**79.2**
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	E	C	0.60	18.3	**F**	**1.17**	**85.5**
SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp	E	C	0.68	22.9	**F**	**1.45**	**45.5**
SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp	F	B	0.44	17.8	F	1.30	51.4

(Continued on next page)

Table 4.12-4
Freeway Segment LOS – Existing Conditions

Freeway Section	Criteria LOS	AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp	F	B	0.34	11.5	F	1.12	75.1
SR-4 between SR-242 on-ramp and HOV Lane Begins	F	B	0.46	12.2	F	4.18	45.0
SR-4 between HOV Lane Begins and Lane Drop	F	A	0.28	9.6	A	0.88	6.9
SR-4 between Lane Drop and Port Chicago Highway on-ramp	F	B	0.37	12.7	F	1.18	9.2
SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp	F	B	0.46	16.1	F	1.51	45.0
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	F	B	0.37	12.9	F	1.24	10.8
SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp	F	B	0.38	11.8	F	3.24	45.0
SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp	F	B	0.35	12.0	F	1.21	10.1
SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp	F	B	0.39	13.8	F	1.24	12.2
SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane	F	B	0.39	12.4	F	1.24	12.7
SR-4 between Add Lane and Bailey Road Diagonal off-ramp	F	A	0.31	10.4	A	0.94	9.5
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp	F	A	0.29	9.2	A	0.89	8.1
SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp	F	B	0.36	11.9	F	1.09	6.7
SR-4 between Bailey Road Diagonal on-ramp and Add Lane	F	B	0.36	11.3	F	1.09	13.4
SR-4 between Add Lane and Railroad Avenue off-ramp	F	A	0.34	11.4	A	0.95	9.5
Westbound							
SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp	F	F	0.88	76.4	B	0.45	13.6
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp	F	F	0.81	73.4	A	0.39	10.9
SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp	F	F	0.95	29.6	B	0.46	13.4

(Continued on next page)

Table 4.12-4
Freeway Segment LOS – Existing Conditions

Freeway Section	Criteria LOS	AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
SR-4 between Bailey Road on-ramp and Lane Drop	F	F	0.71	76.5	A	0.34	9.5
SR-4 between Lane Drop and San Marco Boulevard off-ramp	F	F	1.00	62.1	B	0.51	16.3
SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp	F	F	0.99	75.2	B	0.44	13.2
SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp	F	F	0.99	30.8	B	0.44	12.4
SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp	F	F	1.26	54.3	A	0.37	10.2
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	F	F	1.25	72.7	B	0.50	15.2
SR-4 between Willow Pass Road on-ramp and HOV Lane Add	F	F	1.25	31.3	B	0.50	14.2
SR-4 between HOV Lane Add and Add Lane	F	F	1.08	27.8	B	0.43	12.0
SR-4 between Add Lane and Port Chicago Highway off-ramp	F	C	0.99	22.6	B	0.42	12.6
SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp	F	C	0.84	21.0	A	0.39	11.0
SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp	E	**F**	**1.10**	**12.6**	B	0.35	12.1
SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp	E	**F**	**1.13**	**15.6**	B	0.46	16.8
SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp	E	**F**	**1.56**	**45.0**	C	0.65	21.5
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	E	**F**	**1.20**	**16.0**	B	0.50	16.9
SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp	E	**F**	**1.61**	**45.0**	C	0.64	23.1

Notes:
Locations that are operating below acceptable levels are shown in **BOLD**.
[1] pcpmpl = passenger cars per mile per lane.

Source: Kimley-Horn and Associates, Inc., 2019.

Table 4.12-5
Freeway Ramp LOS – Existing Conditions

Freeway Section	Criteria LOS	AM Peak Hour		PM Peak Hour	
		LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)
Eastbound SR 4					
Willow Pass Road Off-Ramp	F	A	5.2	F	35.2
Willow Pass Road On-Ramp	F	A	9.0	F	44.8
San Marco Boulevard Off-Ramp	F	A	8.6	D	34.2
SB San Marco Boulevard Loop On-Ramp	F	A	8.0	D	29.1
NB San Marco Boulevard Diagonal On-Ramp	F	A	5.5	C	26.5
SB Bailey Road Diagonal Off-Ramp	F	A	5.1	C	24.3
NB Bailey Road Loop Off-Ramp	F	A	7.3	C	26.2
Bailey Road On-Ramp	F	B	11.6	E	35.0
Westbound SR 4					
NB Bailey Road Diagonal Off-Ramp	F	C	27.3	B	15.3
SB Bailey Road Loop Off-Ramp	F	C	25.1	B	19.5
Bailey Road On-Ramp	F	C	24.3	B	14.1
San Marco Boulevard Off-Ramp	F	D	28.2	B	16.3
NB San Marco Boulevard Loop On-Ramp	F	E	36.7	B	17.4
SB San Marco Boulevard Diagonal On-Ramp	F	F	45.4	B	16.2
Willow Pass Road Off-Ramp	F	C	27.3	B	16.6
Willow Pass Road On-Ramp	F	E	37.3	C	20.3

Notes:
Locations that are operating below acceptable levels are shown in **BOLD**.
[1] pcpmpl = passenger cars per mile per lane

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

Table 4.12-6
East County MTSOs

MTSO	Corridors Applied To	MTSO Criteria
DI	SR 4	DI should not exceed 2.5 in the AM and PM peak hours.
HOV Lane Usage	SR 4	HOV lane utilization should exceed 600 vehicles per lane in the peak direction in the peak hour.
Signalized Intersection LOS	Study Intersections	LOS should not exceed LOS D, except on Bailey Road, where LOS E is acceptable.

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

The MTSOs outlined in the Central County Action Plan for Routes of Regional Significance are summarized in Table 4.12-7 below.

Delay Index

The DI is defined as the ratio between the peak congested travel time and the uncongested travel time along a roadway facility. Table 4.12-8 shows the existing DI and congested travel time for all of the roadway segments outlined in the East and Central County Action Plans. As shown in the table, all roadway facilities in Central and East County meet the MTSO criteria in the Existing Condition, except for the following locations:

- EB SR-4 in the East County operates at a delay index of 5.1 in the PM peak hour in the Existing conditions and the addition of project traffic increases the delay index to 5.4 (criteria = 2.5 or better); and
- NB SR-242 in the Central County operates at a delay index of 3.4 in the PM Peak hour in the Existing conditions and the addition of project traffic increases the delay index to 3.5 (criteria = 3.0 or better).

Table 4.12-7
Central County MTSOs

MTSO	Corridors Applied To	MTSO Criteria
DI	SR 242	DI should not exceed 3.0 in the AM and PM peak hours.
	SR 4	DI should not exceed 5.0 in the AM and PM peak hours.
Roadway Average Speed	Clayton Road	Average speed should exceed 15 mph.
Roadway Average Stopped Delay	Bailey Road and Concord Boulevard	Three signal cycles to clear.
	Baily Road and Clayton Road	
	Clayton Road and Ygnacio Valley Road/Kirker Pass Road	
	Clayton Road and Treat Boulevard/Denkinger Road	
	Treat Boulevard and Cowell Road	Five signal cycles to clear.
	Treat Boulevard and Oak Grove Road	
Roadway V/C Ratio	Ygnacio Valley Road/Kirker Pass Road	V/C ratio should be less than 1.5.

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

Table 4.12-8
Delay Index Summary – Existing Conditions

Roadway Segment	Distance (miles)	Uncongested Travel Time		AM Peak Hour		PM Peak Hour	
		AM Peak	PM Peak	CTT	DI	CTT	DI
East County							
EB SR 4	~~4.23~~2.99	~~234.5~~2.39	~~234.5~~2.39	~~234.5~~2.58	~~1.0~~1.1	~~249.9~~12.15	~~1.1~~**5.1**
WB SR 4	~~4.23~~3.53	~~234.5~~2.82	~~234.5~~2.82	~~241.9~~8.35	~~1.0~~**3.0**	~~234.5~~2.93	~~1.0~~1.0
Central County							
Eastbound SR-4	~~6.13~~4.43	~~339.5~~3.55	~~339.5~~3.55	~~339.5~~4.10	~~1.0~~1.2	~~367.8~~12.38	~~1.1~~3.5
Westbound SR-4	~~6.13~~3.63	~~339.5~~2.90	~~339.5~~2.90	~~361.8~~5.51	~~1.1~~1.9	~~339.5~~3.17	~~1.0~~1.1
Northbound SR-242	~~3.52~~2.50	~~194.7~~2.00	~~194.7~~2.00	~~194.7~~2.41	~~1.0~~1.2	~~194.7~~6.70	~~1.0~~**3.4**
Southbound SR-242	~~3.52~~2.23	~~194.7~~1.78	~~194.7~~1.78	~~197.8~~4.47	~~1.0~~2.5	~~194.7~~1.97	~~1.0~~1.1

Note: CTT = Congested Travel Time, measured in seconds.

Source: Kimley-Horn and Associates, Inc., ~~2017~~ 2019.

Average Speed, Average Stopped Delay, LOS, and V/C

Table 4.12-9 summarizes roadway average speed, roadway average stopped delay, roadway segment LOS, roadway V/C for the Routes of Regional Significance in the Central County in the Existing Condition. As shown in the table, all corridors currently comply with the applicable established thresholds (where such thresholds are provided) for all the listed measures of effectiveness.

Table 4.12-9
MTSO Summary – Existing Conditions

Corridor	Measure of Effectiveness	Direction	Threshold	AM Peak Hour	PM Peak Hour
Central County					
Bailey Road	Average Speed (mph)	NB	None	18	18
		SB	None	21	20
	Average Stopped Delay	Concord Blvd	3.0	0.3	0.3
		Clayton Rd	3.0	0.2	0.2
	LOS	NB	None	D	D
		SB	None	C	C
	V/C	NB	None	0.19	0.53
		SB	None	0.55	0.41
Clayton Road	Average Speed (mph)	EB	15	30	29
		WB	15	31	29
	Average Stopped Delay	Bailey Rd	3.0	0.2	0.2
		Ygnacio Valley Rd	3.0	0.3	0.3
		Treat Blvd	3.0	0.3	0.4
	LOS	EB	None	B	B
		WB	None	B	B
	V/C	EB	None	0.24	0.68
		WB	None	0.68	0.35
Treat Boulevard	Average Speed (mph)	NB	None	27	28
		SN	None	26	28
	Average Stopped Delay	Clayton Rd	3.0	0.3	0.4
		Cowell Rd	5.0	0.5	0.5
		Oak Grove Rd	5.0	0.4	0.5
	LOS	NB	None	C	C
		SB	None	B	B
	V/C	NB	1.5	0.24	0.89
		SB	1.5	0.81	0.33
Ygnacio Valley Road	Average Speed (mph)	NB	None	18	3
		SB	None	16	29
	Average Stopped Delay	Clayton Rd	3.0	0.3	0.3
	LOS	NB	None	D	F
		SB	None	E	B
	V/C	NB	1.50	0.20	0.73
		SB	1.50	0.68	0.28

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

HOV Usage

HOV lane usage was observed for SR 4 within the study corridor. Table 4.12-10 summarizes the persons using the HOV lane in the peak direction in the Existing Condition.

Table 4.12-10
HOV Lane Summary – SR 4 – Existing Conditions

Peak Hour	Direction	Vehicles Using HOV Lane	Persons Using HOV Lane
AM	EB	1,755	3,608
PM	WB	703	1,470

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

As shown in the table, the number of vehicles in the HOV lane would exceed the 600-vehicle utilization goal established by the CCTA for each peak direction in the Existing Condition.

Transit System

Three major public mass transit operators provide service within or adjacent to the study area, including Bay Area Rapid Transit (BART), the Eastern Contra Costa Transit Authority (or Tri Delta Transit), and the County Connection.

BART

BART is a rapid mass transit system which provides regional transportation connections to much of the Bay Area. BART runs from the North Bay Area in Richmond to the South Bay Area in Fremont. In the east-west direction BART runs from Pittsburg to the San Francisco Airport and Milbrae with several connections in Oakland. The Pittsburg/Bay Point BART station, which is approximately 1.33 miles northeast of the project site, serves all of Pittsburg, Bay Point, Antioch, and all other surrounding cities and runs from 4:00 AM to 12:00 AM daily, with a weekday frequency of 15 minutes. A future E-BART extension to Hillcrest Avenue in Antioch is currently under construction. The E-BART service will connect with BART at the Bay Point BART station. It should be noted that an additional E-BART Station is also planned at Railroad Avenue and the widening of SR 4 is currently underway to accommodate the planned station.

Tri Delta Transit

Tri Delta Transit serves the East County including Brentwood, Oakley, Pittsburg, Antioch, Bay Point and unincorporated areas of East County. Tri Delta Transit operates fourteen local bus routes from Monday to Friday, including three express services, and three local bus routes during weekends and holidays. The Tri Delta Transit routes that run closest to the proposed project are routes 200, 201, 300, 380, 387, 388, 389, 390, 391, 392, 393, and 394.

Currently, bus routes do not pass directly adjacent to the proposed project site because roadway access to the vacant project site is lacking. Current bus routes do not exist along Avila Road, San Marco Boulevard south of W. Leland Road, and Bailey Road south of W. Leland Road. Tri-Delta

Transit connects passengers to the Antioch Park-and-Ride, Kaiser Medical Center, Pittsburg/Bay Point BART Station, Tri Delta Transit Station, various local schools, Brentwood Park-and-Ride, and the Streets of Brentwood. In addition, Tri-Delta Transit provides convenient connections to many locations in the City and connections to other local and regional transit routes. Detailed information related to each Tri-Delta Transit bus route servicing the project area is included in the TIS (see Appendix N).

County Connection

The County Connection currently operates a total of 31 fixed-route bus routes on weekdays throughout Central CCC with limited service to the East County area. Routes 10, 11, 15, and 19 operate within the study area. The County Connection connects passengers to the Antioch Park-and-Ride, Kaiser Medical Center, Pittsburg/Bay Point BART Station, Tri Delta Transit Station, various local schools, Brentwood Park-and-Ride, and the Streets of Brentwood. In addition, County Connection provides convenient connections to many locations in the City and connections to other local and regional transit routes. Detailed information related to each County Connection bus route servicing the project area is included in the TIS (see Appendix N).

Bicycle and Pedestrian System

Sidewalks and crosswalks are mostly provided throughout the study area in Pittsburg to allow for pedestrians to access nearby transit stops, residential uses, and commercial uses. Sidewalks do not exist along Avila Road, Willow Pass Road near Avila Road and the SR 4 ramps, Range Road near Parkside Drive, sections of Farm Bureau Road between Willow Pass Road and Clayton Road, and a majority of Bailey Road between Myrtle Drive and Dessira Court.

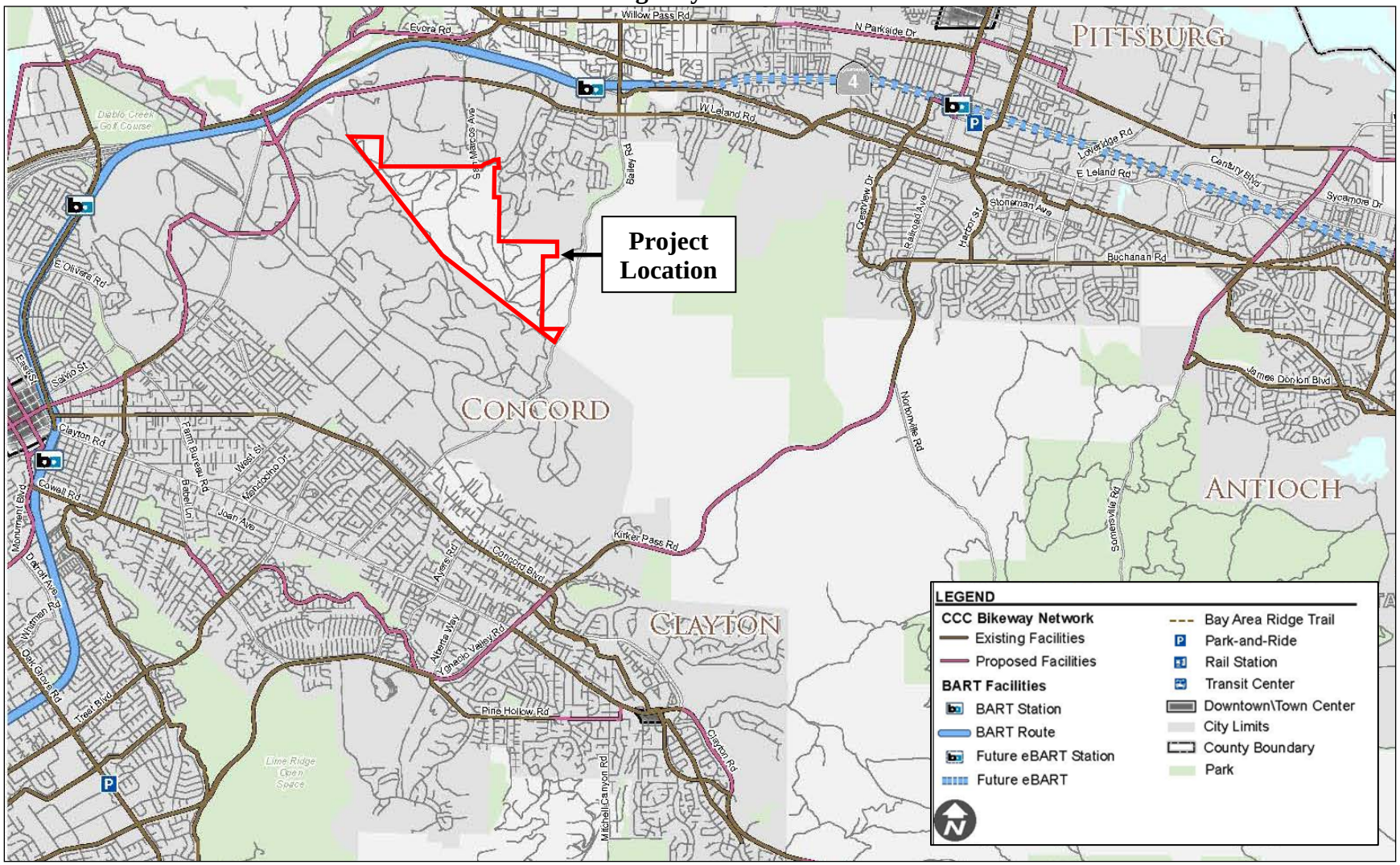
Bicycle paths, lanes, and routes are typical examples of bicycle transportation facilities, which are defined by the California Department of Transportation (Caltrans) as being in one of the following three classes: Class I, Class II, or Class III. The existing and proposed bicycle network in the vicinity of the project site is shown in Figure 4.12-2.

Class I

Class I bike paths provide a completely separated facility designed for the exclusive use of bicyclists and pedestrians with crossing points minimized.

Class I bike paths located within the project study area include the Delta De Anza Regional Trail, a bike path along the East Bay Municipal Utility District (EBMUD) right-of way-in East County, and the Contra Costa County Trail. A Class I bike path is proposed adjacent to San Marco Boulevard between W. Leland Road and Rio Verde Circle, as well as between Tomales Bay Drive and Rio Verde Circle.

Figure 4.12-2
Existing Bicycle Network



Source: Contra Costa Transportation Authority, 2009 Contra Costa Countywide Bicycle and Pedestrian Plan, October 2009.

Class II

Class II bike lanes provide a restricted right-of-way designated lane for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with vehicle parking and cross-flows by pedestrians and motorists permitted.

Class II bike lanes are located within the project study area on Concord Boulevard between Kirker Pass Road and west of Farm Bureau Road, W. Leland Road between west of San Marco Boulevard and Burton Avenue, Willow Pass Road between Port Chicago Highway and Loftus Road, Bailey Road between Willow Pass Road and W. Leland Road, and Crestview Drive between Olympia Drive and the Frontage Road. Class II bike lanes are proposed on the following locations within the project study area: Willow Pass Road between Evora Road and immediately north of Lynwood Drive, San Marco Boulevard between Rio Verde Circle and Bailey Road, Range Road between Willow Pass Road and SR 4, and Railroad Avenue between the Contra Costa Canal and California Avenue.

Class III

Class III bike routes provide a route designated by signs or permanent markings and are shared with pedestrians and motorists. Class III bike routes are located within the project study area on Willow Pass Road east of Loftus Road and on Bailey Road between the SR 4 EB ramps and Highland Boulevard. Class III bike routes are proposed in the following locations within the project study area: Farm Bureau Road between Willow Pass Road and Clayton Road, W. Leland Road between Burton Road and Railroad Avenue, and Railroad Avenue between SR 4 and 10th Street.

Existing Funding Programs

The following funding programs are currently in effect for improvements to the transportation network within the vicinity of the project site.

Pittsburg Local Traffic Mitigation Fee

The City of Pittsburg has a local traffic mitigation fee (LTMF) for development projects within the City of Pittsburg. The fee was designed to aid in funding for capital improvement projects within the City limits, such as the extension of W. Leland Road and/or the widening of Avila Road and Willow Pass Road. In addition, the fee may be used for implementing signal interconnect on local roadways, installing traffic signals and other intersection improvements. The most recent LTMF schedule states that for a single-family residential land use the LTMF fee is $7,123 with City administrative costs per dwelling unit. The City of Concord has a similar program, the traffic mitigation fee (TMF) program, which collects fees from developers to aid in the funding of capital improvement projects.

Pittsburg 5-Year Capital Improvement Program

The City of Pittsburg's 5-Year Capital Improvement Program (CIP) is a multi-year planning instrument for the construction of new and expansion, rehabilitation, or replacement of existing City-owned assets. The 5-Year CIP is used by City staff members as a guide for project prioritization to accomplish community goals. The Program is updated annually to account for projects that have been completed, changing priorities, new priorities, and funding availability.

The 5-Year CIP for Fiscal Year 2012/2013 through 2016/2017 includes various projects for the Pittsburg area. Each of the projects meets some or all of the following criteria:

1. Elimination of potentially hazardous or unsafe conditions and potential liabilities;
2. Replacement of high maintenance and inefficient/ineffective infrastructure;
3. Improvement to and/or creation of new services to the public;
4. Outside agency regulatory requirements and mandates;
5. Stimulation of the local economy/eliminate blighted conditions;
6. Compliance with the City of Pittsburg General Plan; and
7. Preservation of existing assets.

The schedule for capital improvement projects is based on available funding, public benefit, and funding restrictions. The project schedule is updated annually with the annual 5-Year CIP update.

Regional Transportation Development Impact Mitigation

The East Contra Costa Regional Fee & Financing Authority (ECCRFFA) establishes a funding source for capital improvements projects in Eastern CCC. The fee was designed to collect funds for regional transportation improvements, such as the W. Leland Road extension, the SR 4 bypass, and the widening of SR 4 through Pittsburg and Antioch. The 2017 ECCRFFA fee schedule states that for a single-family residential land use, the Regional Transportation Development Impact Mitigation (RTDIM) fee is $21,395with a temporary fee credit in 2017 of 15 percent or $3,209.

Contra Costa Congestion Management Program

The Contra Costa Transportation Authority (the Authority) is responsible for preparing and adopting a Congestion Management Program (CMP) and updating the Program every other year. The Authority adopted the County’s first CMP in October 1991. The 2011 Contra Costa CMP Update represents the twelfth biennial update.

The 2015 update, which was prepared with help from and consultation with representatives of local, regional and State agencies, transit operators and the public, responds to changes in regional transportation planning, projects, and programs made since 2013. The 2015 CMP focuses primarily on bringing the required seven-year CIP up-to-date, while also responding to primarily technical changes and corrections from the 2013 CMP.

Concord Capital Improvement Program

The City of Concord Adopted Capital Improvement & Transportation Improvement Program, 2010/2011–2019/2020 10-Year Plan, contains various transportation and infrastructure improvement projects planned by the City of Concord. The CIP are included in the City Budget. The City Council adopted the CIP on June 22, 2010 by City Council Resolution 10-47 and the CIP budget took effect on July 1, 2010.

4.12.3 REGULATORY CONTEXT

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

Federal Regulations

Federal plans, policies, regulations, or laws related to transportation, traffic, and circulation do not apply to the proposed project.

State Regulations

Caltrans has jurisdiction over State highways. Therefore, Caltrans controls all construction, modification, and maintenance of State highways, such as SR 4. Any improvements to such roadways would require Caltrans' approval.

Guide for the Preparation of Traffic Impact Studies

Caltrans' *Guide for the Preparation of Traffic Impact Studies* provides general guidance regarding the preparation of traffic impact studies for projects that may have an impact on the State Highway System. The guidance includes when a traffic study should be prepared and the methodology to use when evaluating operating conditions on the State highway system, including requiring that weave segments use the Liesch method to analyze traffic operations. The *Guide for the Preparation of Traffic Impact Studies* states that where "an existing State highway facility is operating at less than the appropriate target LOS, the existing measure of effectiveness (MOE) should be maintained."[3]

Local Regulations

Local rules and regulations applicable to the proposed project are discussed below.

Contra Costa Countywide Comprehensive Transportation Plan Update (2009)

The CCCTA is a public agency formed by the Contra Costa voters to manage the County's transportation sales tax program and to do countywide transportation planning. The 2017 Countywide Comprehensive Transportation Plan, adopted September 20, 2017, is the CCTA's

[3] Caltrans. *Guide for the Preparation of Traffic Impact Studies* [pg. 1]. 2002.

most recent, broadest policy and planning document. The Plan identifies the criteria for analyzing transportation impacts and sets forth plans for future roadway improvements in the County. In addition, the Plan relies on collaboration with and between partners, both on the countywide and regional levels. Each of the county's five Regional Transportation Planning Committees created an Action Plan, which identifies a complete list of actions to be completed as a result of the Action Plan.

Central and East County Action Plans

As part of the Action Plan process, each Regional Transportation Planning Committee identified projects and programs in the form of actions to be included in the Action Plan for the Routes of Regional Significance. Each Action Plan states the vision, goals, and policies; designates Routes of Regional Significance; sets objectives for such routes; and presents specific actions to achieve established objectives. The actions are listed on both a route-by-route and a regional scale, and aim to support the transportation objectives as specified by each Regional Transportation Planning Committee. The latest *East County Action Plan for Routes of Regional Significance* was adopted September 2017.

City of Pittsburg General Plan

The following are applicable policies related to transportation, traffic, and circulation from the Transportation Element of the Pittsburg General Plan.

Goal 7-G-1 Achieve service level standards for roadway intersections that are based on the roadway's classification and location shown in Figure 7-2 of the Pittsburg General Plan.

Goal 7-G-3 Coordinate circulation system plans with other jurisdictions' and agencies' plans, including Antioch and Concord, the CCTA, and Caltrans.

Goal 7-G-4 Work with the CCTA to manage morning commute traffic from East to Central CCC by studying and implementing arterial metering management plans.

Goal 7-G-5 Provide adequate capacity on arterial roadways to meet LOS standards and to avoid traffic diversion to local roadways or the freeway.

As congestion increases on SR 4, monitor and evaluate the need to implement neighborhood traffic management controls on local streets to eliminate or minimize the impact of diverted traffic.

Goal 7-G-6 Locate high traffic-generating uses so that they have direct access or immediate secondary access to arterial roadways.

Goal 7-G-7 Complete arterial roadway improvements required to mitigate traffic impacts of an approved project before the project is fully occupied. Arterial improvements should

be completed by creating funding sources, which include but are not limited to Traffic Mitigation Fees, Development Agreements, and Assessment Districts.

Policy 7-P-1 Require mitigation for development proposals that are not part of the Traffic Mitigation Fee program which contribute more than one percent of the volume to an existing roadway or intersections with inadequate capacity to meet cumulative demand.

Development projects that contribute to future traffic congestion on existing roadways shall provide mitigation to ensure adequate future capacities. Traffic analysis of development plans will determine the proportion of cumulative impact each project is creating.

Policy 7-P-2 Use the adopted Regional and Local Transportation Impact Mitigation Fee ordinances to ensure that all new development pays an equitable pro-rata share of the cost of transportation improvements. Review the Traffic Impact Mitigation Fee schedule annually and update every five years at a minimum.

Policy 7-P-3 Review and update the City's Engineering Design Standards for each functional roadway classification, according to Table 7-1 of the Pittsburg General Plan.

Roadway standards are illustrated in the City's Engineering Design Standards for typical midblock applications. Additional right-of-way may be needed for turn lanes at some intersection approaches.

Policy 7-P-4 Require that all traffic studies be conducted by professional transportation consultants selected by the Planning and Building and Engineering Departments, with the City acting as the lead agency. Ensure that all costs associated with the traffic study are paid by the applicant.

Policy 7-P-5 Apply for federal Congestion Mitigation Air Quality grant funding, designed to improve air quality through roadway improvement projects.

Policy 7-P-6 Ensure that all Regional Routes of Significance within the City maintain the following traffic LOS standards (applicable to non-freeway routes and routes not subject to a Traffic Management Program):

- LOS mid D (peak hour volume to capacity ratio less than or equal to 0.85) at intersections along major arterials, except for intersections along Bailey Road;

- LOS high E (peak hour volume to capacity ratio less than or equal to 0.99) at intersections along Bailey Road between West Leland Road and SR 4; and
- LOS mid E (peak hour volume to capacity ratio less than or equal to 0.95) at intersections on Kirker Pass Road.

Policy 7-P-7 Endeavor to implement Transportation Element improvements prior to deterioration in levels of service below those set forth in Goal 7-G-1.

Development approvals should require reasonable demonstration that traffic improvements necessary to serve the development will be in place in time to accommodate trips generated by the project.

Policy 7-P-8 Ensure that all non-Regional Routes within the City (not designated as RRS in Figure 7-2 of the Pittsburg General Plan) maintain the following traffic LOS standards based on their location in rural, semi-rural, suburban, urban or downtown areas, as designated in Figure 7-2 of the Pittsburg General Plan:

- Rural – LOS low C (peak hour volume to capacity ratio less than or equal to 0.74)
- Semi-rural – LOS high C (peak hour volume to capacity ratio less than or equal to 0.79)
- Suburban – LOS low D (peak hour volume to capacity ratio less than or equal to 0.84)
- Urban – LOS high D (peak hour volume to capacity ratio less than or equal to 0.89)
- Downtown – LOS high D (peak hour volume to capacity ratio less than or equal to 0.89)

Specific improvements should be identified and implemented on the basis of detailed traffic studies or Environmental Impact Reports. Improvements may include intersection approach lane expansion, related channelization improvements and traffic signal installations.

Policy 7-P-9 Implement the intersection improvements (including signalization and additional or reallocated lanes) as illustrated in Appendix A of the Pittsburg General Plan.

Policy 7-P-10 Require mitigation for development proposals which result in projected parking demand that would exceed the proposed parking supply on a regular and frequent basis.

Policy 7-P-11 Maximize the carrying capacity of arterial roadways by controlling the number of intersections and driveways, minimizing residential

access, implementing Transportation Systems Management (TSM) measures, and requiring sufficient on-site parking to meet the needs of each project (see also Table 7-1 of the Pittsburg General Plan).

Additional guidelines for arterial access include providing smooth ingress/egress to development. This includes designing parking areas so that traffic turning into the parking areas does not stack up on the arterial roadway; combining driveways to serve small parcels; and maintaining adequate distance between driveways and intersections to permit efficient traffic merges. In the built environment, roadway right-of-way may not be available to increase arterial capacity. Therefore, improving the efficiency of existing arterials through TSM measures should be one of the first considerations to meet level of service standards. TSM measures include signal coordination, channelization and signal improvements at intersections, and implementation of new traffic control technology.

Policy 7-P-12 Continue to collect fees, plan and design for the future construction of Buchanan Bypass. Ensure preparation of a feasibility and environmental impact study to determine the precise alignment, costs, mitigation measures, and impacts on adjacent uses.

Policy 7-P-13 Upgrade or extend the hillside access routes from Bailey Road, Buchanan Road, Kirker Pass Road, and proposed San Marco Boulevard, as development potential warrants.

Policy 7-P-14 Increase access to alternative north-south routes providing connection to SR 4, other than Railroad Avenue.

Policy 7-P-15 Support Caltrans' planned improvements to the Railroad Avenue and Loveridge Road interchanges in conjunction with SR 4 widening projects. Work with Federal, State and regional authorities to ensure timely completion of these projects needed to adequately serve local circulation needs.

Policy 7-P-16 Continue to collect fees for the extension of West Leland Road to Willow Pass Road, subject to the Traffic Mitigation Fee program. As established by nexus, require new development adjacent to the extension to dedicate right-of-way and construct or fund new intersections and frontage improvements.

Policy 7-P-21 Design local residential streets and implement traffic-control measures to keep traffic below 5,000 vehicles per day.

Policy 7-P-22 Avoid adding traffic roadways carrying volumes above the standards, and consider traffic control measures where perceived nuisance is severe.

Goal 7-G-8 Cooperate with public agencies and other jurisdictions to promote local regional public transit serving Pittsburg and provide an express bus system between Pittsburg, Brentwood, Oakley, Antioch, and the Pittsburg/Bay Point BART Station.

The City should encourage transit development, expansion, coordination and aggressive marketing throughout eastern CCC to serve a broader range of local and regional transportation needs including commuter and express service.

Policy 7-P-26 Require mitigation for development proposals which increase transit demand above the service levels provided by public transit operators and agencies.

Policy 7-P-27 Support the expansion of the existing transit service area and an increase in the service levels of existing transit. Support increased Tri- Delta and County Connection express bus service to the Pittsburg/Bay Point BART Station to reduce traffic demand on SR 4.

Policy 7-P-28 Encourage the extension of BART to Railroad Avenue within the median of SR 4. Cooperate with BART and regional agencies to develop station area plans and transit-oriented development patterns.

Policy 7-P-29 Preserve options for future transit use when designing improvements for roadways. Ensure that developers provide bus turnouts and/or shelters, where appropriate, as part of projects.

Policy 7-P-30 Work with Tri-Delta and planning area residents to plan for local bus routes that more effectively serve potential riders within local neighborhoods.

Goal 7-G-10 Study the feasibility of a comprehensive network of on- and off-road bike routes to encourage the use of bikes for commute, recreational and other trips.

A continuous network of safe and convenient bikeways has the potential to connect neighborhoods with major activity centers, parks, schools, employment centers, civic uses, the waterfront, and the County bicycle system.

Goal 7-G-11 Coordinate with neighboring communities and regional agencies to establish a continuous regional system of bicycle and pedestrian facilities.

Goal 7-G-14 Develop urban design and streetscape standards and guidelines to improve pedestrian environments and accessibility in new development projects and in Downtown.

Goal 7-G-15 Encourage walking as a regular means of transportation for people who live within a half-mile walk of school, work, or routine shopping destinations.

Goal 7-G-16 Ensure that current bicycle-friendly roadways, featuring wide shoulders or marked bicycle lanes, are not redesigned to improve traffic LOS, unless all other alternative roadways possible to alleviate congestion are exhausted.

Policy 7-P-33 Require mitigation for development proposals which result in potential conflicts, or fail to provide adequate access, for pedestrians and bicycles.

Policy 7-P-34 As part of development approval, ensure that safe and contiguous routes for pedestrians and bicyclists are provided within new development projects and on any roadways that are impacted as a result of new development.

Policy 7-P-36 Ensure continued compliance with Title 24 of the Uniform Building Code, requiring removal of all barriers to disabled persons on arterial and collector streets.

Policy 7-P-38 Develop a series of continuous pedestrian systems within Downtown and residential neighborhoods, connecting major activity centers and trails with City and County open space areas.

Sidewalks should be creatively designed to invite safe use by pedestrians, and be free of obstacles, such as newspaper racks, bus benches, utility poles, and fire hydrants.

Policy 7-P-39 Ensure that residential and commercial developments provide pedestrian pathways between lots for direct routes to commercial centers, schools, and transit facilities.

Policy 7-P-40 Ensure provision of sufficiently wide sidewalks and pedestrian paths in all new residential development.

Policy 7-P-41 Ensure the provision of multi-use trails or trailheads within new hillside developments, preferably connecting to the regional trail network.

Policy 7-P-42 Improve pedestrian crossing safety at heavily used intersections by installing crossing controls that provide adequate time for pedestrians to cross the street.

Policy 7-P-43 Provide adequate roadway width dedications for bicycle lanes, paths, and routes as designated in Figure 7-4 of the Pittsburg General Plan.

Policy 7-P-45 During review of development projects, encourage secure bicycle facilities and other alternative transportation facilities at employment sites, public facilities, and multi-family residential complexes.

Policy 7-P-46 Construction or expansion of roadways and intersections within the City shall not result in the severance of an existing bicycle route, unless an alternative exists or is provided.

Policy 7-P-48 Ensure that construction of bulb-outs and curb extensions at intersections for pedestrian safety does not endanger bicyclists by forcing them into traffic lanes.

Policy 7-P-52 Require that new arterial and collector streets accommodate bicyclists.

Policy 7-P-53 Require that any grind and overlay of existing arterial and collector streets consider the needs of bicyclists.

Policy 7-P-54 Amend engineering standards to require the use of bicycle grates on all new catch basins and storm drain inlet replacements on streets.

4.12.4 IMPACTS AND MITIGATION MEASURES

The standards of significance to be used in identifying project-specific and cumulative impacts are presented. The standards are based on policies of the City of Pittsburg and other responsible agencies. In addition, the methods used to analyze the impacts of the project on the roadway, bicycle, pedestrian, and transit systems are provided in this section. A discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

Standards of Significance

According to CEQA guidelines, a significant impact would occur if the proposed project would result in the following:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit (Initial Study Question XVI.a.);

- Conflict with an applicable congestion management program, including, but not limited to, LOS standards, and travel demand measures, or other standards established by a county congestion management agency for designated roadways (Initial Study Question XVI.b.);
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities (Initial Study Question XVI.f.);
- Result in a projected future over-capacity freeway condition where current long-range planning studies show an under-capacity condition;
- Result in an internal circulation system design that does not meet City standards;
- Substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) (Initial Study Question XVI.d.); or
- Result in inadequate emergency access (Initial Study Question XVI.e.).

The applicable LOS standards for each of the study intersections, freeway segments, and freeway ramps are included in Table 4.12-3, Table 4.12-4, and Table 4.12-5 above. For study intersections within the City of Pittsburg, a significant impact would occur under either of the following scenarios:

- If the intersection operates at an acceptable LOS without the project and degrades to an unacceptable LOS with the project; or
- If the intersection operates at an unacceptable LOS without the project and experiences an increase in delay of five seconds or more.~~, and the project contributes more than one percent of the volume to the intersection.~~

For study intersections within the City of Concord, a significant impact would occur under either of the following scenarios:

- If the intersection operates at an acceptable LOS without the project and degrades to an unacceptable LOS with the project; or
- If the intersection operates at an unacceptable LOS without the project and experiences an increase in v/c of 0.03 or more.

For freeway segments and ramps, a significant impact would occur under either of the following scenarios:

- If the freeway segment or ramp operates at an acceptable LOS without the project and degrades to an unacceptable LOS with the project.
- If the freeway segment or ramp operates at an unacceptable LOS without the project and experiences an increase in density, and the project contributes more than one percent of the volume to the freeway segment or ramp.

Regional Routes of Significance

For the traffic service objectives, a significant impact to Regional Routes of Significance would occur under the following scenarios:

- If the DI operates at an acceptable DI without the project and degrades to an unacceptable DI with the project;
- If the DI operates at an unacceptable DI without the project and experiences an increase in DI;
- If the roadway segment operates at an acceptable V/C without the project and degrades to an unacceptable V/C with the project;
- If the roadway segment operates at an unacceptable V/C without the project and experiences an increase in V/C;
- If the persons in vehicles in the HOV lane exceeds the established criteria without the project and is reduced to less than the established criteria with the project;
- If the roadway segment operates at an acceptable average speed without the project and degrades to an unacceptable average speed with the project;
- If the roadway segment operates at an unacceptable average speed without the project and experiences a decrease in average speed;
- If the intersection meets the acceptable number of signal cycles to clear without the project and the project increases the number of signal cycles to clear to an unacceptable number; or
- If the intersection exceeds the number of signal cycles to clear without the project and experiences an increase in the number of signal cycles to clear.

Table 4.12-6 and Table 4.12-7 above include a summary of the East and Central County MTSOs evaluated, as well as the standards used in this analysis.

Issues Not Discussed Further

It should be noted that as presented in the Introduction to Analysis chapter of this EIR, the Initial Study prepared for the proposed project (see Appendix C) determined that development of the proposed project would result in no impact related to change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks (Initial Study Question XVI.c.). Accordingly, impacts related to such are not further addressed within this chapter.

Method of Analysis

The analysis methodology provided in the TIS prepared for the proposed project by Kimley-Horn and Associates, Inc. is discussed below.

Analysis Scenarios

The following analysis scenarios are included in this chapter:

- **Existing Conditions:** LOS based on current (2017) traffic counts, existing roadway geometry, and existing traffic control.
- **Existing Plus Project Conditions:** Existing traffic volumes, roadway geometry, and traffic control plus trips from the proposed project.
- **Long-Term (2035) Conditions:** Based on future year traffic forecasts from the CCTA Travel Demand Forecast model. Future year corresponds with the approximate buildout of the City's General Plan and includes road projects anticipated to be in place under the long-term condition.
- **Long-Term (2035) Plus Project Conditions:** Based on the CCTA traffic forecasts and traffic generated by the proposed project. Future year corresponds with the approximate buildout of the City's General Plan and includes road projects anticipated to be in place under the long-term condition.

The CCTA's Travel Demand Forecast model can model traffic volumes between the base year of 2010, and the future growth year of 2030. Model outputs were used to compare 2010 base year volumes and year 2030 model forecasts to determine the annual incremental growth in traffic volumes at study intersections. Year 2035 turning movement volumes were calculated by adding the growth increment to the existing traffic counts to calculate the final adjusted roadway link forecast volume.

Intersections

Traffic counts at the study intersections were conducted in June of 2017. Volumes were collected during the AM (7:00 AM to 9:00 PM) and PM (4:00 PM to 6:00 PM) peak periods of a typical weekday when local schools were in session. Ramp volumes were counted during the same time as the study intersections. Ramp metering was active during the data collection for the existing conditions and may affect the merge-diverge analysis.

Signalized Intersections

The HCM methodology determines the capacity of each lane group approaching the intersection. The LOS is then based on average control delay (in seconds per vehicle) for the various movements within the intersection (e.g. the delay for a vehicle turning left, right, or moving straight through a given intersection). A combined weighted average control delay and LOS are presented for the intersection. The combined weighted average control delay and LOS represent the average amount of delay and the average LOS experienced by drivers at the intersection. Using a weighted average allows for equal consideration of all intersection movements, where some movements may take longer or shorter than other movements. A summary of the HCM results and copies of the detailed HCM LOS calculations are included in Appendix N to this EIR.

Unsignalized Intersections

The HCM describes the method for evaluating LOS and delay at unsignalized (all-way stop controlled and two-way stop controlled) intersections. LOS at unsignalized intersections is also defined by the average control delay per vehicle (measured in seconds). The control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the

queue. The average delay for the overall intersection is reported for all-way stop controlled intersections. The delay ranges for unsignalized intersections are lower than for signalized intersections as drivers expect less delay at unsignalized intersections.

Multi-Modal Transportation Service Objectives

Routes of Regional Significance were analyzed using MTSOs for all the analysis scenarios. As noted previously, in CCC, action plans exist for each region (East County and Central County) that describe the MTSOs that are needed to be analyzed. Table 4.12-6 lists the MTSOs for the East County and Table 4.12-7 lists the MTSOs for the Central County. MTSOs analyzed per the CCTA established criteria include delay index, average speed, average stopped delay, arterial LOS, V/C, and HOV usage.

Delay Index

The DI for the freeway segments was calculated using HCS7 software using HCM ~~2010~~ 6th Edition methodology, consistent with the freeway analysis. The DI for arterial roadways was calculated using Synchro software. Travel times were determined under peak congestion and also under uncongested conditions. For roadways without specific standards mentioned for DI, speeds are used for comparison purposes only.

Average Speed

For arterial roadways, the average speed is determined from the Synchro analysis. For freeways, the average speed is determined from the Highway Capacity Software (HCS) analysis. The only roadway corridor that has a specified average speed threshold is Clayton Road with an average speed of 15 mph or better. Specific standards mentioned for average speeds for the other corridors do not exist and, therefore, the speeds are used for comparison purposes only.

Average Stopped Delay

The average stopped delay is determined from the Synchro analysis for each arterial roadway and is measured in the number of cycle lengths to clear the intersection. The number of cycle lengths was calculated by taking the average intersection delay divided by the cycle length, resulting in the number of cycles for a vehicle to get through the intersection. As shown in Table 4.12-6, only five intersections have a specified average stopped delay threshold: Baily Road and Concord Boulevard; Bailey Road and Clayton Road; Clayton Road and Ygnacio Valley Road/Kirker Pass Road; Clayton Road and Treat Boulevard/Denkinger Road; Treat Boulevard and Cowell Road; and Treat Boulevard and Oak Grove Road. The remaining intersections do not have specific standards mentioned for average stopped delay and, therefore, the average stopped delay is used for comparison purposes only.

Arterial Roadway LOS

The arterial roadway LOS is determined from the Synchro analysis for each roadway. Specified arterial LOS for each of the listed roadways do not exist. Instead, the LOS threshold is listed for specific intersections. Therefore, the arterial LOS are used for comparison purposes only.

Volume to Capacity Ratio

The V/C is the ratio of the traffic volume on a specified corridor to the corridor's operational capacity. The capacity for each roadway is mentioned in the CCTA Countywide Travel Demand Model. The V/C thresholds are only mentioned for Treat Boulevard and Ygnacio Valley Road/Kirker Pass Road. Therefore, the V/C ratios for the other corridors are used for comparison purposes only.

HOV Usage

The HOV usage is determined by the Caltrans' HOV lane utilization report. The most recent version of the report that includes the study corridors is from 2010. Future HOV lane usage was determined by using the CCTA model to estimate the future growth rate for the HOV lane and applying that rate to the existing HOV volume. The same vehicle occupancy percentages in 2010 were assumed for the future scenario to determine the persons in vehicle using the HOV lane. The HOV lane utilization shall exceed 600 vehicles per lane in the peak direction during the peak hour.

Project Trip Generation

The Draft Master Plan specifies that the total number of dwelling units within the project site would not be permitted to exceed 1,500, consistent with Policy 2-P-96 in the City's General Plan. As such, maximum buildout of the proposed project site is assumed to include 1,500 residential units for purposes of this CEQA analysis. The trip generation calculations for buildout of the proposed project site are summarized in Table 4.12-11 below.

Table 4.12-11
Project Trip Generation

Time Period	Equation	Trips		
		In	Out	Total
Daily	Ln(T) = 0.92 Ln(X) + 2.71	6,280	6,280	12,560
AM Peak	T = 0.70(X) + 9.74	265	795	1,060
PM Peak	Ln(T) = 0.90 Ln(X) + 0.51	757	445	1,202

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

The trip generation rates for Single-Family Detached Housing (Land Use Code 210) from the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 9th Edition, were utilized. The total trip generation reflects all vehicle trips that would be counted at the project driveways, both inbound and outbound. Adjustments were not applied to trip generation to account for pass-by or internal trips because the project would consist solely of residential development. As shown in the table, the project would generate approximately 1,060 new peak AM trips and approximately 1,202 new peak PM trips.

Project Trip Distribution

The proposed project trip distribution is based on the County's travel forecast demand model provided by CCTA as well as existing traffic patterns and field observations. A select zone analysis was run for the proposed project to determine the distribution of vehicle trips throughout the study area. The results were checked to ensure that trips were using San Marco Boulevard and Bailey Road to access the project site in the Existing Plus Project Condition and the Leland Road access in the Cumulative Plus Project Condition.

Figure 4.12-3 shows the traffic distribution for the proposed project assumed in the TIS. Based on the assumed trip distribution, new vehicle trips generated by the proposed project were assigned to the street network in the Existing Plus Project and Cumulative Plus Project Conditions.

It should be noted that in the Cumulative Plus Project Condition, Leland Road will be extended to Avila Road, and, thus, trip distribution would differ from the Existing Plus Project Condition.

Existing Scenario

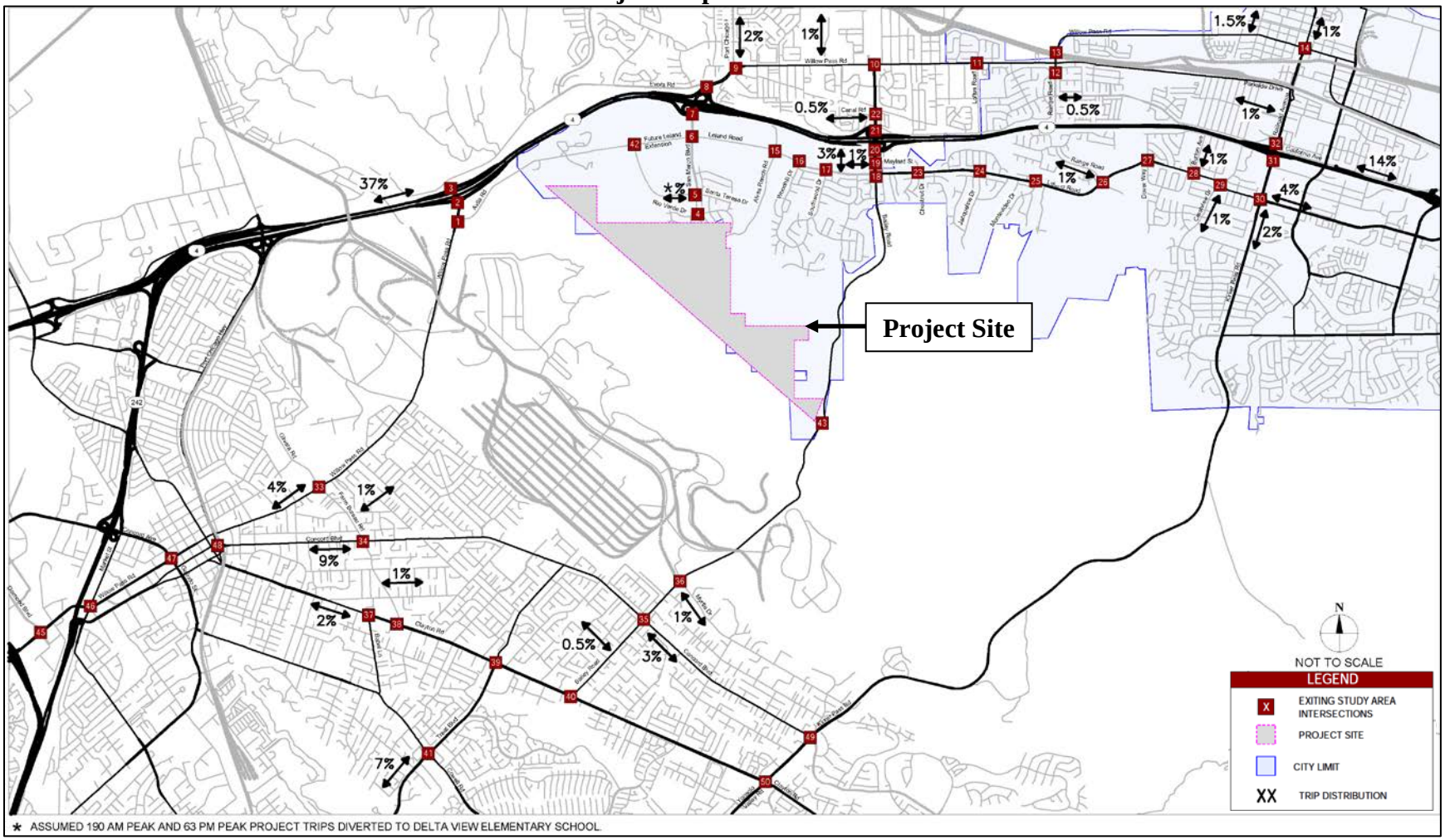
The existing scenarios include Existing Conditions and Existing Plus Project Conditions. The existing scenario is based on current (2017) traffic counts, existing roadway geometry, and existing traffic control. The Existing Plus Project Condition includes the Existing Condition plus traffic generated by buildout of the Draft Master Plan Area.

Long-Term (2035) Scenario

The long-term scenarios include Long-Term (2035) Conditions and Long-Term (2035) Plus Project Conditions. Several roadway improvements are planned in the study area for the Long-Term (2035) Condition, as identified by the City of Pittsburg and the City of Concord. The future intersection improvements and roadway improvements that would affect the study area include:

- Intersection #1 – At the intersection of Avila Road and Willow Pass Road, the westbound approach will have two left turn lanes and one right turn lane. The southbound approach will be restriped to include a left turn lane and two through lanes. In addition, the intersection will be signalized.
- Intersection #2 – At the intersection of Willow Pass Road and SR 4 EB ramps, the southbound approach will be widened to include a left turn lane. In addition, the intersection will be signalized.
- Intersection #3 – At the intersection of Willow Pass Road and SR 4 WB ramps, the northbound approach will be widened to include a left turn lane and two through lanes. In addition, the intersection will be signalized.
- Intersection #6 – At the intersection of San Marco Boulevard and W. Leland Road, the northbound approach will be widened to include an additional left turn lane and add an exclusive right turn lane. The existing westbound yielding right turn lane will be a free right turn lane. The free right turn lane will have its own auxiliary lane on the northbound departure.

Figure 4.12-3
Project Trip Distribution



Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

- Intersection #11 – At the intersection of Willow Pass Road and Loftus Road, the westbound approach will be widened to include an additional through lane.
- Intersection #15 – At the intersection of Leland Road and Alves Ranch Road, the southbound approach will be striped as a left turn lane and a shared through-right turn lane. This approach did not exist in the Existing condition.
- Intersection #18 – At the intersection of Bailey Road and W. Leland Road, the eastbound approach will be widened to include an additional left turn lane and add an exclusive right turn lane.
- Intersection #33 – At the intersection of Olivera Road and Willow Pass Road, the northbound and southbound approaches will be widened to add an additional northbound through lane and an additional southbound through lane.
- Intersection #34 – At the intersection of Farm Bureau Road and Concord Boulevard, the northbound and southbound approaches will be widened to add an additional northbound through lane and an additional southbound through lane.
- Intersection #38 – At the intersection of Farm Bureau Road and Clayton Road, the southbound approach will be widened to include an additional southbound lane that drops into the southbound right turn lane.
- Intersection #42 – The intersection of W. Leland Road and Santa Teresa Drive will be a new intersection in the Long-Term (2035) Condition. The intersection will be used by the San Marco Plan development. The eastbound approach will be two through lanes and a right turn lane. The westbound approach will be two through lanes and one left turn lane. The northbound approach will be one left turn lane and one right turn lane.
- Intersection #43 – The intersection of Bailey Road and the Project entrance will be a new intersection in the Long-term. The intersection will extend San Marco Boulevard to Bailey Road. The eastbound approach will be one left turn lane and one right turn lane. The northbound approach will be one left turn lane and one through lane. The southbound approach will be one right turn lane and one through lane.

In the Long-Term (2035) Condition, W. Leland Road is planned to be extended from San Marco Boulevard to Avila Road and Avila Road will be improved to the City's major arterial standards (i.e., a four-lane roadway with a raised median), regardless of whether the proposed project is developed or not. It should be noted that the City of Concord has historically objected to such improvements.

In addition, James Donlon Boulevard is planned to be extended from Somersville Road to Kirker Pass Road. Although the roadway is not within the study area, the extension could affect the volume distribution in the Long-Term (2035) Condition. Another planned major roadway improvement is the extension of San Marco Boulevard from its existing terminus to Bailey Road.

Impacts and Mitigation Measures

The proposed project impacts on the transportation system are evaluated in this section based on the standards of significance and methodology described above. Each impact is followed by recommended mitigation to reduce the identified impacts, if needed.

4.12-1 Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system during construction. Based on the analysis below, the impact would be *less than significant.*

Construction of the project, including site preparation and construction, and delivery activities, would generate contractor employee trips and a variety of construction-related vehicles. As a result, construction activities could include disruptions to the transportation network near the project site, including the possibility of temporary lane closures, street closures, sidewalk closures, and bikeway closures. The increase in traffic as a result of construction activities associated with the proposed project has been quantified assuming a worst-case, single-phase construction period of five years.

Heavy Equipment

Heavy equipment transport to and from the site could temporarily increase traffic on area roadways and intersections in the vicinity of the project site during construction. However, prior to tentative subdivision map approval, future development occurring within the project site would be required by the City to include the submittal of a Traffic Control Plan. The purpose of the Traffic Control Plan would be to ensure that construction-related traffic is managed in an orderly fashion and does not adversely affect local circulation systems.

The requirements within the Traffic Control Plan include, but are not limited to, the following: truck drivers would be notified of and required to use the most direct route between the site and SR 4, as determined by the City Engineering Department; all site ingress and egress would occur only at the main driveways to the project site and construction activities may require installation of temporary (or ultimate) traffic signals as determined by the City Engineer; specifically designated travel routes for large vehicles would be monitored and controlled by flaggers for large construction vehicle ingress and egress; warning signs indicating frequent truck entry and exit would be posted on major roadways in the area; and any debris and mud on nearby streets caused by trucks would be monitored daily and may require instituting a street cleaning program.

Employees

The weekday work would likely begin at approximately 7:00 AM and end at 4:00 PM (noise producing activities are restricted by City ordinance between 8:00 AM and 5:00 PM). The construction worker arrival peak would occur between 6:30 AM and 7:30 AM, and the departure peak would occur between 4:00 PM and 5:00 PM. The construction worker peak hours are slightly before the citywide commute peaks. It should be noted

that the number of trips generated during construction would occur over a five-year period. Construction workers would require parking areas during the peak construction period. Additionally, deliveries, visits, and other activities may generate peak non-worker parking demand for trucks and automobiles. Furthermore, the Traffic Control Plan requires construction employee parking be provided on the project site to eliminate conflicts with nearby residential areas and ensure a safe flow of traffic in the project area.

Construction Material Import

The project would also require the importation of construction material, including raw materials for the building pads, the buildings, the parking areas, and landscaping. Importing this material would require trucks for raw materials, concrete, and trucks for the parking lots, asphalt paving, and landscaping material. Each truck would generate one inbound and one outbound trip, accounting for two trips each. Under the provisions of the Traffic Control Plan, if importation and exportation of material becomes a traffic nuisance, then the City Engineer may limit the hours the activities can take place.

Conclusion

Based on the above, preparation of a Traffic Control Plan would ensure that acceptable operating conditions on local roadways and freeway facilities are maintained during construction activities, including requiring parking for construction employees on-site. Therefore, the proposed project would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system during construction, and a ***less-than-significant*** impact would occur. To the extent construction could result in noise or air quality impacts, please see Chapter 4.3, Air Quality and Greenhouse Gas Emissions, and Chapter 4.10, Noise, of this EIR.

This analysis assumed construction of the entire project in one phase to identify the potential worst-case traffic effects. If the project is built in phases over time, the overall intensity of construction would be reduced due to smaller areas of disturbance and distribution of construction traffic over a longer period of time. Each phase would be subject to a Traffic Control Plan and oversight by the City Engineer. The Traffic Control Plan would be required to prescribe specific durations and times for any required lane closures, provide an overview of the planned construction schedule, detail all required traffic control devices, and incorporate all other applicable information detailed in the City's standard Temporary Traffic Control Plan Checklist.

City review and approval of the Traffic Control Plan would ensure that construction traffic does not substantially impede safe and acceptable traffic flow on area roadways. The last phase may require added worker parking measures, depending on the circumstances, as remaining vacant land for parking would not be available; however, location of final phase construction worker parking would be determined through the Traffic Control Plan process.

Mitigation Measure(s)
None required.

4.12-2 Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the study intersections under Existing Plus Project Conditions. Based on the analysis below, because traffic generated by the proposed project would cause unacceptable LOS, increase delay, and increase traffic volumes by one percent or more at a number of intersections under Existing Plus Project Conditions, even with mitigation, the impact would be *significant and unavoidable*.

As noted previously, buildout of the Draft Master Plan Area would generate approximately 12,560 new daily trips, including 1,060 new AM peak hour trips and 1,202 new PM peak hour trips. In order to evaluate project impacts, such trips were assigned to the study intersections in accordance with the trip generation and distribution assumptions described above. Table 4.12-12 shows the Existing Plus Project LOS results at the study intersections.

Per Table 4.12-12, traffic generated by buildout of the Draft Master Plan Area would result in unacceptable LOS~~,~~ and increase delay by five seconds or more~~, and increase traffic volumes by one percent or more~~ at the following study intersections under the Existing Plus Project Condition:

- EB SR 4 ramps and Willow Pass Road (Intersection #2) (~~AM and~~ PM peak hour~~s~~);
- WB SR 4 ramps and Willow Pass Road (Intersection #3) (AM peak hour);
- W. Leland Road and San Marco Boulevard (Intersection #6) (AM peak hour);
- WB SR-4 ramps and San Marco Boulevard (Intersection #8) (AM peak hour);
- ~~Willow Pass Road and Loftus Road (Intersection #11) (AM peak hour);~~
- ~~W. Leland Road and Bailey Road (Intersection #18) (AM peak hour);~~
- ~~W. Leland Road and Chestnut Drive (Intersection #23) (AM peak hour);~~
- ~~W. Leland Road and Jacqueline Drive (Intersection #24) (AM peak hour);~~
- ~~W. Leland Road and Crestview Drive (Intersection #29) (AM peak hour);~~
- Concord Boulevard and Bailey Road (Intersection #35) (AM and PM peak hours); and
- Bailey Road and Myrtle Drive (Intersection #36) (AM peak hour).~~;~~
- ~~Clayton Road and Treat Boulevard (Intersection #39) (PM peak hour);~~
- ~~Cowell Road and Treat Boulevard (Intersection #41) (AM and PM peak hours); and~~
- ~~Treat Boulevard and Oak Grove Road (Intersection #44) (AM peak hour).~~

All other study intersections would either operate acceptably both with and without the proposed project or would not increase delay by five seconds or more ~~traffic volumes by one percent or more~~. Nonetheless, the Draft Master Plan could conflict with applicable General Plan LOS thresholds, and a ***significant*** impact could occur.

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing				Existing Plus Project					
			AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
			LOS	Delay	LOS	Delay	LOS	Delay	A Delay	LOS	Delay	A Delay
1. Avila Road/Willow Pass Road	SSSC	E	A	0.1	A	0.5	A	0.2	0.1	A	0.6	0.1
Worst Approach			*B*	*10.5*	*C*	*23.8*	B	10.6	0.1	D	29.5	5.7
2. EB SR 4 Ramps/ Willow Pass Road	AWSC	E	**F**	**117.5**	**F**	**201.1**	**F**	**136.7**	**19.2**	**F**	**255.8**	**54.7**
3. WB SR 4 Ramps/ Willow Pass Road	AWSC	E	**F**	**143.6**	C	19.2	**F**	**165.4**	**21.8**	C	22.7	3.5
4. Rio Verde Circle/San Marco Boulevard	AWSC	E	B	11.9	A	8.2	C	24.5	12.6	B	12.3	4.1
5. Santa Teresa Drive/San Marco Boulevard	AWSC	D	C	28.3	B	15.9	D	37.7	9.4	B	15.0	-0.9
6. W. Leland Road/San Marco Boulevard	Signal	D	D	39.7	C	25.9	**E**	**66.0**	**26.3**	C	26.9	1.0
7. EB SR 4 Ramps/San Marco Boulevard	Signal	D	A	9.5	B	13.7	B	12.3	2.8	C	23.8	10.1
8. WB SR 4 Ramp/San Marco Boulevard	Signal	D	C	26.9	B	18.5	C	30.8	3.9	B	19.8	1.3
9. Willow Pass Road/Port Chicago Highway	Signal	D	B	15.8	B	11.0	B	16.5	0.7	B	11.1	0.1
10. Willow Pass Road/Bailey Road	Signal	D	C	27.9	D	39.8	C	28.1	0.2	D	40.0	0.2
11. Willow Pass Road/Loftus Road	Signal	D	**F**	**107.2**	C	24.5	**F**	**108.4**	**1.2**	C	25.3	0.8
12. EB Willow Pass Road/Range Road	SSSC	E	A	5.5	A	6.6	A	5.8	0.3	A	6.7	0.1
Worst Approach			*B*	*11.1*	*B*	*11.5*	B	11.3	0.2	B	11.6	0.1
13. WB Willow Pass Road/Range Road	SSSC	E	A	0.2	A	0.5	A	0.2	0.0	A	0.5	0.0
Worst Approach			*A*	*0.8*	*A*	*0.8*	A	0.8	0.0	A	0.9	0.1

(Continued on next page)

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing				Existing Plus Project					
			AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
			LOS	Delay	LOS	Delay	LOS	Delay	Δ Delay	LOS	Delay	Δ Delay
14. Willow Pass Road/Railroad Avenue	Signal	D	C	23.1	C	20.6	C	23.2	0.1	C	20.8	0.2
15. W. Leland Road/Alves Ranch Road	Signal	D	B	11.8	A	9.7	B	11.8	0.0	A	9.6	-0.1
16. W. Leland Road/Woodhill Drive	Signal	D	A	8.2	A	7.8	A	8.2	0.0	A	7.7	-0.1
17. W. Leland Road/Southwood Drive	Signal	D	B	18.4	C	21.2	B	18.9	0.5	C	21.2	0.0
18. W. Leland Road/Bailey Road	Signal	E	**F**	**97.6**	D	52.3	**F**	**98.9**	**1.3**	E	63.9	11.6
19. Maylard Street/Bailey Road	Signal	E	B	11.6	B	18.1	B	12.3	0.7	B	18.7	0.6
20. EB SR 4 Ramps/Bailey Road	Signal	E	C	22.4	D	35.2	C	22.4	0.0	D	36.5	1.3
21. WB SR 4 Ramp/Bailey Road	Signal	E	C	25.2	B	19.3	C	28.3	3.1	B	19.5	0.2
22. Canal Road/Bailey Road	Signal	D	B	13.5	B	10.9	B	13.6	0.1	B	11.0	0.1
23. W. Leland Road/Chestnut Drive	Signal	D	**F**	**112.9**	C	27.8	**F**	**115.9**	**3.0**	C	26.4	-1.4
24. W. Leland Road/Jacqueline Drive	Signal	D	**E**	**75.2**	C	34.2	**E**	**78.7**	**3.5**	C	31.7	-2.5
25. W. Leland Road/Montevideo Drive	Signal	D	A	6.4	A	6.5	A	6.6	0.2	A	6.7	0.2
26. W. Leland Road/Range Road	Signal	D	C	31.8	D	46.2	C	31.4	-0.4	D	45.5	-0.7
27. W. Leland Road/Dover Way	Signal	D	C	28.9	C	33.1	C	28.8	-0.1	C	31.9	-1.2
28. W. Leland Road/Burton Avenue	Signal	D	B	16.9	C	30.9	B	17.9	1.0	C	29.8	-1.1

(Continued on next page)

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing				Existing Plus Project					
			AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
			LOS	Delay	LOS	Delay	LOS	Delay	Delay	LOS	Delay	Delay
29. W. Leland Road/Crestview Drive	Signal	D	F	111.8	D	39.0	F	114.1	2.3	D	38.5	0.5
30. W. Leland Road/Railroad Avenue	Signal	D	D	52.1	D	45.3	D	52.5	0.4	D	46.1	0.8
31. EB SR 4 Ramps/Railroad Avenue	Signal	D	C	25.4	E	63.1	C	25.6	0.2	E	63.0	0.1
32. WB SR 4 Ramp/Railroad Avenue	Signal	D	D	41.3	C	30.9	D	41.3	0.0	C	30.7	0.2
33. Willow Pass Road/Olivera Road	Signal	D	B	16.7	D	47.2	B	17.0	0.3	D	50.9	3.7
34. Concord Boulevard/Farm Bureau Road	Signal	D	C	25.4	C	26.5	C	25.9	0.5	C	27.2	0.7
35. Concord Boulevard/Bailey Road	Signal	D	E	64.5	E	65.0	F	100.9	36.4	F	88.0	23.0
36. Bailey Road/Myrtle Drive	SSSC		A	5.0	A	1.9	B	13.0	8.0	A	2.4	0.5
Worst Approach			*F*	*62.2*	*C*	*19.8*	F	203.9	141.7	D	29.1	9.3
37. Clayton Road/Babel Lane	Signal	D	C	25.4	C	30.9	C	25.5	0.1	C	31.3	0.4
38. Clayton Road/Farm Bureau Road	Signal	D	C	24	B	16.0	C	23.7	0.3	B	16.2	0.2
39. Clayton Road/Treat Boulevard	Signal	D	D	46	E	55.2	D	47.7	1.7	E	57.5	2.3
40. Clayton Road/Bailey Road	Signal	D	C	32.4	C	32.5	D	43.2	10.8	C	33.6	1.1
41. Cowell Road/Treat Boulevard	Signal	D	E	73. 2	F	89.0	E	78.6	5.4	F	90.7	1.7
42. W. Leland Road/Santa Teresa Drive	Signal	D	Future Intersection				Future Intersection					

(Continued on next page)

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing				Existing Plus Project					
			AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
			LOS	Delay	LOS	Delay	LOS	Delay	Δ Delay	LOS	Delay	Δ Delay
43. Bailey Road/Project Entrance	Signal	D	Future Intersection with Project				C	30.8	30.8	B	10.8	10.8
44. Treat Boulevard/Oak Grove Road	Signal	D	**E**	**59.7**	**F**	**93.5**	**E**	**60.3**	**0.6**	**F**	**96.4**	**2.9**
45. Willow Pass Road/Diamond Boulevard	Signal	D	B	17.2	D	39.4	B	17.2	0.0	D	39.5	0.1
46. Willow Pass Road/Market Street	Signal	E	D	38.2	D	43.8	D	39.6	1.4	D	44.1	0.3
47. Willow Pass Road/Galindo Street	Signal	E	D	37.8	D	51.0	D	37.6	-0.2	D	51.2	0.2
48. Concord Boulevard/Port Chicago Highway	Signal	E	E	61.5	C	23.6	E	75.3	13.8	C	24.7	1.1
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	Signal	D	**F**	**665.4**	**F**	**341.6**	**F**	**664.0**	**-1.4**	**F**	**339.7**	**-1.9**
50. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	Signal	D	D	39.3	D	47.1	D	39.2	-0.1	D	47.1	0.0

Notes:
Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
1. Each study intersection is controlled by a traffic signal, a side-street stop-control (SSSC), or an all-way stop-control (AWSC).
2. LOS criteria is based on seconds of delay.

Source: Kimley-Horn and Associates, 2017.

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing Plus Project									
			AM Peak Hour					PM Peak Hour				
			LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
1. Avila Road/Willow Pass Road	SSSC	D	A	0.2	0.1	0.38	0.01	A	0.6	0.1	0.5	0.01
Worst Approach			B	10.6	0.1	0.03	0.00	D	29.5	5.7	0.1	0.01
2. EB SR 4 Ramps/ Willow Pass Road	AWSC	E	E	47.9	9.4			**F**	**50.8**	**7.9**		
3. WB SR 4 Ramps/ Willow Pass Road	AWSC	E	**F**	**165.4**	**21.8**			C	22.7	3.5		
4. Rio Verde Circle/San Marco Boulevard	AWSC	E	C	24.5	12.6			B	12.3	4.1		
5. Santa Teresa Drive/San Marco Boulevard	AWSC	D	D	37.7	9.4			B	15.0	-0.9		
6. W. Leland Road/San Marco Boulevard	Signal	D	**F**	**298.4**	**53.4**			C	33.4	1.0		
7. EB SR 4 Ramps/San Marco Boulevard	Signal	D	B	12.3	2.8			C	23.8	10.1		
8. WB SR 4 Ramp/San Marco Boulevard	Signal	D	**F**	**173.3**	**5.1**			B	19.8	1.3		
9. Willow Pass Road/Port Chicago Highway	Signal	D	B	16.5	0.7			B	11.1	0.1		
10. Willow Pass Road/Bailey Road	Signal	D	C	28.1	0.2			D	40.0	0.2		
11. Willow Pass Road/Loftus Road	Signal	D	**F**	**108.4**	**1.2**			C	25.3	0.8		
12. EB Willow Pass Road/Range Road	SSSC	E	A	5.8	0.3			A	6.7	0.1		
Worst Approach			B	11.3	0.2			B	11.6	0.1		
13. WB Willow Pass Road/Range Road	SSSC	E	A	0.2	0.0			A	0.5	0.0		
Worst Approach			A	0.8	0.0			A	0.9	0.1		

(Continued on next page)

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing Plus Project									
			AM Peak Hour					PM Peak Hour				
			LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
14. Willow Pass Road/Railroad Avenue	Signal	D	C	23.2	0.1			C	20.8	0.2		
15. W. Leland Road/Alves Ranch Road	Signal	D	B	11.8	0.0			A	9.6	-0.1		
16. W. Leland Road/Woodhill Drive	Signal	D	A	8.2	0.0			A	7.7	-0.1		
17. W. Leland Road/Southwood Drive	Signal	D	B	18.9	0.5			C	21.2	0.0		
18. W. Leland Road/Bailey Road	Signal	E	**F**	**98.9**	**1.3**			E	63.9	11.6		
19. Maylard Street/Bailey Road	Signal	E	B	12.3	0.7			B	18.7	0.6		
20. EB SR 4 Ramps/Bailey Road	Signal	E	C	22.4	0.0			D	36.5	1.3		
21. WB SR 4 Ramp/Bailey Road	Signal	E	C	28.3	3.1			B	19.5	0.2		
22. Canal Road/Bailey Road	Signal	D	B	13.6	0.1			B	11.0	0.1		
23. W. Leland Road/Chestnut Drive	Signal	D	**F**	**115.9**	**3.0**			C	26.4	-1.4		
24. W. Leland Road/Jacqueline Drive	Signal	D	**E**	**78.7**	**3.5**			C	31.7	-2.5		
25. W. Leland Road/Montevideo Drive	Signal	D	A	6.6	0.2			A	6.7	0.2		
26. W. Leland Road/Range Road	Signal	D	C	31.4	-0.4			D	45.5	-0.7		
27. W. Leland Road/Dover Way	Signal	D	C	28.8	-0.1			C	31.9	-1.2		
28. W. Leland Road/Burton Avenue	Signal	D	B	17.9	1.0			C	29.8	-1.1		

(Continued on next page)

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing Plus Project									
			AM Peak Hour					PM Peak Hour				
			LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
29. W. Leland Road/Crestview Drive	Signal	D	**F**	**114.1**	**2.3**			D	38.5	-0.5		
30. W. Leland Road/Railroad Avenue	Signal	D	D	52.5	0.4			D	46.1	0.8		
31. EB SR 4 Ramps/Railroad Avenue	Signal	D	C	25.6	0.2			**E**	**63.0**	**-0.1**		
32. WB SR 4 Ramp/Railroad Avenue	Signal	D	D	41.3	0.0			C	30.7	-0.2		
33. Willow Pass Road/Olivera Road	Signal	E	B	17.0	0.3	0.63	0.01	D	50.9	3.7	0.9	0.02
34. Concord Boulevard/Farm Bureau Road	Signal	D	C	25.9	0.5	0.76	0.03	C	27.2	0.7	0.8	0.03
35. Concord Boulevard/Bailey Road	Signal	D	**F**	**100.9**	**36.4**	**1.04**	**0.10**	**F**	**88.0**	**23.0**	**1.0**	**0.13**
36. Bailey Road/Myrtle Drive	SSSC	D	B	13.0	8.0	0.30	0.07	A	2.4	0.5	0.5	0.11
Worst Approach			**F**	**203.9**	**141.7**	**0.83**	**0.27**	D	29.1	9.3	0.4	0.13
37. Clayton Road/Babel Lane	Signal	E	C	25.5	0.1	0.75	0.01	C	31.3	0.4	0.8	0.00
38. Clayton Road/Farm Bureau Road	Signal	E	C	23.7	-0.3	0.78	0.01	B	16.2	0.2	0.6	0.00
39. Clayton Road/Treat Boulevard	Signal	E	D	47.7	1.7	0.83	0.01	E	57.5	2.3	0.9	0.04
40. Clayton Road/Bailey Road	Signal	E	D	43.2	10.8	0.87	0.10	C	33.6	1.1	0.7	0.02
41. Cowell Road/Treat Boulevard	Signal	D	**E**	**78.6**	**5.4**	**0.96**	**0.02**	**F**	**90.7**	**1.7**	**1.1**	**0.02**
42. W. Leland Road/Santa Teresa Drive	Signal	D	Future Intersection									
43. Bailey Road/Project Entrance	Signal	D	C	30.8	30.8			B	10.8	10.8		

(Continued on next page)

Table 4.12-12
Intersection LOS – Existing Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Existing Plus Project									
			AM Peak Hour					PM Peak Hour				
			LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
44. Treat Boulevard/Oak Grove Road	Signal	E	**E**	**60.3**	**0.6**	0.95	0.01	**F**	**96.4**	**2.9**	**1.0**	**0.02**
45. Willow Pass Road/Diamond Boulevard	Signal	E	B	17.2	0.0	0.48	0.00	D	39.5	0.1	0.7	0.01
46. Willow Pass Road/Market Street	Signal	E	D	39.6	1.4	0.79	0.01	D	44.1	0.3	1.0	0.00
47. Willow Pass Road/Galindo Street	Signal	E	D	37.6	-0.2	0.68	0.01	D	51.2	0.2	0.9	0.01
48. Concord Boulevard/Port Chicago Highway	Signal	E	E	75.3	13.8	0.81	0.02	C	24.7	1.1	0.5	0.02
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	Signal	D	**F**	**664.0**	**-1.4**	**1.04**	**0.01**	**F**	**339.7**	**-1.9**	**0.9**	**0.01**
50. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	Signal	E	D	39.2	-0.1	0.68	0.01	D	47.1	0.0	0.7	0.01

Notes:
Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
1. Each study intersection is controlled by a traffic signal, a side-street stop-control (SSSC), or an all-way stop-control (AWSC).
2. LOS criteria is based on seconds of delay.

Source: Kimley-Horn and Associates, 2019

Mitigation Measure(s)

Table 4.12-13 shows the study intersection LOS in the Existing Plus Project Condition both with and without mitigation. ~~With the exception of the following intersections, which would remain *significant and unavoidable*, implementation of the following mitigation measures would reduce impacts to the remaining intersections to less-than-significant levels:~~ While mitigation measures would be implemented which would reduce some impacts to the intersections found to operate unacceptably, the impacts at the following intersections would remain *significant and unavoidable*:

- EB SR 4 Ramps/Willow Pass Road (Intersection #2);
- WB SR 4 Ramps/Willow Pass Road (Intersection #3);
- W. Leland Road/San Marco Boulevard (Intersection #6);
- WB SR-4 Ramps/San Marco Boulevard (Intersection #18); and
- Concord Boulevard and Bailey Road (Intersection #35).~~;~~
- ~~Bailey Road and Myrtle Drive intersection (Intersection #36);~~
- ~~Clayton Road Treat Boulevard intersection (Intersection #39); and~~
- ~~Treat Boulevard and Oak Grove Road (Intersection #44).~~

A discussion of the mitigation measure(s) required for each impacted intersection, as well as a description of how the measures would reduce impacts at that intersection, is provided below, immediately following the list of mitigation measures.

4.12-2(a) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Capital Improvement Program for the 2015 Update to the Contra Costa CMP (Project 1028). Such improvements would include, but would not necessarily be limited to, the following:

1. *The EB SR-4 Ramps/Willow Pass Road intersection shall be signalized, a southbound left turn lane shall be added, the shared southbound through-left lane shall be restriped to be a through lane, and the eastbound approach shall be restriped to be an eastbound left turn lane and a shared eastbound through-right lane; and*
2. *The WB SR-4 Ramps/Willow Pass Road shall be signalized, a northbound left turn lane shall be added, the northbound shared through-left turn lane shall be restriped to be a through lane, and the westbound approach shall be restriped to be two westbound left turn lanes and a shared westbound through-right lane.*

Proof of payment shall be submitted to the City of Pittsburg Community Development Department.

Table 4.12-13
Intersection LOS – Existing Plus Project Conditions with Mitigation

Intersection	Delay Criteria[1]	Existing Plus Project										Existing Plus Project (Mitigated)					
		AM Peak Hour					PM Peak Hour					AM Peak Hour			PM Peak Hour		
		LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	LOS	Delay	Δ Delay
1. Avila Road/Willow Pass Road	~~E~~D	A	0.2	0.1	0.38	0.01	A	0.6	0.1	0.48	0.01						
Worst Approach		B	10.6	0.1	0.03	0.00	D	29.5	5.7	0.14	0.01						
2. EB SR 4 Ramps/ Willow Pass Road	E	~~F~~E	~~136.7~~ 47.9	~~19.2~~ 9.4			**F**	~~255.8~~ **50.8**	~~54.7~~ **7.9**						B	10.7	-32.2
3. WB SR 4 Ramps/ Willow Pass Road	E	**F**	**165.4**	**21.8**			C	22.7	3.5			**E**	**66.2**	**-77.4**			
4. Rio Verde Circle/San Marco Boulevard	E	C	24.5	12.6			B	12.3	4.1								
5. Santa Teresa Drive/San Marco Boulevard	D	D	37.7	9.4			B	15.0	-0.9								
6. W. Leland Road/San Marco Boulevard	D	~~E~~F	~~66.0~~ **298.4**	~~26.3~~ **53.4**			C	~~26.9~~ 33.4	1.~~0~~1			**F**	**298.4**	**53.4**			
7. EB SR 4 Ramps/San Marco Boulevard	D	B	12.3	2.8			C	23.8	10.1								
8. WB SR 4 Ramp/San Marco Boulevard	D	~~C~~F	~~30.8~~ **173.3**	~~3.9~~ **5.1**			B	19.8	1.3			**F**	**173.3**	**5.1**			
9. Willow Pass Road/Port Chicago Highway	D	B	16.5	0.7			B	11.1	0.1								
10. Willow Pass Road/Bailey Road	D	C	28.1	0.2			D	40.0	0.2								
11. Willow Pass Road/Loftus Road	D	**F**	**108.4**	**1.2**			C	25.3	0.8								
12. EB Willow Pass Road/Range Road	E	A	5.8	0.3			A	6.7	0.1								
Worst Approach		B	11.3	0.2			B	11.6	0.1								
13. WB Willow Pass Road/Range Road	E	A	0.2	0.0			A	0.5	0.0								
Worst Approach		A	0.8	0.0			A	0.9	0.1								
14. Willow Pass Road/Railroad Avenue	D	C	23.2	0.1			C	20.8	0.2								
15. W. Leland Road/Alves Ranch Road	D	B	11.8	0.0			A	9.6	-0.1								
16. W. Leland Road/Woodhill Drive	D	A	8.2	0.0			A	7.7	-0.1								
17. W. Leland Road/Southwood Drive	D	B	18.9	0.5			C	21.2	0.0								
18. W. Leland Road/Bailey Road	E	**F**	**98.9**	**1.3**			E	63.9	11.6								
19. Maylard Street/Bailey Road	E	B	12.3	0.7			B	18.7	0.6								
20. EB SR 4 Ramps/Bailey Road	E	C	22.4	0.0			D	36.5	1.3								
21. WB SR 4 Ramp/Bailey Road	E	C	28.3	3.1			B	19.5	0.2								
22. Canal Road/Bailey Road	D	B	13.6	0.1			B	11.0	0.1								
23. W. Leland Road/Chestnut Drive	D	**F**	**115.9**	**3.0**			C	26.4	-1.4								
24. W. Leland Road/Jacqueline Drive	D	**E**	**78.7**	**3.5**			C	31.7	-2.5								
25. W. Leland Road/Montevideo Drive	D	A	6.6	0.2			A	6.7	0.2								
26. W. Leland Road/Range Road	D	C	31.4	-0.4			D	45.5	-0.7								
27. W. Leland Road/Dover Way	D	C	28.8	-0.1			C	31.9	-1.2								
28. W. Leland Road/Burton Avenue	D	B	17.9	1.0			C	29.8	-1.1								
29. W. Leland Road/Crestview Drive	D	**F**	**114.1**	**2.3**			D	38.5	-0.5								
30. W. Leland Road/Railroad Avenue	D	D	52.5	0.4			D	46.1	0.8								
31. EB SR 4 Ramps/Railroad Avenue	D	C	25.6	0.2			**E**	**63.0**	**-0.1**								
32. WB SR 4 Ramp/Railroad Avenue	D	D	41.3	0.0			C	30.7	-0.2								
33. Willow Pass Road/Olivera Road	D	B	17.0	0.3	0.63	0.01	D	50.9	3.7	0.91	0.02						
34. Concord Boulevard/Farm Bureau Road	D	C	25.9	0.5	0.76	0.03	C	27.2	0.7	0.77	0.03						
35. Concord Boulevard/Bailey Road	D	**F**	**100.9**	**36.4**	**1.04**	**0.10**	**F**	**88.0**	**23.0**	**0.99**	**0.13**	**E**	**67.1**	**6.2**	**E**	**56.1**	**-8.9**
36. Bailey Road/Myrtle Drive	E	B	13.0	8.0	0.30	0.07	A	2.4	0.5	0.54	0.11						

Continued on Next Page

Table 4.12-13
Intersection LOS – Existing Plus Project Conditions with Mitigation

Intersection	Delay Criteria[1]	Existing Plus Project										Existing Plus Project (Mitigated)					
		AM Peak Hour					PM Peak Hour					AM Peak Hour			PM Peak Hour		
		LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	LOS	Delay	Δ Delay
Worst Approach		**F**	**203.9**	**141.7**	**0.83**	**0.27**	D	29.1	9.3	0.43	0.13	B	16.8	-45.4			
37. Clayton Road/Babel Lane	D	C	25.5	0.1	0.75	0.01	C	31.3	0.4	0.78	0.00						
38. Clayton Road/Farm Bureau Road	D	C	23.7	-0.3	0.78	0.01	B	16.2	0.2	0.60	0.00						
39. Clayton Road/Treat Boulevard	D	D	47.7	1.7	0.83	0.01	E	57.5	2.3	0.88	0.04						
40. Clayton Road/Bailey Road	D	D	43.2	10.8	0.87	0.10	C	33.6	1.1	0.68	0.02						
41. Cowell Road/Treat Boulevard	D	**E**	**78.6**	**5.4**	**0.96**	**0.02**	**F**	**90.7**	**1.7**	**1.11**	**0.02**						
42. W. Leland Road/Santa Teresa Drive	D	Future Intersection															
43. Bailey Road/Project Entrance	D	C	30.8	30.8			B	10.8	10.8								
44. Treat Boulevard/Oak Grove Road	D	**E**	**60.3**	**0.6**	0.95	**0.01**	**F**	**96.4**	**2.9**	**0.99**	**0.02**						
45. Willow Pass Road/Diamond Boulevard	D	B	17.2	0.0	**0.48**	0.00	D	39.5	0.1	0.74	0.01						
46. Willow Pass Road/Market Street	E	D	39.6	1.4	0.79	0.01	D	44.1	0.3	0.96	0.00						
47. Willow Pass Road/Galindo Street	E	D	37.6	-0.2	0.68	0.01	D	51.2	0.2	0.88	0.01						
48. Concord Boulevard/Port Chicago Highway	E	E	75.3	13.8	0.81	0.02	C	24.7	1.1	0.54	0.02						
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	D	**F**	**664.0**	**-1.4**	1.04	**0.01**	**F**	**339.7**	**-1.9**	**0.91**	**0.01**						
50. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	D	D	39.2	-0.1	**0.68**	0.01	D	47.1	0.0	0.74	0.01						

Notes:
Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
[1] LOS criteria is based on seconds of delay.

Source: Kimley-Horn and Associates, 2017~~9~~.

~~*4.12-2(b) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP (Project ST-7) to the City of Pittsburg Community Development Department. Such improvements would include, but would not necessarily be limited to, optimization of cycle lengths/intersection timing splits at the following intersections:*~~

- ~~*W. Leland Road and San Marco Boulevard (Intersection #6);*~~
- ~~*Willow Pass Road and Loftus Road (Intersection #11);*~~
- ~~*Leland Road and Bailey Road (Intersection #18);*~~
- ~~*Leland Road and Jacqueline Drive (Intersection #24);*~~
- ~~*Leland Road and Crestview Drive (Intersection #29).*~~

~~*Proof of payment shall be submitted to the City of Pittsburg Community Development Department.*~~

~~*4.12-2(c) As part of future development applications, the project applicant shall show that the westbound left turn and eastbound left turn movements at W. Leland Road and Chestnut Drive (Intersection #23) would be converted from protected left turn phasing to permitted left turn phasing. Implementation of the required improvements shall be accomplished by way of one of the following methods:*~~

~~*If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.*~~

~~*Or*~~

~~*If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.*~~

4.12-2(~~d~~ b) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Concord CIP (Project 2049). Such improvements would include, but would not necessarily be limited to, the following:

- *The southbound approach at the Concord Boulevard and Bailey Road intersection shall be widened and restriped to include a southbound left turn lane, a southbound through lane, and a southbound right turn lane. ~~In addition, t~~ The northbound approach*

shall be widened to be a northbound left turn lane and a shared through-right turn lane;

- *The northbound and southbound approach shall be modified from split phasing to protected phasing; and*
- *The Bailey Road and Myrtle Drive intersection shall be signalized, a southbound left turn lane shall be added, and the shared southbound through-left lane shall be restriped to be a through lane.*

~~*4.12-2(e) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Concord CIP (Project 2144). Such improvements would include, but would not necessarily be limited to, the following:*~~

- ~~*The Clayton Road and Treat Boulevard intersection shall be widened for the northbound approach to be two northbound left turn lanes, two northbound through lanes, and a northbound right turn lane. In addition, the northbound and southbound phases shall be changed from split phasing to protected phasing and the intersection timing splits shall be optimized.*~~

~~*4.12-2(f) Prior to occupancy of the proposed buildings, the project applicant shall optimize the intersection timing splits at the following City of Concord intersections: Cowell Road and Treat Boulevard (Intersection #41); and Treat Boulevard and Oak Grove Road (Intersection #44).*~~

EB SR 4 ramps and Willow Pass Road (Intersection #2)

As presented above, Mitigation Measure 4.12-2(a) includes the following improvements to the EB SR 4 ramps and Willow Pass Road intersection: signalization; addition of a southbound left turn lane; restriping of the shared southbound through-left lane to be a through lane; and restriping of the eastbound approach to be an eastbound left turn lane and a shared eastbound through-right lane. The aforementioned improvement has been planned by the Capital Improvement Program for the 2015 Update to the Contra Costa CMP (Project 1028); however, funding sources have not yet been identified, and a timeframe for the improvement has not been established. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(a) would improve the operations at the EB SR 4 ramps and Willow Pass Road intersection to LOS B in the ~~AM and~~ PM peak hour~~s~~ which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of ~~Concord~~ Pittsburg. However, given that funding is not available for the required improvements, the impact to the EB SR 4 ramps and Willow Pass Road intersection would remain *significant and unavoidable.*

- Implement Mitigation Measure 4.12-2(a).

WB SR 4 Ramps and Willow Pass Road (Intersection #3)

As shown above, Mitigation Measure 4.12-2(a) includes the following improvements to the WB SR 4 ramps and Willow Pass Road intersection: signalization; addition of a northbound left turn lane; restriping of the northbound shared through-left turn lane to be a through lane; and restriping of the westbound approach to be two westbound left turn lanes and a shared westbound through-right lane. The aforementioned improvement has been planned by the Capital Improvement Program for the 2015 Update to the Contra Costa CMP (Project 1028), although funding sources have not yet been identified, and a timeframe for the improvement has not been established As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(a) would improve the operations at the WB SR 4 ramps and Willow Pass Road intersection to LOS E in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. Although the intersection would operate better than without the proposed project, funding is not available for the required improvements, Therefore, the project impact to the WB SR 4 ramps and Willow Pass Road intersection would remain *significant and unavoidable.*

- Implement Mitigation Measure 4.12-2(a).

W. Leland Road and San Marco Boulevard (Intersection #6)

~~As shown above, Mitigation Measure 4.12-2(b) includes optimization of the intersection cycle length at the W. Leland Road and San Marco Boulevard intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-7) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(b) would improve the operations at the W. Leland Road and San Marco Boulevard intersection to LOS C in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-2(b) would reduce the impact to the W. Leland Road and San Marco Boulevard intersection to a *less-than-significant* level.~~

As shown above, the W. Leland Road and San Marco Boulevard intersection operates at Los F during the AM peak hour, which is unacceptable under Existing Conditions. The intersection would increase in delay by five seconds or more with the addition of the proposed project. In order to mitigate the impacts expected to occur in the Existing plus Project Conditions, the WB SR-4 loop on-ramp from NB San Marco Boulevard would need to be modified. Currently, a ramp meter has been implemented for the on-ramp in the AM peak period, which results in on-ramp queues that extend onto NB San Marco Boulevard and onto WB Leland Road. Even without ramp metering at the intersection, the on-ramp volume and freeway volumes are high enough to cause congestion. Therefore, a feasible solution does not exist to reduce the LOS at the intersection to an acceptable standard. In addition, any improvements would involve cooperation with Caltrans and could not be guaranteed by the City of Pittsburg. Therefore, the impact would be *significant and unavoidable.*

- ~~Implement Mitigation Measure 4.12-2(b).~~ Mitigation not feasible.

WB SR-4 Ramps and San Marco Boulevard (Intersection #8

The WB SR-4 Ramps and San Marco Boulevard intersection operates at LOS F during the AM peak hour, which is unacceptable under the Existing Condition. The intersection would increase in delay by five seconds or more with the addition of the proposed project. To mitigate, the project impacts expected to occur in the Existing Plus Project Condition, the WB SR-4 diagonal on-ramp from SB San Marco Boulevard would need to be modified. Ramp metering is currently implemented for the on-ramp in the AM peak period. The result is queuing onto SB San Marco Boulevard and WB Willow Pass road. Even without ramp metering, the on-ramp volume and freeway volumes at the intersection are high enough to cause congestion. In addition, any improvements would involve cooperation with Caltrans and could not be guaranteed by the City of Pittsburg. Therefore, feasible mitigation is not possible and the impact remains *significant and unavoidable*.

- Mitigation not feasible.

~~*Willow Pass Road and Loftus Road (Intersection #11)*~~

~~As shown above, Mitigation Measure 4.12-2(b) includes optimization of the intersection cycle length at the Willow Pass Road and Loftus Road intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-7) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(b) would improve the operations at the Willow Pass Road and Loftus Road intersection to LOS D in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-2(b) would reduce the impact to the Willow Pass Road and Loftus Road intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-2(b).~~

~~*W. Leland Road and Bailey Road (Intersection #18)*~~

~~As shown above, Mitigation Measure 4.12-2(b) includes optimization of the intersection cycle length at the W. Leland Road and Bailey Road intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-7) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(b) would improve the operations at the W. Leland Road and Bailey Road intersection to LOS F in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. However, the intersection would operate better than without the proposed project. Therefore, implementation of Mitigation Measure 4.12-2(b) would~~

~~reduce the project impact to the W. Leland Road and Bailey Road intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-2(b).~~

~~*W. Leland Road and Chestnut Drive (Intersection #23)*~~

~~As shown above, Mitigation Measure 4.12-2(c) includes conversion of the westbound left turn and eastbound left turn movements from protected left turn phasing to permitted left turn phasing at the W. Leland Road and Chestnut Drive intersection. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(c) would improve the operations at the W. Leland Road and Chestnut Drive intersection; however, the intersection would continue to operate at LOS F in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Nonetheless, the intersection would operate better than without the proposed project. Therefore, implementation of Mitigation Measure 4.12-2(c) would reduce the project impact to the W. Leland Road and Chestnut Drive intersection to a *less-than-significant* level. Because the intersection already operated at LOS F without the project, and the proposed mitigation improves the intersection operations to better than the without project conditions, the project shall be responsible for a proportionate share of the mitigation costs.~~

- ~~Implement Mitigation Measure 4.12-2(c).~~

~~*W. Leland Road and Jacqueline Drive (Intersection #24)*~~

~~As shown above, Mitigation Measure 4.12-2(b) includes optimization of the intersection cycle length at the W. Leland Road and Jacqueline Drive intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-7) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(b) would improve the operations at the W. Leland Road and Jacqueline Drive intersection to LOS D in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-2(b) would reduce the impact to the W. Leland Road and Jacqueline Drive intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-2(b).~~

~~*W. Leland Road and Crestview Drive (Intersection #29)*~~

~~As shown above, Mitigation Measure 4.12-2(b) includes optimization of the intersection cycle length at the W. Leland Road and Crestview Drive intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-7) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(b) would improve the~~

~~operations at the W. Leland Road and Crestview Drive intersection; however, the intersection would continue to operate at LOS F in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. Nonetheless, the intersection would operate better than without the proposed project. Therefore, implementation of Mitigation Measure 4.12-2(b) would reduce the project impact to the W. Leland Road and Crestview Drive intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-2(b).~~

Concord Boulevard and Bailey Road (Intersection #35)

As shown above, Mitigation Measure 4.12-2(d) includes the following improvements to the Concord Boulevard and Bailey Road intersection: widening of the southbound approach and restriping to include a southbound left turn lane, a southbound through lane, and a southbound right turn lane; and restriping of the northbound approach to be a northbound left turn lane and a shared through-right turn lane. In addition, the northbound and southbound approach would be modified from split phasing to protected phasing. The aforementioned improvement has been planned by the Concord CIP (Project 2049) with funding from traffic mitigation fees, grant funds, and Concord-owned ROW. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(d) would improve the operations at the Concord Boulevard and Bailey Road intersection to LOS E in the AM and PM peak hours, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. In both the AM and PM peak hour, the v/c still increases by 0.03 or more with the mitigation. ~~During the PM peak hour, the delay would operate better than without the proposed project. However, during the AM peak hour, the delay would continue to be substantially worse with the inclusion of project-generated traffic.~~ As such, the impact to the Concord Boulevard and Bailey Road intersection would remain *significant and unavoidable*.

- Implement Mitigation Measure 4.12-2(d).

Bailey Road and Myrtle Drive (Intersection #36)

As shown above, Mitigation Measure 4.12-2(d) includes the following improvements to the Bailey Road and Myrtle Drive intersection: signalization; addition of a southbound left turn lane; and restriping of the shared southbound through-left lane to be a through lane. The aforementioned improvement has been planned by the Concord CIP (Project 2049) with funding from traffic mitigation fees, grant funds, and Concord-owned ROW. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(d) would improve the operations at the Bailey Road and Myrtle Drive intersection to LOS B in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. However, given that a timeframe has not been established, completion of the proposed improvements prior to buildout of the project site cannot be guaranteed. As such, the impact to the Bailey Road and Myrtle Drive intersection would temporarily remain *significant and unavoidable*.

- Implement Mitigation Measure 4.12-2(d).

~~*Clayton Road and Treat Boulevard (Intersection #39)*~~

~~As shown above, Mitigation Measure 4.12-2(e) includes the following improvements to the Clayton Road and Treat Boulevard intersection: widening of the northbound approach to be two northbound left turn lanes, two northbound through lanes, and a northbound right turn lane; and changing of the northbound and southbound phases from split phasing to protected phasing. The aforementioned improvement has been planned by the Concord CIP (Project 2144), with funding from the Measure J bond, Proposition 111, and Measure C local funds. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(e) would improve the operations at the Clayton Road and Treat Boulevard intersection to LOS D in the PM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. However, given that a timeframe has not been established, completion of the proposed improvements prior to buildout of the project cannot be guaranteed. Therefore, the impact to the Clayton Road and Treat Boulevard intersection would temporarily remain *significant and unavoidable*.~~

- ~~Implement Mitigation Measure 4.12-2(e).~~

~~*Cowell Road and Treat Boulevard (Intersection #41)*~~

~~As shown above, Mitigation Measure 4.12-2(f) includes optimization of the intersection timing splits at the Cowell Road and Treat Boulevard intersection. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(f) would improve the operations at the Cowell Road and Treat Boulevard intersection to LOS E in the AM peak hour and LOS D in the PM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. However, the intersection would operate better than without the proposed project. Nonetheless, given that the Concord CIP does not include a city-wide timing update, the project impact to the Cowell Road and Treat Boulevard intersection would remain *significant and unavoidable*.~~

- ~~Implement Mitigation Measure 4.12-2(f).~~

~~*Treat Boulevard and Oak Grove Road (Intersection #44)*~~

~~As shown above, Mitigation Measure 4.12-2(f) includes optimization of the intersection timing splits at the Treat Boulevard and Oak Grove Road intersection. As shown in Table 4.12-13, implementation of Mitigation Measure 4.12-2(f) would improve the operations at the Treat Boulevard and Oak Grove Road intersection to LOS E in the AM and PM peak hours, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. During the PM peak hour, the delay would operate better than without the proposed project. However, during the AM peak hour, the delay would continue to be substantially worse with the inclusion of project-generated~~

~~traffic. In addition, the Concord CIP does not include a city-wide timing update. As such, even with implementation of Mitigation Measure 4.12-2(b), the impact to the Treat Boulevard and Oak Grove Road intersection would remain *significant and unavoidable*.~~

- ~~Implement Mitigation Measure 4.12-2(f).~~

4.12-3 Conflict with an applicable congestion management program, including, but not limited to, LOS standards, and travel demand measures, or other standards established by a county congestion management agency for designated roadways. Based on the analysis below, the impact would be *~~less than significant~~* *significant and unavoidable*.

The Central and East County Routes of Regional Significance were evaluated based on the respective MTSO criteria, including DI, roadway average speed, roadway average stopped delay, LOS, V/C, and persons in vehicles in the HOV lane. A discussion regarding each MTSO criteria is provided below.

Delay Index

Table 4.12-15 summarizes the delay index for the Routes of Regional Significance in the study area. SR-4 in the East County operates at an acceptable DI for the Existing and Existing Plus Project Conditions at all freeway segments, with the exception of the following:

- EB SR-4 in the East County operates at a delay index of 5.1 in the PM peak hour under Existing Conditions. The addition of project traffic would increase the DI to 5.4, which does not meet the applicable DI criteria of 2.5 or better.

SR-4 in the Central County operates at an acceptable DI for Existing and Existing Plus Project Conditions at all freeway segments, with the exception of the following:

- NB SR-242 in the Central County operates at a delay index of 3.4 in the PM Peak hour in the Existing Conditions. The addition of project traffic would increase the delay index to 3.5, which exceeds the applicable DI criteria of 2.5 or better.

~~SR-4 in the East County operates at a DI of 1.1 or better for the Existing and Existing Plus Project Conditions, which meets the applicable DI criteria of 2.5 or better for that roadway. SR-4 in the Central County operates at a DI of 1.1 or better for the Existing and Existing Plus Project Conditions, which meets the applicable DI criteria of 1.0 or better for that roadway. SR-242 in the Central County operates at a DI of 1.0 or better for the Existing and Existing Plus Project Conditions, which meets the applicable DI criteria of 3.0 or better for that roadway. Therefore, all roadway facilities in Central and East County meet the MTSO DI criteria for the Existing and Existing Plus Project Conditions.~~

Other MTSCOs

Other MTSOs analyzed per the CCTA established criteria include average speed, average stopped delay, arterial LOS, V/C, and HOV usage. Table 4.12-16 summarizes the MTSOs for the Routes of Regional Significance in the Central County. As shown in Table 4.12-16, all of the study corridors in the Central County meet the MTSO criteria for the Existing and Existing Plus Project Condition.

HOV Lane Summary

Table 4.12-14 summarizes the persons using the HOV lane in the peak direction for the Existing Plus Project Condition. As shown in Table 4.12-14, the number of vehicles in the HOV lane would exceed the 600-vehicle utilization goal for each peak direction and scenario. Thus, the project would not conflict with the applicable HOV lane utilization standard.

Table 4.12-14
HOV Lane Summary – SR 4 – Existing Plus Project Conditions

Scenario	Peak	Direction	Vehicles Using HOV Lane	Persons Using HOV Lane
Existing	AM	EB	1,755	3,608
	PM	WB	703	1,470
Existing Plus Project	AM	EB	1,823	3,747
	PM	WB	737	1,539

Source: Kimley-Horn and Associates, 2017.

Conclusion

Based on the above analysis, all roadway facilities in Central and East County would ~~continue to~~ meet the MTSO criteria for Routes of Regional Significance, with the exception of the above-listed freeway segments which would increase DI with the addition of project traffic. Therefore, the proposed project would have a ***~~less-than-significant~~*** ***significant*** impact to the Central and East County Routes of Regional Significance under the Existing Plus Project Condition and ~~would be consistent~~ could conflict with the Cortese-Knox Hertzberg Local Government Reorganization Act of 2000 and Contra Costa County Local Agency Formation Commission Policy (g), as discussed in Appendix J of ~~this~~ the Draft EIR.

Table 4.12-15
Delay Index Summary – Existing Plus Project Conditions

Roadway Segment	Distance (miles)	Uncongested Travel Time		Existing				Existing Plus Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		AM Peak	PM Peak	CTT	DI	CTT	DI	CTT	DI	CTT	DI
East County											
EB SR 4	~~4.23~~2.99	~~234.5~~2.39	~~234.5~~2.39	~~234.5~~ 2.58	~~1.0~~ 1.1	~~249.9~~ 12.15	~~1.1~~**5.1**	~~234.5~~ 2.59	~~1.0~~1.1	~~254.0~~ 12.82	~~1.1~~**5.4**
WB SR 4	~~4.23~~3.53	~~234.5~~2.82	~~234.5~~2.82	~~241.9~~ 8.35	~~1.0~~ **3.0**	~~234.5~~ 2.93	~~1.0~~1.0	~~245.8~~ 8.52	~~1.0~~**3.0**	~~234.5~~	~~1.0~~1.0
Central County											
Eastbound SR 4	~~6.13~~4.43	~~339.5~~3.55	~~339.5~~3.55	~~339.5~~ 4.10	~~1.0~~1.2	~~367.8~~ 12.38	~~1.1~~3.5	~~339.5~~ 4.11	~~1.0~~1.2	~~374.0~~ 12.49	~~1.1~~3.5
Westbound SR 4	~~6.13~~3.63	~~339.5~~2.90	~~339.5~~2.90	~~361.8~~ 5.51	~~1.1~~1.9	~~339.5~~ 3.17	~~1.0~~1.1	~~367.8~~ 5.79	~~1.1~~2.0	~~339.5~~ 3.18	~~1.0~~1.1
Northbound SR 242	~~3.52~~2.50	~~194.7~~2.00	~~194.7~~2.00	~~194.7~~ 2.41	~~1.0~~1.2	~~194.7~~ 6.70	~~1.0~~3.4	~~194.7~~ 2.40	~~1.0~~1.2	~~197.8~~ 6.90	~~1.0~~**3.5**
Southbound SR 242	~~3.52~~2.23	~~194.7~~1.78	~~194.7~~1.78	~~197.8~~ 4.47	~~1.0~~2.5	~~194.7~~ 1.97	~~1.0~~1.1	~~200.9~~ 4.64	~~1.0~~2.6	~~194.7~~ 1.97	~~1.0~~1.1

Locations operating unacceptably are listed in **bold**
Note: CTT = Congested Travel Time, measured in seconds

Source: Kimley-Horn and Associates, 201~~5~~9.

Table 4.12-16
MTSO Summary – Existing Plus Project Conditions

Corridor	Measure of Effectiveness	Direction	Threshold	Existing		Existing Plus Project	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Central County							
Bailey Road	Average Speed (mph)	NB	None	18	18	18	13
		SB	None	21	20	22	20
	Average Stopped Delay	Concord Blvd	3.0	0.3	0.3	0.5	0.5
		Clayton Rd	3.0	0.2	0.2	0.3	0.2
	LOS	NB	None	D	D	D	E
		SB	None	C	C	C	C
	V/C	NB	None	0.19	0.53	0.22	0.60
		SB	None	0.55	0.41	0.63	0.45
Clayton Road	Average Speed (mph)	EB	15	30	29	30	29
		WB	15	31	29	29	28
	Average Stopped Delay	Bailey Rd	3.0	0.2	0.2	0.3	0.2
		Ygnacio Valley Rd	3.0	0.3	0.3	0.3	0.3
		Treat Blvd	3.0	0.3	0.4	0.3	0.4
	LOS	EB	None	B	B	B	B
		WB	None	B	B	B	B
	V/C	EB	None	0.24	0.68	0.25	0.68
		WB	None	0.68	0.35	0.75	0.35
Treat Boulevard	Average Speed (mph)	NB	None	27	28	26	27
		SN	None	26	28	25	28
	Average Stopped Delay	Clayton Rd	3.0	0.3	0.4	0.3	0.4
		Cowell Rd	5.0	0.5	0.5	0.5	0.6
		Oak Grove Rd	5.0	0.4	0.5	0.4	0.7
	LOS	NB	None	C	C	C	C
		SB	None	B	B	B	B
	V/C	NB	1.5	0.24	0.89	0.25	0.91
		SB	1.5	0.81	0.33	0.83	0.35
		NB	None	18	3	18	3

(Continued on next page)

Table 4.12-16
MTSO Summary – Existing Plus Project Conditions

Corridor	Measure of Effectiveness	Direction	Threshold	Existing		Existing Plus Project	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Ygnacio Valley Road	Average Speed (mph)	SB	None	16	29	15	29
	Average Stopped Delay	Clayton Rd	3.0	0.3	0.3	0.3	0.3
	LOS	NB	None	D	F	D	F
		SB	None	E	B	E	B
	V/C	NB	1.50	0.20	0.73	0.20	0.74
		SB	1.50	0.68	0.28	0.68	0.28

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

Mitigation Measure(s)

~~*None required.*~~

Currently, the congestion on NB SR-242 is due to downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve the congestion. To improve the operations of the EB SR-4 interchange at Port Chicago Highway, additional lanes would be required along the segment and the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp. While Mitigation Measure 4.12-3 would alleviate some of the impacts associated with unacceptable DI, the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway. As such, even with mitigation, the impact is *significant and unavoidable.*

4.12-3 Prior to issuance of building permits, the project applicant shall pay the necessary East Contra Costa Regional Fee. Proof of payment shall be submitted to the Community Development Department.

4.12-4 Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. Based on the analysis below, with adequate infrastructure to accommodate the increased demand on transit, bicycle, and pedestrian systems in the area and with implementation of mitigation, the impact would be *less than significant.*

The proposed project's impact on local transit, bicycle, and pedestrian systems under the Existing Plus Project Condition is described below.

Transit System

Residents would have the option of driving, walking, or bicycling; however, due to the remote nature of the project site, most residents would likely drive. Existing transit routes are not located adjacent to the proposed project entrances along San Marco Boulevard, Bailey Road, or Avila Road. However, the Pittsburg BART station is approximately two miles from the project entrances, and some residents would likely drive to BART and commute from this BART station.

According to the 2011-2015 U.S. Census, 10.5 percent of Pittsburg residents use transit to travel to work.[4] The nine percent typically represents the highest level of transit ridership during the day. However, transit routes providing access to the proposed project site do not exist, so residents are not anticipated to extensively use the transit facilities. The proposed project would not conflict with any transit plans or goals of the City or the CCTA, or interfere with any existing bus routes and would not remove or relocate any existing bus stops. Policy 7-P-29 of the Pittsburg General Plan requires options for future transit use preserved when designing improvements for roadways. In addition, the policy

[4] Kimley-Horn and Associates, Inc. *Traffic Impact Study, Faria Annexation, Pittsburg, CA* [pg. ~~49~~51]. ~~November 2017.~~ August 2019.

aims to ensure that developers provide bus turnouts and/or shelters, where appropriate, as part of projects. The Draft Master Plan does not include specific designs for transit facilities for the project do not exist at this time; however, upon future submittal of a Tentative Subdivision Map, the City's Design Review process would ensure that adequate transit infrastructure is provided consistent with City policies.

Bicycle and Pedestrian System

The proposed project would generate additional pedestrian and bicycle traffic in the area, thereby potentially increasing conflicts between vehicles, bicycles, and pedestrians. Sidewalks currently exist on San Marco Boulevard near the proposed project entrance, which would provide pedestrian connectivity to the adjacent land uses along San Marco Boulevard. Pedestrian facilities do not exist along Avila Road, but few destinations for pedestrians exist along Avila Road. Along Bailey Road, near the proposed project entrance, pedestrian facilities do not exist; however, nearby destinations that pedestrians would want to access do not exist along Bailey Road.

Cyclists would be able to access the residential development using the proposed bike lanes along San Marco Boulevard between Rio Verde Circle and Bailey Road. A Class I bike path exists parallel to San Marco Boulevard from Rio Verde Circle to W. Leland Road. The aforementioned path provides connectivity to the existing bike lanes along W. Leland Road from San Marco Boulevard to Burton Avenue. Bicycle facilities at the other two proposed project entrances are not anticipated.

As discussed in Chapter 4.11, Public Services and Utilities, of this EIR regional trails provide opportunities for hiking, biking, and jogging along open space corridors throughout the region. The Delta De Anza Regional Trail is a paved multi-use hiking, bicycling and equestrian trail currently spanning over 15 miles of the planned 25-mile length, which is easily accessible from the project site. When completed, the Delta De Anza Regional Trail would generally follow the East Bay Municipal Utility District's corridor and the CCWD's canal. The trail intersects Bailey Road north of the project site, near the Bailey Road SR 4 overpass, approximately two miles away from the project site. The trail also connects the cities of Concord, Bay Point, Pittsburg, Antioch, and Oakley and provides access to Contra Loma Regional Park (and Black Diamond Mines Regional Preserve) through Antioch Community Park. The Delta De Anza Regional Trail and the Black Diamond Mines Regional Preserve are under the jurisdiction of the East Bay Regional Park District (EBRPD). It should be noted that the EBRPD has partnered with the City of Concord and the National Park Service to provide a new regional park in Concord on the former CNWS located to the west of the project site. The EBRPD has developed a Land Use Plan for the future regional park on the former CNWS, known as the Concord Hills Regional Park.

The Draft Master Plan does not include specific connections to the aforementioned trail systems; however, the Design Review Guidelines included in the Draft Master Plan require that future development prioritizes pedestrian circulation by developing linear parks, public trails, and/or trailheads to connect pedestrians to schools, commercial

centers, parks, and other neighborhoods and local and regional open space areas, including those planned within the CNWS.

Conclusion

The proposed project would generate an increase in population that would increase the demand on transit, bicycle, and pedestrian systems in the area. With implementation of existing General Plan policies, as well compliance with the Design Review Guidelines included in the Draft Master Plan, adequate infrastructure would be provided to accommodate the increased demand. However, if future development fails to incorporate the required facilities, a ***significant*** impact could occur.

Mitigation Measure(s)
Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

4.12-4(a) As part of any future development applications, the project applicant shall demonstrate that the project would include bus turnouts, including shelters and bicycle racks, where appropriate. The turnouts, shelters, and bicycle racks shall be constructed with the roadway improvements consistent with General Plan Policy 7-P-29. The final location and design of the turnouts, shelters, and bicycle racks shall be submitted to the City Engineer for review and approval prior to approval of a future tentative subdivision map.

4.12-4(b) As part of any future development applications, the project applicant shall demonstrate that the project would provide linkages to nearby pedestrian and bicycle facilities consistent with the Design Review Guidelines provided in the Draft Master Plan. The final location and design of the linkage shall be submitted to the City Engineer for review and approval prior to approval of a future tentative subdivision map.

4.12-5 Result in a projected future over-capacity freeway condition where current long-range planning studies show an under-capacity condition at a freeway segment under Existing Plus Project Conditions. Based on the analysis below, even with mitigation, the impact would be ~~*less-than-significant*~~ *significant and unavoidable*.

Traffic operations were evaluated at the study freeway segments under Existing Plus Project traffic conditions. Freeway segment volumes were calculated by adding the proposed project trips to the existing segment volumes. Table 4.12-17 shows the Existing Plus Project LOS results, d/c ratio, and density at the study freeway segments. As shown in the table, all study freeway segments would continue to meet established LOS standards under Existing Plus Project Conditions, except at the following segments: ~~As such, the proposed project would result in a ***less-than-significant*** impact to study freeway segments under Existing Plus Project Conditions.~~

Table 4.12-17
Freeway Segment LOS – Existing Plus Project Conditions

Freeway Section	Criteria LOS	Existing						Existing Plus Project					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
Northbound													
SR-242 between I-680 and Clayton Road off-ramp	E	A	0.10	3.1	C	0.67	24.5	A	0.10	3.3	C	0.68	24.5
SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp	E	A	0.10	3.4	**F**	0.70	**47.3**	A	0.11	3.6	**F**	**0.71**	**51.3**
SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-ramp	E	A	0.08	2.4	**F**	0.52	**81.7**	A	0.08	2.6	**F**	**0.53**	**86.5**
SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp	E	C	0.75	21.2	**F**	0.80	**83.2**	C	0.75	21.3	**F**	**0.81**	**83.9**
SR-242 between Grant Street off-ramp and Grant Street on-ramp	E	A	0.24	8.0	**F**	0.82	**83.6**	A	0.25	8.3	**F**	**0.84**	**84.0**
SR-242 between Grant Street on-ramp and Olivera Road off-ramp	E	A	0.37	8.6	**F**	0.73	**102.9**	A	0.37	8.8	**F**	**0.74**	**103.0**
SR-242 between Olivera Road off-ramp and SR-4 off-ramp	E	A	0.17	6.6	**F**	1.26	**14.0**	A	0.17	6.8	**F**	**1.28**	**14.0**
Southbound													
SR-242 between SR-4 on-ramp and Olivera Road on-ramp	F	D	0.89	28.2	B	0.49	13.9	D	0.92	29.6	B	0.51	14.4
SR-242 between Olivera Road on-ramp and Solano Way off-ramp	F	C	0.77	25.0	B	0.46	13.1	C	0.80	25.8	B	0.47	13.4
SR-242 between Solano Way off-ramp and Solano Way on-ramp	F	B	0.65	18.0	A	0.36	10.4	B	0.67	17.9	A	0.37	10.7
SR-242 between Solano Way on-ramp and Concord Avenue off-ramp	F	F	0.85	52.0	B	0.78	15.8	F	0.86	57.9	B	0.78	16.2
SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp	F	F	0.72	78.5	A	0.35	10.1	F	0.75	83.0	A	0.36	10.5
SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp	F	F	0.75	96.6	B	0.37	11.4	F	0.77	97.8	B	0.39	11.9
SR-242 between Clayton Road on-ramp and I-680	F	F	1.17	22.3	B	0.50	15.6	F	1.21	22.3	B	0.52	16.0
Eastbound													
SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp	E	C	0.77	27.1	**F**	**1.27**	**79.2**	C	0.79	28.1	**F**	**1.35**	**78.0**
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	E	C	0.60	18.3	**F**	**1.17**	**85.5**	C	0.63	19.4	**F**	**1.25**	**86.0**
SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp	E	C	0.68	22.9	**F**	**1.45**	**45.5**	C	0.71	23.8	**F**	**157.**	**45.0**
SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp	F	B	0.44	17.8	F	1.30	51.4	B	0.46	18.7	F	1.37	29.1
SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp	F	B	0.34	11.5	F	1.12	75.1	B	0.36	12.3	F	1.31	67.3
SR-4 between SR-242 on-ramp and HOV Lane Begins	F	B	0.46	12.2	F	4.18	45.0	B	0.49	13.1	F	4.34	45.0
SR-4 between HOV Lane Begins and Lane Drop	F	A	0.28	9.6	A	0.88	6.9	A	0.30	10.2	A	0.92	7.1
SR-4 between Lane Drop and Port Chicago Highway on-ramp	F	B	0.37	12.7	F	1.18	9.2	B	0.40	13.5	F	1.22	9.4
SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp	F	B	0.46	16.1	F	1.51	45.0	B	0.48	17.1	F	1.59	45.0
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	F	B	0.37	12.9	F	1.24	10.8	B	0.39	13.6	F	1.28	10.9
SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp	F	B	0.38	11.8	F	3.24	45.0	B	0.41	12.6	F	3.52	45.0
SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp	F	B	0.35	12.0	F	1.21	10.1	B	0.37	12.6	F	1.23	9.7
SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp	F	B	0.39	13.8	F	1.24	12.2	B	0.41	14.4	F	1.27	11.7
SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane	F	B	0.39	12.4	F	1.24	12.7	B	0.41	13.0	F	1.26	12.3

(Continued on next page)

Table 4.12-17
Freeway Segment LOS – Existing Plus Project Conditions

Freeway Section	Criteria LOS	Existing						Existing Plus Project					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
SR-4 between Add Lane and Bailey Road Diagonal off-ramp	F	A	0.31	10.4	A	0.94	9.5	A	0.32	10.9	A	0.96	9.3
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp	F	A	0.29	9.2	A	0.89	8.1	A	0.30	9.5	A	0.90	7.4
SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp	F	B	0.36	11.9	F	1.09	6.7	B	0.37	12.5	F	1.09	5.7
SR-4 between Bailey Road Diagonal on-ramp and Add Lane	F	B	0.36	11.3	F	1.09	13.4	B	0.37	11.7	F	1.09	12.7
SR-4 between Add Lane and Railroad Avenue off-ramp	F	A	0.34	11.4	A	0.95	9.5	A	0.36	12.1	A	0.96	8.9
Westbound													
SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp	F	F	0.88	76.4	B	0.45	13.6	F	0.89	78.5	B	0.47	14.0
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp	F	F	0.81	73.4	A	0.39	10.9	F	0.82	75.6	B	0.41	11.3
SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp	F	F	0.95	29.6	B	0.46	13.4	F	0.95	60.2	B	0.46	13.4
SR-4 between Bailey Road on-ramp and Lane Drop	F	F	0.71	76.5	A	0.34	9.5	F	0.71	86.0	A	0.34	9.6
SR-4 between Lane Drop and San Marco Boulevard off-ramp	F	F	1.00	62.1	B	0.51	16.3	F	1.02	65.8	B	0.52	16.8
SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp	F	F	0.99	75.2	B	0.44	13.2	F	1.01	74.5	B	0.45	13.5
SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp	F	F	0.99	30.8	B	0.44	12.4	F	1.01	31.1	B	0.45	12.7
SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp	F	F	1.26	54.3	A	0.37	10.2	F	1.28	53.8	A	0.38	10.6
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	F	F	1.25	72.7	B	0.50	15.2	F	1.29	72.8	B	0.52	15.8
SR-4 between Willow Pass Road on-ramp and HOV Lane Add	F	F	1.25	31.3	B	0.50	14.2	F	1.28	31.4	B	0.52	14.8
SR-4 between HOV Lane Add and Add Lane	F	F	1.08	27.8	B	0.43	12.0	F	1.11	28.2	B	0.44	12.4
SR-4 between Add Lane and Port Chicago Highway off-ramp	F	C	0.99	22.6	B	0.42	12.6	F	1.02	22.8	B	0.44	13.0
SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp	F	C	0.84	21.0	A	0.39	11.0	C	0.87	21.7	B	0.41	11.4
SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp	E	**F**	**1.10**	**12.6**	B	0.35	12.1	**F**	**1.13**	**11.9**	B	0.38	13.1
SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp	E	**F**	**1.13**	**15.6**	B	0.46	16.8	**F**	**1.16**	**14.7**	B	0.49	17.9
SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp	E	**F**	**1.56**	**45.0**	C	0.65	21.5	**F**	**1.60**	**45.0**	C	0.68	22.7
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	E	**F**	**1.20**	**16.0**	B	0.50	16.9	**F**	**1.23**	**15.3**	B	0.53	17.9
SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp	E	**F**	**1.61**	**45.0**	C	0.64	23.1	**F**	**1.68**	**45.0**	C	0.66	24.3

Notes:
Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
[1] pcpmpl = passenger cars per mile per lane.

Source: Kimley-Horn and Associates, 2019

- NB SR-242 between Clayton Road off-ramp and SR-4 (PM peak hour); and
- EB SR-4 between I-680 on-ramp and SR-242 off-ramp (PM peak hour).

All other freeway segments would operate at an acceptable LOS with the addition of project traffic. However, because the above freeway segments would not satisfy the City's standards, the project could result in a projected future over-capacity freeway condition where current long-range planning studies show an under-capacity condition at a freeway segment under Existing Plus Project Conditions, and a significant impact could occur. Currently, congestion on NB SR-242 is due to the downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve the congestion. Improving the operations of the EB SR-4 interchange at Port Chicago Highway would entail adding additional lanes to the freeway segment and the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp; however, any improvements would require cooperation and coordination with Caltrans and CCTA. Therefore, since the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway, the impact is *significant and unavoidable.*

Mitigation Measure(s)
~~*None required.*~~
4.12-5. Implement Mitigation Measure 4.12-3.

4.12-6 Result in a projected future over-capacity freeway condition where current long-range planning studies show an under-capacity condition at a freeway ramp under Existing Plus Project Conditions. Based on the analysis below, the impact would be *less than significant.*

Traffic operations were evaluated at the study freeway ramps under Existing Plus Project traffic conditions. Ramp volumes were calculated by adding the proposed project trips to the existing ramp volumes. Table 4.12-18 shows the peak hour LOS and density for each freeway ramp in the study area.

As shown in the table, all study freeway ramps would continue to meet established LOS standards under Existing Plus Project Conditions. As such, the proposed project would result in a ***less-than-significant*** impact to study freeway ramps under Existing Plus Project Conditions.

Mitigation Measure(s)
None required.

Table 4.12-18
Freeway Ramp LOS – Existing Plus Project Conditions

Freeway Section	Criteria LOS	Existing				Existing Plus Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)
Eastbound SR 4									
Willow Pass Road Off-Ramp	F	A	5.2	F	35.2	A	5.7	F	37.6
Willow Pass Road On-Ramp	F	A	9.0	F	44.8	B	17.2	F	47.0
San Marco Boulevard Off-Ramp	F	A	8.6	D	34.2	A	9.3	E	36.1
SB San Marco Boulevard Loop On-Ramp	F	A	8.0	D	29.1	A	8.1	D	29.6
NB San Marco Boulevard Diagonal On-Ramp	F	A	5.5	C	26.5	A	5.8	C	27.1
SB Bailey Road Diagonal Off-Ramp	F	A	5.1	C	24.3	A	5.5	C	26.5
NB Bailey Road Loop Off-Ramp	F	A	7.3	C	26.2	A	7.4	C	26.1
Bailey Road On-Ramp	F	B	11.6	E	35.0	B	11.3	E	35.5
Westbound SR 4									
NB Bailey Road Diagonal Off-Ramp	F	C	27.3	B	15.3	C	27.5	B	15.8
SB Bailey Road Loop Off-Ramp	F	C	25.1	B	19.5	C	22.8	C	20.6
Bailey Road On-Ramp	F	C	24.3	B	14.1	C	25.3	B	14.8
San Marco Boulevard Off-Ramp	F	D	28.2	B	16.3	D	28.7	B	16.8
NB San Marco Boulevard Loop On-Ramp	F	E	36.7	B	17.4	E	38.1	B	18.2
SB San Marco Boulevard Diagonal On-Ramp	F	F	45.4	B	16.2	F	45.7	B	16.7
Willow Pass Road Off-Ramp	F	C	27.3	B	16.6	D	28.6	B	17.4
Willow Pass Road On-Ramp	F	E	37.3	C	20.3	E	38.5	C	21.0

Notes:
[1] pcpmpl = passenger cars per mile per lane.

Source: Kimley-Horn and Associates, ~~2017~~2019.

4.12-7 Result in an internal circulation system design that does not meet City standards, substantially increase hazards due to design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment), or result in inadequate emergency access. Based on the analysis below, the impact would be *less than significant.*

The proposed project is in the program-level general plan and zoning stage and does not have a detailed site plan. Therefore, on-site circulation and access evaluation would be speculative.

However, three access points exist for the project that would connect to existing streets: along San Marco Boulevard, along Bailey Road, and along Santa Teresa Drive to W. Leland Road in the future. The access along Bailey Road would be a signalized intersection with full access. The access along San Marco Boulevard connects to the existing dead end just south of Rio Verde Circle. The operations of the signalized intersections are discussed in the intersection LOS sections for each scenario.

It should be noted that the Draft Master Plan includes Design Review Guidelines derived from existing General Plan Policies. The Design Review Guidelines provide specific standards related to circulation systems within the Draft Master Plan Area. Upon annexation of the proposed project site into the City of Pittsburg, the project applicant would be required to submit a Tentative Subdivision Map and detailed plans for Design Review approval to the City of Pittsburg. Design Review of future development, consistent with Chapter 18.36 of the City's Municipal Code, would ensure that future development occurring within the project site would comply with the proposed Design Review Guidelines.

According to Section 18.36.100 of the Municipal Code, the purpose of the Design Review process is to avoid substandard development, ensure that improvements within residential neighborhoods maintain consistent standards of design, and ensure that development is consistent with criteria adopted under Section 18.36.120 of the City's Municipal Code.

With regard to emergency access, several factors determine whether a project has sufficient access for emergency vehicles, including the following:

- Number of access points (both public and emergency access only);
- Width of access points; and
- Width of internal roadways.

Based on the Contra Costa County Fire District Ordinance (503.1.2.1), the following guidance is provided for access to residential developments:

> The minimum number of access roads serving residential development(s) shall be based upon the number of dwelling units served as follows:
>
> - 1-25 units, one public or private access road.

- 26-150 units, one public or private access road and one emergency access road.
- 151+ units, a minimum of two public or private access roads.

Based on the above, the proposed project would result in an internal circulation system design that would meet City standards. However, given that the proposed project does not have a detailed site plan at this time, whether the project would increase hazards due to design features and the project's ability to provide adequate emergency access meeting the standards above cannot be verified. Therefore, the proposed project could result in inadequate emergency access, and a ***significant*** impact could occur.

Mitigation Measure(s)
Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

4.12-7 *As part of any future development applications, the project applicant shall submit a circulation plan to the City identifying how many units would be constructed before implementation of the proposed secondary access point at Bailey Road. The circulation plan shall comply with all applicable Contra Costa County Fire District standards related to emergency access.*

Cumulative Impacts and Mitigation Measures

As discussed above, the Long-Term (2035) Conditions at each of the study intersections are based on future year traffic forecasts from the CCTA 2030 model. Future year corresponds with the approximate buildout of the Pittsburg General Plan and includes the addition of traffic from all planned and approved projects anticipated in the region. In addition, the Long-Term (2035) Conditions assume that the roadway improvements outlined in the Method of Analysis section above have been completed. Cumulative impacts of the proposed project on the transportation system are identified in this section. Each impact is followed by recommended mitigation measures to reduce the significance of identified impacts.

4.12-8 Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the study roadway intersections under Long-Term (2035) Plus Project Conditions. Based on the analysis below, because traffic generated by the proposed project would cause unacceptable LOS, increase delay, and increase traffic volumes by one percent or more at a number of intersections under Long-Term (2035) Plus Project Conditions, even with implementation of mitigation, the impact would remain *significant and unavoidable*.

Table 4.12-19 summarizes the LOS results for Long-Term (2035) Conditions and Long-Term (2035) Plus Project Conditions for each of the project study intersections. Vehicle trips associated with buildout of the Draft Master Plan Area were added to the long-term traffic volumes for the Long-Term (2035) Plus Project Conditions.

As shown in the table, the proposed project would result in an increased delay at some of the study intersections. However, some of the intersections with an increased delay

are anticipated to function unacceptably even without the project. For those intersections that would experience unacceptable operations without the project, a significant impact would occur if the project would increase delay by five seconds or more within the City of Pittsburg, or result in an increase in v/c of 0.03 or more within the City of Concord. ~~contribute more than one percent of the volume to the intersection.~~

Per Table 4.12-19, traffic generated by buildout of the Draft Master Plan Area would result in significant impacts at the following study intersections under the Long-Term (2035) Plus Project Condition:

- Avila Road and Willow Pass Road: LOS F (~~A~~PM peak hour);
- WB SR-4 Ramps and Willow Pass Road: LOS F (AM peak hour);
- Rio Verde Circle and San Marco Boulevard: LOS F (AM peak hour);
- W. Leland Road and San Marco Boulevard: LOS F (AM ~~and PM~~ peak hour~~s~~);
- EB SR-4 Ramps and San Marco Boulevard: LOS E (AM and PM peak hours);
- ~~WB SR-4 Ramps and San Marco Boulevard: LOS E (AM peak hour);~~
- ~~W. Leland Road and Southwood Drive: LOS F (AM peak hour);~~
- W. Leland Road and Bailey Road: LOS F (AM and PM peak hours);
- ~~W. Leland Road and Chestnut Drive: LOS F (AM peak hour);~~
- ~~W. Leland Road and Jacqueline Drive: LOS F (AM peak hour);~~
- ~~W. Leland Road and Range Road: LOS E (AM peak hour);~~
- ~~W. Leland Road and Dover Way: LOS F (AM peak hour);~~
- W. Leland Road and Burton Avenue: LOS F (AM peak hour;
- W. Leland Road and Crestview Drive: LOS F (AM peak hour) ~~and LOS E (PM peak hour)~~;
- ~~Willow Pass Road and Olivera Road: LOS E (PM peak hour);~~
- Concord Boulevard and Bailey Road: LOS F (AM and PM peak hours);
- Bailey Road and Myrtle Drive: LOS F (AM and PM peak hours);
- Clayton Boulevard and Treat Boulevard: LOS F (~~AM and~~ PM peak hours);
- Clayton Road and Bailey Road: LOS F (AM peak hour);
- ~~Cowell Road and Treat Boulevard: LOS F (AM and PM peak hours);~~
- ~~Bailey Road and Project Entrance: LOS F (AM peak hour);~~
- ~~Treat Boulevard and Oak Grove Road: LOS F (AM and PM peak hours)~~; and
- Concord Boulevard and Port Chicago Highway: LOS F (AM peak hour).

Table 4.12-19
Intersection LOS – Long-Term (2035) Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Long-Term (2035)						Long-Term (2035) Plus Project									
			AM Peak			PM Peak			AM Peak					PM Peak				
			LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
1. Avila Road/Willow Pass Road	Signal	~~E~~D	C	~~30.0~~ 25.5	0.83	**F**	**104.6**	**1.10**	C	30.0	4.5	0.85	0.02	**F**	**121.7**	**17.1**	**1.16**	**0.06**
2. EB SR 4 Ramps/ Willow Pass Road	Signal	E	B	~~12.0~~ 11.7		C	24.9		B	12.0	0.3			C	26.3	1.4		
3. WB SR 4 Ramps/ Willow Pass Road	Signal	E	**F**	**343.6**		B	15.9		**F**	**358.2**	**14.6**			B	16.6	0.7		
4. Rio Verde Circle/San Marco Boulevard	AWSC	E	D	32.3		A	9.2		**F**	**67.4**	**35.1**			B	13.8	4.6		
5. Santa Teresa Drive/San Marco Boulevard	Signal	~~E~~D	C	34.5		B	18.5		D	46.6	12.1			B	18.3	-0.2		
6. W. Leland Road/San Marco Boulevard	Signal	D	**F**	**~~91.6~~ 79.8**		**F**	**143.1**		**F**	**~~98.8~~ 89.8**	**~~7.2~~ 10.0**			**F**	**147.0**	**3.9**		
7. EB SR 4 Ramps/San Marco Boulevard	Signal	D	D	47.6		E	56.3		**E**	**62.3**	**14.7**			**E**	**78.6**	**22.3**		
8. WB SR 4 Ramp/San Marco Boulevard	Signal	D	**F**	**~~129.0~~ 338.8**		C	30.4		**F**	**~~132.8~~ 341.6**	**~~3.8~~ 2.8**			C	32.0	1.6		
9. Willow Pass Road/Port Chicago Highway	Signal	D	B	13.6		B	11.0		B	13.9	0.3			B	11.2	0.2		
10. Willow Pass Road/Bailey Road	Signal	D	**F**	**146.6**		**F**	**110.6**		**F**	**146.9**	**0.3**			**F**	**111.6**	**1.0**		
11. Willow Pass Road/Loftus Road	Signal	D	C	27.7		B	19.0		C	27.8	0.1			B	19.2	0.2		
12. EB Willow Pass Road/Range Road	SSSC	E	A	6.9		A	9.1		A	7.2	0.3			A	9.3	0.2		
Worst Approach			B	12.4		B	14.0		B	12.7	0.3			B	14.3	0.3		
13. WB Willow Pass Road/Range Road	SSSC	E	A	0.2		A	0.4		A	0.2	0.0			A	0.4	0.0		
Worst Approach			A	0.6		A	0.6		A	0.6	0.0			A	0.7	0.1		
14. Willow Pass Road/Railroad Avenue	Signal	D	**E**	**58.0**		C	31.4		**E**	**58.2**	**0.2**			C	31.9	0.5		
15. W. Leland Road/Alves Ranch Road	Signal	D	C	32.5		C	22.0		C	32.7	0.2			C	22.1	0.1		
16. W. Leland Road/Woodhill Drive	Signal	D	B	13.5		B	12.1		B	13.6	0.1			B	12.2	0.1		
17. W. Leland Road/Southwood Drive	Signal	D	**F**	**92.9**		D	47.0		**F**	**96.2**	**3.3**			D	47.9	0.9		
18. W. Leland Road/Bailey Road	Signal	~~D~~E	**F**	**165.8**		E	66.8		**F**	**174.8**	**9.0**			**F**	**104.0**	**37.2**		
19. Maylard Street/Bailey Road	Signal	E	C	21.8		C	26.2		C	21.4	-0.4			C	26.5	0.3		
20. EB SR 4 Ramps/Bailey Road	Signal	E	C	24.9		D	41.6		C	24.6	-0.3			E	55.2	13.6		
21. WB SR 4 Ramp/Bailey Road	Signal	E	D	48.2		C	23.0		D	53.9	5.7			C	24.3	1.3		
22. Canal Road/Bailey Road	Signal	~~E~~D	C	32.2		B	12.8		C	32.3	0.1			B	13.1	0.3		
23. W. Leland Road/Chestnut Drive	Signal	D	**F**	**230.4**		C	25.9		**F**	**232.3**	**1.9**			C	28.1	2.2		
24. W. Leland Road/Jacqueline Drive	Signal	D	**F**	**179.7**		C	27.6		**F**	**182.1**	**2.4**			C	27.3	-0.3		
25. W. Leland Road/Montevideo Drive	Signal	D	B	11.3		A	5.3		B	11.9	0.6			A	5.4	0.1		
26. W. Leland Road/Range Road	Signal	D	**E**	**70.0**		C	33.8		**E**	**72.4**	**2.4**			C	33.5	-0.3		
27. W. Leland Road/Dover Way	Signal	D	**F**	**83.8**		C	25.8		**F**	**87.3**	**3.5**			C	25.0	-0.8		
28. W. Leland Road/Burton Avenue	Signal	D	**F**	**95.7**		C	30.0		**F**	**115.5**	**19.8**			C	31.9	1.9		
29. W. Leland Road/Crestview Drive	Signal	D	**F**	**202.7**		**E**	**60.2**		**F**	**208.3**	**5.6**			**E**	**64.0**	**3.8**		
30. W. Leland Road/Railroad Avenue	Signal	D	**F**	**183.8**		**F**	**172.8**		**F**	**165.7**	**-18.1**			**F**	**171.2**	**-1.6**		
31. EB SR 4 Ramps/Railroad Avenue	Signal	D	C	27.6		**F**	**94.8**		C	27.9	0.3			**F**	**94.7**	**-0.1**		
32. WB SR 4 Ramp/Railroad Avenue	Signal	D	D	41.9		D	35.5		D	41.9	0.0			D	35.4	-0.1		
33. Willow Pass Road/Olivera Road	Signal	~~D~~E	D	51.0	0.97	E	67.7	1.00	D	53.5	2.5	0.99	0.02	E	71.2	3.5	1.01	0.01
34. Concord Boulevard/Farm Bureau Road	Signal	D	D	47.4	0.96	D	36.1	0.90	D	49.6	2.2	0.99	0.03	D	37.3	1.2	0.93	0.03
35. Concord Boulevard/Bailey Road	Signal	D	**F**	**204.7**	**1.34**	**F**	**120.8**	**1.21**	**F**	**251.4**	**46.7**	**1.44**	**0.10**	**F**	**157.5**	**36.7**	**1.35**	**0.14**
36. Bailey Road/Myrtle Drive	SSSC	~~E~~D	A	4.3	N/A	**F**	**281.4**	**1.59**	**F**	**231.8**	**227.5**	**N/A**	**N/A**	**F**	**379.8**	**98.4**	**1.93**	**0.34**

(Continued on next page)

Table 4.12-19
Intersection LOS – Long-Term (2035) Plus Project Conditions

Intersection	Intersection Control[1]	Delay Criteria[2]	Long-Term (2035)						Long-Term (2035) Plus Project									
			AM Peak			PM Peak			AM Peak					PM Peak				
			LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
Worst Approach			B	10.4	N/A	**F**	**~~1096.4~~ OVRFL**	**3.33**	**F**	**~~6,648.8~~ OVRFL**	**6,638.4**	**N/A**	**N/A**	**F**	**~~1,630.1~~ OVRFL**	**~~533.7~~ N/A**	**N/A**	**N/A**
37. Clayton Road/Babel Lane	Signal	~~D~~E	C	31.1	0.79	C	31.3	0.85	C	31.2	0.1	0.80	0.01	C	31.6	0.3	0.86	0.01
38. Clayton Road/Farm Bureau Road	Signal	~~D~~E	**F**	**90.1**	**1.03**	**F**	**87.3**	**0.92**	**F**	**92.1**	**2.0**	**1.04**	**0.01**	**F**	**86.8**	**-0.5**	**0.92**	**0.00**
39. Clayton Road/Treat Boulevard	Signal	~~D~~E	**F**	**83.5**	**0.98**	**F**	**102.2**	**1.04**	**F**	**89.0**	**5.5**	**0.99**	**0.01**	**F**	**122.7**	**20.5**	**1.08**	**0.04**
40. Clayton Road/Bailey Road	Signal	~~D~~E	**F**	**198.6**	**1.28**	C	33.5	0.74	**F**	**229.4**	**30.8**	**1.37**	**0.09**	C	34.5	1.0	0.76	0.02
41. Cowell Road/Treat Boulevard	Signal	D	**F**	**89.8**	**1.02**	**F**	**124.5**	**1.20**	**F**	**96.0**	**6.2**	**1.04**	**0.02**	**F**	**129.0**	**4.5**	**1.22**	**0.02**
42. W. Leland Road/Santa Teresa Drive	Signal	D	A	9.2		A	7.1		B	12.2	3.0			A	8.1	1.0		
43. Bailey Road/Project Entrance	Signal	D	B	16.3		A	5.9		**F**	**129.4**	**113.1**			B	16.6	10.7		
44. Treat Boulevard/Oak Grove Road	Signal	~~D~~E	**F**	**237.7**	**1.48**	**F**	**272.5**		**F**	**237.9**	**0.2**	**1.49**	**0.01**	**F**	**276.6**	**4.1**	**1.50**	**0.02**
45. Willow Pass Road/Diamond Boulevard	Signal	~~D~~E	B	18.0	0.52	D	41.1	0.74	B	17.9	-0.1	0.52	0.00	D	41.2	0.1	0.75	0.01
46. Willow Pass Road/Market Street	Signal	~~D~~E	D	40.6	0.89	D	49.5	1.01	D	40.7	0.1	0.90	0.01	D	49.8	0.3	1.02	0.01
47. Willow Pass Road/Galindo Street	Signal	E	D	54.7	0.84	**F**	**111.7**	**1.11**	D	54.4	-0.3	0.85	0.01	**F**	**111.8**	**0.1**	**1.13**	**0.02**
48. Concord Boulevard/Port Chicago Highway	Signal	E	**F**	**130.0**	0.89	C	23.1	0.60	**F**	**147.8**	**17.8**	**0.92**	**0.03**	C	24.2	1.1	0.62	0.02
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	Signal	~~E~~D	**F**	**699.3**	**1.24**	**F**	**336.6**	**1.05**	**F**	**693.9**	**-5.4**	**1.25**	**0.01**	**F**	**334.5**	**-2.1**	**1.06**	**0.01**
50. Ygnacio Valley Road/Clayton Road	Signal	~~D~~E	**F**	**289.0**	**1.19**	**F**	**108.7**	**1.01**	**F**	**288.1**	**-0.9**	**1.20**	**0.01**	**F**	**110.2**	**1.5**	**1.01**	**0.00**

Notes:
Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
[1.] Each study intersection is controlled by a traffic signal, a side-street stop-control (SSSC), or an all-way stop-control (AWSC).
[2.] LOS criteria is based on seconds of delay.

Source: Kimley-Horn and Associates, 201~~7~~9.

All other study intersections would either operate acceptably both with and without the proposed project, or would not experience an increase in traffic volumes by one percent or more, where the intersection would already operate unacceptably without the proposed project. Nonetheless, based on the above, the Draft Master Plan could conflict with applicable General Plan LOS thresholds, and a ***significant*** impact could occur.

Mitigation Measure(s)

Table 4.12-20 shows the study intersection LOS in the Long Term (2035) Plus Project Condition both with and without mitigation. With the exception of impacts to the following intersections, which would all remain *significant and unavoidable*, implementation of the following mitigation measures would reduce impacts to the remaining intersections to less-than-significant levels:

- Avila Road/Willow Pass Road (Intersection #1);
- WB SR4 Ramps/Willow Pass Road (Intersection #3);
- W. Leland Road/San Marco Boulevard (Intersection #6);
- W. Leland Road/Bailey Road (Intersection #18);
- Concord Boulevard and Bailey Road (Intersection #35);
- Bailey Road and Myrtle Drive (Intersection #36);
- Clayton Road and Treat Boulevard (Intersection #39);
- Cowell Road/Treat Boulevard (Intersection #41);
- Bailey Road/Project Entrance (Intersection #43);
- Treat Boulevard and Oak Grove Road (Intersection #44); and
- Concord Boulevard/Port Chicago Highway (Intersection #48).

A discussion of the mitigation measure(s) required for each impacted intersection, as well as a description of how the measures would reduce impacts at that intersection, is provided below, immediately following the list of mitigation measures.

4.12-8(a) Prior to occupancy of the proposed buildings, the project applicant shall complete the following improvements at intersections within the City of Concord.

- *The northbound approach at the Avila Road and Willow Pass Road intersection shall be restriped to include one through lane and one right turn lane; and*
- *The intersection timing splits at the following intersections shall be optimized: ~~Cowell Road and Treat Boulevard (Intersection #41); Treat Boulevard and Oak Grove Road (Intersection #44); and~~ Concord Boulevard/Port Chicago Highway (Intersection #48).*

Table 4.12-20
Intersection LOS – Long-Term (2035) Plus Project Conditions with Mitigation

Intersection	Delay Criteria[1]	Long-Term (2035) Plus Project						Long-Term (2035) Plus Project (Mitigated)									
		AM Peak Hour			PM Peak Hour			AM Peak Hour					PM Peak Hour				
		LOS	Delay	Δ Delay	LOS	Delay	Δ Delay	LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
1. Avila Road/Willow Pass Road	~~E~~D	C	30.0	4.5	**F**	**121.7**	**17.1**						**E**	**62.2**	**-42.4**	**1.05**	**-0.05**
2. EB SR 4 Ramps/ Willow Pass Road	E	B	12.0	0.3	C	26.3	1.4										
3. WB SR 4 Ramps/ Willow Pass Road	E	**F**	**358.2**	**14.6**	B	16.6	0.7	**F**	**102.6**	**-241.0**							
4. Rio Verde Circle/San Marco Boulevard	E	**F**	**67.4**	**35.1**	B	13.8	4.6	E	38.8	6.5							
5. Santa Teresa Drive/San Marco Boulevard	~~E~~D	D	46.6	12.1	B	18.3	-0.2										
6. W. Leland Road/San Marco Boulevard	D	**F**	**~~98.8~~ 89.8**	**~~7.2~~ 10.0**	**F**	**147.0**	**3.9**	**F**	**~~98.8~~ 89.8**	**~~7.2~~ 10.0**							
7. EB SR 4 Ramps/San Marco Boulevard	D	**E**	**62.3**	**14.7**	**E**	**78.6**	**22.3**	B	13.6	-34.0			C	23.9	-32.4		
8. WB SR 4 Ramp/San Marco Boulevard	D	**F**	**~~132.8~~ 341.6**	**~~3.8~~ 2.8**	C	32.0	1.6										
9. Willow Pass Road/Port Chicago Highway	D	B	13.9	0.3	B	11.2	0.2										
10. Willow Pass Road/Bailey Road	D	**F**	**146.9**	**0.3**	**F**	**111.6**	**1.0**										
11. Willow Pass Road/Loftus Road	D	C	27.8	0.1	B	19.2	0.2										
12. EB Willow Pass Road/Range Road	E	A	7.2	0.3	A	9.3	0.2										
Worst Approach		B	12.7	0.3	B	14.3	0.3										
13. WB Willow Pass Road/Range Road	E	A	0.2	0.0	A	0.4	0.0										
Worst Approach		A	0.6	0.0	A	0.7	0.1										
14. Willow Pass Road/Railroad Avenue	D	**E**	**58.2**	**0.2**	C	31.9	0.5										
15. W. Leland Road/Alves Ranch Road	D	C	32.7	0.2	C	22.1	0.1										
16. W. Leland Road/Woodhill Drive	D	B	13.6	0.1	B	12.2	0.1										
17. W. Leland Road/Southwood Drive	D	**F**	**96.2**	**3.3**	D	47.9	0.9										
18. W. Leland Road/Bailey Road	~~D~~E	**F**	**174.8**	**9.0**	**F**	**104.0**	**37.2**	**F**	**145.1**	**-20.7**			E	75.4	8.6		
19. Maylard Street/Bailey Road	E	C	21.4	-0.4	C	26.5	0.3										
20. EB SR 4 Ramps/Bailey Road	E	C	24.6	-0.3	E	55.2	13.6										
21. WB SR 4 Ramp/Bailey Road	E	D	53.9	5.7	C	24.3	1.3										
22. Canal Road/Bailey Road	~~E~~D	C	32.3	0.1	B	13.1	0.3										
23. W. Leland Road/Chestnut Drive	D	**F**	**232.3**	**1.9**	C	28.1	2.2										
24. W. Leland Road/Jacqueline Drive	D	**F**	**182.1**	**2.4**	C	27.3	-0.3										
25. W. Leland Road/Montevideo Drive	D	B	11.9	0.6	A	5.4	0.1										
26. W. Leland Road/Range Road	D	**E**	**72.4**	**2.4**	C	33.5	-0.3										
27. W. Leland Road/Dover Way	D	**F**	**87.3**	**3.5**	C	25.0	-0.8										
28. W. Leland Road/Burton Avenue	D	**F**	**115.5**	**19.8**	C	31.9	1.9	B	12.2	-83.5							
29. W. Leland Road/Crestview Drive	D	**F**	**208.3**	**5.6**	**E**	**64.0**	**3.8**	**E**	**58.1**	**-144.6**							
30. W. Leland Road/Railroad Avenue	D	**F**	**165.7**	**-18.1**	**F**	**171.2**	**-1.6**										
31. EB SR 4 Ramps/Railroad Avenue	D	C	27.9	0.3	**F**	**94.7**	**-0.1**										
32. WB SR 4 Ramp/Railroad Avenue	D	D	41.9	0.0	D	35.4	-0.1										
33. Willow Pass Road/Olivera Road	~~D~~E	D	53.5	2.5	E	71.2	3.5										
34. Concord Boulevard/Farm Bureau Road	D	D	49.6	2.2	D	37.3	1.2										
35. Concord Boulevard/Bailey Road	D	**F**	**251.4**	**46.7**	**F**	**157.5**	**36.7**	**F**	**177.8**	**-26.9**	**1.43**	**0.09**	**F**	**93.2**	**-27.6**	**1.14**	**-0.07**
36. Bailey Road/Myrtle Drive	~~E~~D	**F**	**231.8**	**227.5**	**F**	**379.8**	**98.4**	**F**	**92.4**	**88.1**	**1.25**	**N/A**	**F**	**159.7**	**-121.7**	**1.34**	**-0.25**
Worst Approach		**F**	**~~6,648.8~~ OVRFL**	**6,638.4**	**F**	**~~1,630.1~~ OVRFL**	**~~533.7~~ N/A**										
37. Clayton Road/Babel Lane	~~D~~E	C	31.2	0.1	C	31.6	0.3										

(Continued on next page)

Table 4.12-20
Intersection LOS – Long-Term (2035) Plus Project Conditions with Mitigation

Intersection	Delay Criteria[1]	Long-Term (2035) Plus Project						Long-Term (2035) Plus Project (Mitigated)									
		AM Peak Hour			PM Peak Hour			AM Peak Hour					PM Peak Hour				
		LOS	Delay	Δ Delay	LOS	Delay	Δ Delay	LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
38. Clayton Road/Farm Bureau Road	~~D~~E	**F**	**92.1**	**2.0**	**F**	**86.8**	**-0.5**										
39. Clayton Road/Treat Boulevard	~~D~~E	**F**	**89.0**	**5.5**	**F**	**122.7**	**20.5**						**F**	**99.7**	**-2.5**	**1.07**	**0.03**
40. Clayton Road/Bailey Road	~~D~~E	**F**	**229.4**	**30.8**	C	34.5	1.0	E	76.7	-121.9	1.02	-0.26					
41. Cowell Road/Treat Boulevard	D	**F**	**96.0**	**6.2**	**F**	**129.0**	**4.5**										
42. W. Leland Road/Santa Teresa Drive	D	B	12.2	3.0	A	8.1	1.0										
43. Bailey Road/Project Entrance	D	**F**	**129.4**	**113.1**	B	16.6	10.7	C	21.9	5.6							
44. Treat Boulevard/Oak Grove Road	~~D~~E	**F**	**237.9**	**0.2**	**F**	**276.6**	**4.1**										
45. Willow Pass Road/Diamond Boulevard	~~D~~E	B	17.9	-0.1	D	41.2	0.1										
46. Willow Pass Road/Market Street	~~D~~E	D	40.7	0.1	D	49.8	0.3										
47. Willow Pass Road/Galindo Street	E	D	54.4	-0.3	**F**	**111.8**	**0.1**										
48. Concord Boulevard/Port Chicago Highway	E	**F**	**147.8**	**17.8**	C	24.2	1.1	C	34.4	-95.6	0.92	0.03					
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard	~~E~~D	**F**	**693.9**	**-5.4**	**F**	**334.5**	**-2.1**										
50. Ygnacio Valley Road/Clayton Road	~~D~~E	**F**	**288.1**	**-0.9**	**F**	**110.2**	**1.5**										

Notes:
Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
[1] LOS criteria is based on seconds of delay.

Source: Kimley-Horn and Associates, 201~~7~~9.

4.12-8(b) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Capital Improvement Program for the 2015 Update to the Contra Costa CMP (Project 1832). Such improvements would include, but would not necessarily be limited to, the following:

- *The southbound right turn lane at the WB SR-4 Ramps and Willow Pass Road intersection shall be converted to a free right turn lane.*

Or

If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.

4.12-8(c) As part of future development applications, the project improvement plans shall show that an eastbound left turn lane would be added to the Rio Verde Circle and San Marco Boulevard intersection. Implementation of the required improvements shall be accomplished by way of one of the following methods:

If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.

Or

If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.

4.12-8(d) As part of future development applications, the project improvement plans shall show that the eastbound approach of the EB SR 4 ramps and San Marco Boulevard intersection would be restriped to be an eastbound left turn lane, a shared left-through-right lane, and an eastbound right turn lane. Implementation of the required improvements shall be accomplished by way of one of the following methods:

If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed

prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.

Or

If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.

~~*4.12-8(e) As part of future development applications, the project improvement plans shall show that one of the northbound through lanes at the WB SR-4 Ramps and San Marco Boulevard intersection would be converted to a northbound left turn lane. Implementation of the required improvements shall be accomplished by way of one of the following methods:*~~

~~*If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.*~~

~~*Or*~~

~~*If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.*~~

~~*4.12-8(f) As part of future development applications, the project improvement plans shall show that the northbound approach at the W. Leland Road and Southwood Drive Intersection would be restriped to be a northbound left turn lane and a northbound right turn lane. Implementation of the required improvements shall be accomplished by way of one of the following methods:*~~

~~*If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.*~~

~~*Or*~~

~~*If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.*~~

4.12-8(~~g~~ e) As part of future development applications, the project improvement plans shall show that a northbound right turn lane at the W. Leland Road and Bailey Road intersection would be striped and the shared northbound through-right lane would be restriped to be through lane. In addition, the project improvement plans shall show that a southbound right turn overlap phase and a westbound right turn overlap phase would be implemented. Implementation of the required improvements shall be accomplished by way of one of the following methods:

If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.

Or

If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.

~~*4.12-8(h) Implement Mitigation Measure 4.12-2(c)*~~

~~*4.12-8(i) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP (Project S-16) to the City of Pittsburg Community Development Department. Such improvements would include conversion of the westbound left turn and eastbound left turn movements from protected left turn phasing to permitted left turn phasing at the W. Leland Road and Jacqueline Drive intersection. Proof of payment shall be submitted to the City of Pittsburg Community Development Department.*~~

4.12-8(~~j~~ f) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP (Project S-16) to the City of Pittsburg Community Development Department. Such improvements would include optimization of timing splits at the following intersections:

~~*1. W. Leland Road and Range Road;*~~

2. ~~W. Leland Road and Dover Way;~~
1. W. Leland Road and Burton Avenue; and
2. Clayton Road and Treat Boulevard.

Proof of payment shall be submitted to the City of Pittsburg Community Development Department.

4.12-8(~~k~~ g) As part of future development applications, the project improvement plans shall show that the eastbound left turn phase and westbound left turn phase at the W. Leland and Crestview Drive intersection would be changed from protected to permitting phasing. Implementation of the required improvements shall be accomplished by way of one of the following methods:

If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.

Or

If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.

~~4.12-8(l) As part of future development applications, the project improvement plans shall show that the southbound approach at the Willow Pass Road and Olivera Road intersection would be restriped to be two southbound left turn lanes, a southbound through lane, and a shared southbound through-right turn lane. Implementation of the required improvements shall be accomplished by way of one of the following methods:~~

~~If the required improvements are not included in the Pittsburg CIP prior to issuance of building permits, the project shall be responsible for the construction of the improvements. The improvements shall be completed prior to occupancy of the proposed residences. If the improvements are subsequently included in an update to the Pittsburg CIP, the project applicant may be subject to fee credits.~~

~~Or~~

~~If, prior to issuance of building permits, the City's then-current CIP includes the needed improvements, the project applicant shall pay the fair-~~

~~*share fee for the improvements planned in the Pittsburg CIP to the City of Pittsburg Community Development Department.*~~

4.12-8(~~m~~ h) Implement Mitigation Measure 4.12-2(d).

~~*4.12-8(n) Implement Mitigation Measure 4.12-2(e)*~~

4.12-8(~~o~~i) As part of future development applications, the project applicant shall pay the fair-share fee for the improvements planned in the Pittsburg CIP (Project ST-27) to the City of Pittsburg Community Development Department. Such improvements would include widening of Bailey Road from two lanes two four lanes. Proof of payment shall be submitted to the City of Pittsburg Community Development Department.

Avila Road and Willow Pass Road (Intersection #1)

As shown above, Mitigation Measure 4.12-8(a) includes restriping of the northbound approach to include one through lane and one right turn lane at the Avila Road and Willow Pass Road intersection. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-8(a) would improve the operations at the Avila Road and Willow Pass Road intersection; however, the intersection would continue to operate at LOS F in the PM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord, although the intersection would decrease in v/c with the mitigation and operate better than without the proposed project. Nonetheless, because the intersection is located outside of the City of Pittsburg's jurisdiction, completion of the proposed improvements cannot be guaranteed. Therefore, the project impact to the Avila Road and Willow Pass Road intersection would remain *significant and unavoidable.*

- Implement Mitigation Measure 4.12-8(a).

WB SR-4 Ramps and Willow Pass Road (Intersection #3)

As shown above, Mitigation Measure 4.12-8(b) includes conversion of the southbound right turn lane at the WB SR-4 Ramps and Willow Pass Road intersection to a free right turn lane. The aforementioned improvement has been planned by the Capital Improvement Program for the 2015 Update to the Contra Costa CMP (Project 1832); however, funding sources have not yet been identified, and a timeframe for the improvement has not been established. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-8(b) would improve the operations at the Avila Road and Willow Pass Road intersection; however, the intersection would continue to operate at LOS F in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. Although the intersection would operate better than without the proposed project, given that funding is not available for the required improvements, the project impact to the WB SR-4 Ramps and Willow Pass Road intersection would remain *significant and unavoidable.*

- Implement Mitigation Measure 4.12-8(b).

Rio Verde Circle and San Marco Boulevard (Intersection #4)

As shown above, Mitigation Measure 4.12-8(c) includes addition of an eastbound left turn lane at the Rio Verde Circle and San Marco Boulevard intersection. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(c) would improve the operations at the Rio Verde Circle and San Marco Boulevard intersection to LOS E in the AM peak hour, which would meet the LOS requirement of LOS E or better for a unsignalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-8(c) would reduce the impact to the Rio Verde Circle and San Marco Boulevard intersection to a *less-than-significant* level.

- Implement Mitigation Measure 4.12-8(c).

W. Leland Road and San Marco Boulevard (Intersection #6)

Currently, ramp metering is implemented for the on-ramp in the AM peak period, which result in on-ramp queues that extend onto NB San Marco Boulevard and o to WB Leland Road. Even if ramp metering was not present, the on-ramp volume and freeway volumes are high enough to cause congestion. As shown in Table 4.12-20, the operations at the W. Leland Road and San Marco Boulevard intersection would continue to operate at an unacceptable LOS F in the AM peak hour. In addition, any improvements would involve cooperation with Caltrans and could not be guaranteed by the City of Pittsburg.
~~Feasible mitigation to reduce the impact at the W. Leland Road and San Marco Boulevard intersection does not exist without widening the approaches to the intersection. Given that areas directly adjacent to the right-of-way have been previously developed, existing properties adjacent to the intersection would need to be purchased, and the overlying structures demolished, in order to widen the right-of-way. In addition, widening of the intersection approaches could require relocation of storm drainage infrastructure and major utilities. Therefore, widening of the approaches is not possible.~~ As such, feasible mitigation does not exist and the impact would remain *significant and unavoidable.*

EB SR 4 Ramps and San Marco Boulevard (Intersection #7)

As presented above, Mitigation Measure 4.12-8(d) includes the following improvements to the EB SR 4 ramps and San Marco Boulevard intersection: restriping of the eastbound approach to include an eastbound left turn lane; a shared left-through-right lane; and an eastbound right turn lane. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-8(d) would improve the operations at the EB SR 4 ramps and San Marco Boulevard intersection to LOS B in the AM peak hour and LOS C in the PM peak hour, which would meet the LOS requirement of LOS ~~E~~D or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-8(d) would reduce the impact to the EB SR 4 ramps and San Marco Boulevard intersection to a *less-than-significant* level.

- Implement Mitigation Measure 4.12-8(d).

~~*WB SR-4 Ramps and San Marco Boulevard (Intersection #8)*~~

~~As presented above, Mitigation Measure 4.12-8(e) includes conversion of one of the northbound through lanes at the WB SR-4 Ramps and San Marco Boulevard intersection to a northbound left turn lane. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-8(e) would improve the operations at the WB SR-4 ramps and San Marco Boulevard intersection. However, the intersection would continue to operate at LOS F in the AM peak hour, which would not meet the LOS requirement of LOS E or better for a signalized intersection in the City of Pittsburg. Nonetheless, the intersection would operate better than without the proposed project. Therefore, implementation of Mitigation Measure 4.12-8(e) would reduce the project impact to the WB SR-4 Ramps and San Marco Boulevard intersection to a *less-than-significant* level.~~

~~*W. Leland Road and Southwood Drive (Intersection #17)*~~

~~As presented above, Mitigation Measure 4.12-8(f) includes the following improvements to the W. Leland Road and Southwood Drive intersection: restriping of the northbound approach to include a northbound left turn lane and a northbound right turn lane. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(f) would improve the operations at the intersection to LOS C in the AM peak hour, which would meet the LOS requirement of LOS E or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-8(f) would reduce the impact to the W. Leland Road and Southwood Drive intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-8(f).~~

W. Leland Road and Bailey Road (Intersection #18)

As presented above, Mitigation Measure 4.12-8(g) includes the following improvements to the W. Leland Road and Bailey Road intersection: striping of a northbound right turn lane; restriping of the shared northbound through-right lane to be through lane; and addition of a southbound right turn overlap phase and a westbound right turn overlap phase. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(g) would improve the operations at the W. Leland Road and Bailey Road intersection; however, the intersection would continue to operate at LOS F in the AM peak hour, which would not meet the LOS requirement of LOS E or better for a signalized intersection in the City of Pittsburg. Nonetheless, the intersection would operate better than without the proposed project. Therefore, implementation of Mitigation Measure 4.12-8(g) would reduce the project impact to the W. Leland Road and Bailey Road intersection to a *less-than-significant* level. It should be noted that other intersection improvements are already planned in the CIP for the 2015 Update to the Contra Costa CMP (Project 0914) for the intersection, although funding sources were not identified and a timeframe for the improvements was not established.

- Implement Mitigation Measure 4.12-8(g).

~~*W. Leland Road and Chestnut Drive (Intersection #23)*~~

~~As presented above, Mitigation Measure 4.12-8(h) includes the following improvement to the W. Leland Road and Chestnut Drive intersection: conversion of the westbound left turn and eastbound left turn movements from protected left turn phasing to permitted left turn phasing. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(h) would improve the operations at the W. Leland Road and Chestnut Drive intersection; however, the intersection would continue to operate at LOS F in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Nonetheless, the intersection would operate better than without the proposed project. Therefore, implementation of Mitigation Measure 4.12-8(h) would reduce the project impact to the W. Leland Road and Chestnut Drive intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-8(h).~~

~~*W. Leland Road and Jacqueline Drive (Intersection #24)*~~

~~As presented above, Mitigation Measure 4.12-8(i) includes optimization of the intersection timing splits at the W. Leland Road and Jacqueline Drive intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-7) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(i) would improve the operations at the W. Leland Road and Jacqueline Drive intersection; however, the intersection would continue to operate at LOS F in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Nonetheless, the intersection would operate better than without the proposed project. Therefore, implementation of Mitigation Measure 4.12-8(i) would reduce the project impact to the W. Leland Road and Jacqueline Drive intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-8(i).~~

~~*W. Leland Road and Range Road (Intersection #26)*~~

~~As presented above, Mitigation Measure 4.12-8(j) includes optimization of the intersection timing splits at the W. Leland Road and Range Road intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-16) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(j) would improve the operations at the at the W. Leland Road and Range Road intersection; however, the intersection would continue to operate at LOS E in the AM peak hour, which would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Nonetheless, the intersection would operate better than without the proposed~~

~~project. Therefore, implementation of Mitigation Measure 4.12-8(j) would reduce the project impact to the W. Leland Road and Range Road intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-8(j).~~

~~*W. Leland Road and Dover Way (Intersection #27)*~~

~~As presented above, Mitigation Measure 4.12-8(j) includes optimization of the intersection timing splits at the W. Leland Road and Dover Way intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-16) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(j) would improve the operations at the W. Leland Road and Dover Way intersection to LOS D in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-8(j) would reduce the impact to the W. Leland Road and Dover Way intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-8(j).~~

W. Leland Road and Burton Avenue (Intersection #28)

As presented above, Mitigation Measure 4.12-8(~~j~~f) includes optimization of the intersection timing splits at the W. Leland Road and Burton Avenue intersection. The aforementioned improvement has been planned by the Pittsburg CIP (Project S-16) as a general Citywide on-going signal retiming project with funding from a gas tax. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(~~j~~f) would improve the operations at the W. Leland Road and Burton Avenue intersection to LOS B in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-8(~~j~~f) would reduce the impact to the W. Leland Road and Burton Avenue intersection to a *less-than-significant* level.

- Implement Mitigation Measure 4.12-8(j).

W. Leland Road and Crestview Drive (Intersection #29)

As presented above, Mitigation Measure 4.12-8(~~k~~g) includes changing the eastbound left turn phase and westbound left turn phase at the W. Leland Road and Crestview Drive intersection from protected to permitting phasing. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(~~k~~g) would improve the operations at the intersection to LOS E in the AM peak hour and LOS C in the PM peak hour, which would not meet the LOS requirement of LOS D or better during the AM peak hour for a signalized intersection in the City of Pittsburg. Nonetheless, the intersection would operate better than without the proposed project. Therefore, implementation of

Mitigation Measure 4.12-8(~~k~~g) would reduce the project impact to the W. Leland Road and Crestview Drive intersection to a *less-than-significant* level.

- Implement Mitigation Measure 4.12-8(k).

~~*Willow Pass Road and Olivera Road (Intersection #33)*~~

~~As presented above, Mitigation Measure 4.12-8(l) includes the following improvements to the Willow Pass Road and Olivera Road intersection: restriping of the southbound approach to be two southbound left turn lanes; a southbound through lane; and a shared southbound through-right turn lane. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(l) would improve the operations at the Willow Pass Road and Olivera Road intersection to LOS D in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. Therefore, implementation of Mitigation Measure 4.12-8(l) would reduce the impact to the W. Leland Road and Crestview Drive intersection to a *less-than-significant* level.~~

- ~~Implement Mitigation Measure 4.12-8(l).~~

Concord Boulevard and Bailey Road (Intersection #35)

As presented above, Mitigation Measure 4.12-8(~~m~~h) includes the following improvements to the Concord Boulevard and Bailey Road intersection: widening of the southbound approach; restriping of the southbound approach to include a southbound left turn lane, a southbound through lane, and a southbound right turn lane; and widening of the northbound approach to be a northbound left turn lane and a shared through-right turn lane. The aforementioned improvements have been planned in the Concord CIP (Project 2049) with funding from traffic mitigation fees, grant funds, and Concord-owned ROW. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(~~m~~h) would improve the operations at the Concord Boulevard and Bailey Road intersection ~~to LOS E~~ in the AM and PM peak hours. However, even with implementation of Mitigation Measure 4.12-8(~~m~~h), the v/c is still increased by 0.03 or more in the AM peak hour and decreases in the PM peak hour without project conditions; therefore, the intersection would remain an impact in the AM peak hour and would be reduced to less than significant in the PM peak hour. However, the intersection is located in the City of Concord, the City of Pittsburg cannot guarantee the completion of the improvements. ~~intersection would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord, and the delay would continue to be substantially worse with the inclusion of project-generated traffic.~~ Therefore, the impact to the Concord Boulevard and Bailey Road intersection would remain *significant and unavoidable*.

- Implement Mitigation Measure 4.12-8(m).

Bailey Road and Myrtle Drive (Intersection #36)

As presented above, Mitigation Measure 4.12-8(~~m~~h) includes the following improvements to the Bailey Road and Myrtle Drive intersection: signalization; addition of a southbound left turn lane; and restriping of the shared southbound through-left lane to be a through lane. The aforementioned improvements have been planned in the Concord CIP (Project 2049) with funding from traffic mitigation fees, grant funds, and Concord-owned ROW. It should be noted that the intersection does not meet the peak hour traffic signal warrant in the Existing plus Project scenario (two vehicles less than the threshold on the minor street approach), but does meet the warrant in the Long-Term (2035) Plus Project Condition. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-8(~~m~~h) would improve the operations at the Bailey Road and Myrtle Drive intersection to LOS B in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord. However, given that a timeframe has not been established, completion of the proposed improvements prior to buildout of the project site cannot be guaranteed. Therefore, the impact to the Bailey Road and Myrtle Drive intersection would temporarily remain *significant and unavoidable*.

- Implement Mitigation Measure 4.12-8(m).

Clayton Road and Treat Boulevard (Intersection #39)

As presented above, Mitigation Measure 4.12-8(~~j~~f) includes optimization of the timing splits at the intersection. ~~the following improvements to the Clayton Road and Treat Boulevard intersection: widening the northbound approach to include two northbound left turn lanes, two northbound through lanes, and a northbound right turn lane; and changing of the northbound and southbound phases should be changed from split phasing to protected phasing. The aforementioned improvement has been planned by the Concord CIP (Project 2144), with funding from the Measure J bond, Proposition 111, and Measure C local funds.~~ As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-~~2~~8(~~n~~f) would improve the operations at the Clayton Road and Treat Boulevard intersection ~~to LOS B in the AM peak hour, which would meet the LOS requirement of LOS D~~ in the PM peak hour. Although the intersection would not meet the requirement of LOS E or better for a signalized intersection in the City of Concord, the intersection v/c ratio would be equal to or better than the Long-Term (2035) Plus Project v/c ratio. However, given that the intersection is located in the City of Concord, the City of Pittsburg cannot guarantee the completion of the improvements. ~~a timeframe has not been established, completion of the proposed improvements prior to 2035 cannot be guaranteed~~. Therefore, the impact to the Clayton Road and Treat Boulevard intersection would temporarily remain *significant and unavoidable*.

- Implement Mitigation Measure 4.12-8(~~j~~f).

~~*Cowell Road and Treat Boulevard (Intersection #41)*~~

~~As presented above, Mitigation Measure 4.12-8(a) includes optimization of the intersection timing splits at the Cowell Road and Treat Boulevard intersection. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-8(a) would improve the operations at the Cowell Road and Treat Boulevard intersection to LOS E in the AM peak hour and LOS D in the PM peak hour, which would not meet the LOS requirement of LOS D or better during the AM peak hour for a signalized intersection in the City of Concord. Nonetheless, the intersection would operate better than without the proposed project. Nonetheless, given that the Concord CIP does not include a city-wide timing update, the project impact to the Cowell Road and Treat Boulevard intersection would remain *significant and unavoidable*.~~

- ~~Implement Mitigation Measure 4.12-8(a).~~

Bailey Road and Project Entrance (Intersection #43)

As presented above, Mitigation Measure 4.12-8(~~o~~i) includes widening of Bailey Road from two lanes to four lanes. The aforementioned improvement has been planned by the Pittsburg CIP (Project ST-27), although a timeframe has not been established. While funding sources have not been identified, the improvements are eligible for Measure J funding. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-8(~~o~~i) would improve the operations at the Bailey Road and Project Entrance intersection to LOS C in the AM peak hour, which would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg. However, given that a timeframe has not been established, completion of the proposed improvements prior to buildout of the project site cannot be guaranteed. Therefore, the impact to the Bailey Road and Project Entrance intersection would temporarily remain *significant and unavoidable*.

- Implement Mitigation Measure 4.12-8(~~o~~i).

~~*Treat Boulevard and Oak Grove Road (Intersection #44)*~~

~~As presented above, Mitigation Measure 4.12-8(a) includes optimization of the intersection timing splits at the Treat Boulevard and Oak Grove Road intersection. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(a) would improve the operations at the Treat Boulevard and Oak Grove Road intersection to LOS E in the AM and PM peak hours, which would not meet the LOS requirement of LOS D or better during the AM peak hour for a signalized intersection in the City of Concord. Although, the intersection would operate better than without the proposed project, the Concord CIP does not include a city-wide timing update. Thus, the project impact to the Treat Boulevard and Oak Grove Road intersection would remain *significant and unavoidable*.~~

- ~~Implement Mitigation Measure 4.12-8(a).~~

Concord Boulevard and Port Chicago Highway (Intersection #48)

As presented above, Mitigation Measure 4.12-8(a) includes optimization of the intersection timing splits at the Concord Boulevard and Port Chicago Highway intersection. As shown in Table 4.12-20, implementation of Mitigation Measure 4.12-2(a) would improve the operations at the Concord Boulevard and Port Chicago Highway intersection to LOS C in the AM peak hour, which would meet the LOS requirement of LOS ~~D~~E or better for a signalized intersection in the City of Concord. However, the Concord CIP does not include a city-wide timing update. Therefore, the project impact to the Concord Boulevard and Port Chicago Highway intersection would remain *significant and unavoidable*.

- Implement Mitigation Measure 4.12-8(a).

4.12-9 Impacts related to Central and East County Routes of Regional Significance under Long-Term (2035) Plus Project Conditions. Based on the analysis below, the impact would be ~~*less than significant*~~ *significant and unavoidable*.

The Central and East County Routes of Regional Significance were evaluated based on the respective MTSO criteria, including DI, roadway average speed, roadway average stopped delay, LOS, V/C, and persons in vehicles in the HOV lane for the Long-Term (2035) Plus Project Condition. A discussion regarding each MTSO criteria is provided below.

Delay Index

As noted previously, the DI is defined as the ratio between the peak congested travel time and the uncongested travel time along a roadway facility. Table 4.12-21 summarizes the DI for the Routes of Regional Significance in the study area under the Long-Term (2035) Plus Project Condition. As shown in the table, all freeway study segments meet the delay index criteria, with the exception of the following locations: ~~SR-4 in the East County operates at a DI of 1.1 or better in the Long-Term (2035) Plus Project Condition, which meets the applicable DI criteria of 2.5 or better for that roadway. In addition, SR-4 in the Central County operates at a DI of 1.1 or in the Long-Term (2035) Plus Project Condition, which meets the applicable DI criteria of 5.0 or better for that roadway. Furthermore, SR 242 in the Central County operates at a DI of 1.0 or better in the Long-Term (2035) Plus Project Condition, which meets the applicable DI criteria of 3.0 or better for that roadway. Therefore, the DI for SR-4 and SR 242 would not significant increase as a result of the proposed project in the Long-Term (2035) Plus Project Condition.~~

- EB SR-4 in the East County (PM peak hour);
- WB SR-4 in the East County (AM peak hour);
- EB SR-4 in the Central County (PM peak hour); and
- NB SR-242 in the Central County (PM peak hour)

Table 4.12-21
Delay Index Summary – Long-Term (2035) Plus Project Conditions

Roadway Segment	Distance (miles)	Uncongested Travel Time		Long-Term (2035)				Long-Term (2035) Plus Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		AM Peak	PM Peak	CTT	DI	CTT	DI	CTT	DI	CTT	DI
East County											
EB SR 4	~~4.23~~2.99	~~234.5~~2.39	~~234.5~~2.39	~~234.5~~ 2.65	~~1.0~~ 1.1	~~262.8~~ 18.90	~~1.1~~ **7.9**	~~234.5~~ 2.65	~~1.0~~ 1.1	~~262.8~~ 20.78	~~1.1~~ **8.7**
WB SR 4	~~4.23~~3.53	~~234.5~~2.82	~~234.5~~2.82	~~258.3~~ 9.30	~~1.1~~ **3.3**	~~234.5~~ 2.94	1.0	~~258.3~~ 9.68	~~1.1~~ **3.4**	~~234.5~~ 2.95	~~1.0~~ 1.0
Central County											
Eastbound SR 4	~~6.13~~4.43	~~339.5~~3.55	~~339.5~~3.55	~~339.5~~ 3.94	~~1.0~~ 1.1	~~374.0~~ 22.09	~~1.1~~ **6.2**	~~339.5~~ 3.94	~~1.0~~ 1.1	~~380.5~~ 23.76	~~1.1~~ **6.7**
Westbound SR 4	~~6.13~~3.63	~~339.5~~2.90	~~339.5~~2.90	~~424.4~~ 11.29	~~1.3~~ 3.9	~~339.5~~ 3.13	~~1.0~~ 1.1	~~441.4~~ 12.30	~~1.3~~ 4.2	~~339.5~~ 3.13	~~1.0~~ 1.1
Northbound SR 242	~~3.52~~2.50	~~194.7~~2.00	~~194.7~~2.00	~~194.7~~ 2.99	~~1.0~~ 1.5	~~200.9~~ 6.80	~~1.0~~ **3.4**	~~194.7~~ 2.98	~~1.0~~ 1.5	~~204.2~~ 7.09	~~1.0~~ **3.5**
Southbound SR 242	~~3.52~~2.23	~~194.7~~1.78	~~194.7~~1.78	~~204.2~~ 5.80	~~1.0~~ **3.3**	~~194.7~~ 2.02	~~1.0~~ 1.1	~~207.5~~ 5.90	~~1.1~~ **3.3**	~~194.7~~ 2.03	~~1.0~~ 1.1

Note:

- *CTT = Congested Travel Time, measured in seconds.*
- *Locations operating unacceptably are bolded.*

Source: Kimley-Horn and Associates, ~~2017~~2019.

Each of the freeway segments exceed the allowable delay index and the project adds vehicle trips that worsen the delay index. The proposed project would increase the delay index for EB SR-4 in the East County in the PM peak hour from an unacceptable 7.9 to 8.7, and from 6.2 to 6.7 in the Central County. The project would also increase the delay index for WB SR-4 in the East County in the AM peak hour from an unacceptable 3.3 to 3.4, as well as would increase the delay index for NB SR-242 in the PM peak hour from an unacceptable 3.4 to 3.5, which would constitute a significant impact.

Other MTSCOs

Other MTSOs analyzed per the CCTA established criteria include average speed, average stopped delay, arterial LOS, V/C, and HOV usage. Table 4.12-22 summarizes the MTSOs for the Routes of Regional Significance in the Central County.

As shown in the table, all of the study corridors in the Central County meet the MTSO criteria for the Long-Term (2035) Plus Project Condition.

HOV Lane Summary

Table 4.12-23 summarizes the persons using the HOV lane in the peak direction for the Long-Term (2035) Plus Project Condition. As shown in the table, the number of vehicles in the HOV lane would exceed the 600-vehicle utilization goal for each peak direction with the project. Thus, the project would not conflict with the applicable HOV lane utilization standard.

Conclusion

Based on the above analysis, all roadway facilities in Central and East County would continue to meet the MTSO criteria for Routes of Regional Significance, with the exception of the delay indices for the abovementioned freeway segments. Therefore, the proposed project would have a ***significant*** impact to the Central and East County Routes of Regional Significance under the Long-Term (2035) Plus Project Condition and c~~w~~ould be inconsistent with the Cortese-Knox Hertzberg Local Government Reorganization Act of 2000 and Contra Costa County Local Agency Formation Commission Policy (g), as discussed in Appendix J of ~~this~~ the Draft EIR.

Currently, congestion on NB SR-242 is due to the downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve the congestion. Improving the operations of the EB SR-4 interchange at Port Chicago Highway would entail adding additional lanes to the freeway segment and the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp; however, any improvements would require cooperation and coordination with Caltrans and CCTA. Therefore, since the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway, the impact is *Significant and Unavoidable.*

Table 4.12-22
MTSO Summary – Long-Term (2035) Plus Project Conditions

Corridor	Measure of Effectiveness	Direction	Threshold	Long-Term (2035)		Long-Term (2035) Plus Project	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Central County							
Bailey Road	Average Speed (mph)	NB	None	18	15	17	12
		SB	None	22	20	22	20
	Average Stopped Delay	Concord Blvd	3.0	1.2	0.8	1.7	1.0
		Clayton Rd	3.0	1.4	0.2	1.6	0.2
	LOS	NB	None	D	D	D	E
		SB	None	C	C	C	C
	V/C	NB	None	0.20	0.55	0.23	0.62
		SB	None	1.10	0.45	1.18	0.49
Clayton Road	Average Speed (mph)	EB	15	30	28	30	28
		WB	15	22	27	22	27
	Average Stopped Delay	Bailey Rd	3.0	1.4	0.2	1.6	0.2
		Ygnacio Valley Rd	3.0	1.9	0.7	1.9	0.7
		Treat Blvd	3.0	0.6	0.7	0.6	0.9
	LOS	EB	None	B	B	B	B
		WB	None	D	B	D	C
	V/C	EB	None	0.29	0.82	0.30	0.83
		WB	None	0.75	0.45	0.76	0.45
Treat Boulevard	Average Speed (mph)	NB	None	27	22	27	21
		SN	None	23	27	21	26
	Average Stopped Delay	Clayton Rd	3.0	0.6	0.7	0.6	0.9
		Cowell Rd	5.0	0.6	0.9	0.6	0.9
		Oak Grove Rd	5.0	1.6	1.9	1.6	2.0
	LOS	NB	None	C	D	C	D
		SB	None	C	B	C	B
	V/C	NB	1.5	0.42	1.01	0.43	1.04
		SB	1.5	0.89	0.59	0.91	0.60

(Continued on next page)

Table 4.12-22
MTSO Summary – Long-Term (2035) Plus Project Conditions

Corridor	Measure of Effectiveness	Direction	Threshold	Long-Term (2035)		Long-Term (2035) Plus Project	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Ygnacio Valley Road	Average Speed (mph)	NB	None	17	3	17	3
		SB	None	14	23	14	23
	Average Stopped Delay	Clayton Rd	3.0	1.9	0.7	1.9	0.7
	LOS	NB	None	D	F	D	F
		SB	None	E	C	E	C
	V/C	NB	1.50	0.30	0.91	0.30	0.92
		SB	1.50	0.82	0.39	0.83	0.40

Source: Kimley-Horn and Associates, Inc., ~~2017~~2019.

Table 4.12-23
HOV Lane Summary – SR 4 – Long-Term (2035) Plus Project Conditions

Scenario	Peak	Direction	Vehicles Using HOV Lane	Persons Using HOV Lane
Existing	AM	EB	2,001	4,109
	PM	WB	1,612	3,328
Existing Plus Project	AM	EB	2,001	4,109
	PM	WB	1,646	3,397

Source: Kimley-Horn and Associates, ~~2017~~2019.

Mitigation Measure(s)
~~*None required.*~~
4.12-5. Implement Mitigation Measure 4.12-3.

4.12-10 Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities under Long-Term (2035) Plus Project Conditions. Based on the analysis below, with adequate infrastructure to accommodate the increased demand on transit, bicycle, and pedestrian systems in the area and with implementation of mitigation, the impact would be *less than significant.*

As noted above, the proposed project is expected to generate an increase in demand for alternative transportation facilities, in combination with other proposed and pending projects in the area, the cumulative increase in demand for such facilities could cause potentially significant impacts to the transit, bicycle, and pedestrian systems. With implementation of existing General Plan policies, as well compliance with the Design Review Guidelines included in the Draft Master Plan, adequate infrastructure would be provided to accommodate the increased demand. However, if future development fails to incorporate the required facilities, a ***significant*** impact could occur.

Mitigation Measure(s)
Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

4.12-10 Implement Mitigation Measures 4.12-6(a) and 4.12-6(b).

4.12-11 Result in a projected future over-capacity freeway condition where current long-range planning studies show an under-capacity condition at a freeway segment under Long-Term (2035) Plus Project Conditions. Based on the analysis below, the impact would be ~~*less than significant*~~ *significant and unavoidable*.

Traffic operations were evaluated at the study freeway segments under Long-Term (2035) Plus Project traffic conditions. Freeway volumes for the Long-Term (2035) Plus Project Condition were calculated by adding the proposed project trips to the Long-Term (2035) freeway volumes. Table 4.12-24 shows the peak hour LOS and density for each freeway section in the study area.

Significant impacts for freeway segments occur when the project worsens the LOS from an acceptable LOS to an unacceptable LOS or if the freeway segment operates unacceptably without the project and the project increases the density. As shown in Error! Reference source not found., ~~all the freeway segments would operate at an acceptable LOS under Long-Term (2035) Plus Project Conditions.~~ all freeway segments in the East and Central County satisfy the operational standards, with the exception of the following:

- NB SR-242 between Clayton Road off-ramp and SR-4 (PM peak hour); and
- EB SR04 between I-680 on-ramp and SR-242 off-ramp (PM peak hour).

Table 4.12-24
Freeway Segment LOS – Long-Term (2035) Plus Project Conditions

Freeway Section	Criteria LOS	Long-Term (2035)				Long-Term (2035) Plus Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)
Northbound									
SR 242 between I-680 and Clayton Road	E	A	7.8	D	27.4	A	8.1	D	28.7
SR 242 between Clayton Road and Concord Avenue	E	A	9.2	C	23.4	A	9.6	C	24.4
SR 242 between Concord Avenue and Grant Street	E	A	8.1	C	25.1	A	8.4	C	25.9
SR 242 between Grant Street and Olivera Road	E	A	10.0	D	27.0	A	10.3	D	27.8
SR 242 between Olivera Road and SR 4	E	B	12.7	E	38.9	B	13.0	E	40.9
Southbound									
SR 242 between SR 4 and Olivera Road	F	E	39.1	C	23.6	E	41.3	C	24.2
SR 242 between Olivera Road and Grant Street	F	D	26.9	C	18.7	D	27.9	C	19.1
SR 242 between Grant Street and Concord Avenue	F	D	27.2	B	16.8	D	28.1	B	17.2
SR 242 between Concord Avenue and Clayton Road	F	C	24.0	B	15.0	C	25.1	B	15.6
SR 242 between Clayton Road and I-680	F	D	32.2	C	19.1	D	33.8	C	19.6
Eastbound									
SR 4 between I-680 and Solano Way	E	A	3.4	C	23.5	A	3.6	C	24.0
SR 4 between Solano Way and SR 242	E	A	2.9	C	21.1	A	3.1	C	21.6
SR 4 between SR 242 and Port Chicago Highway	F	A	2.6	C	18.2	A	2.9	C	24.0
SR 4 between Port Chicago Highway and Willow Pass Road	F	A	9.2	F	51.9	A	9.7	F	55.9
SR 4 between Willow Pass Road and San Marco Boulevard	F	A	8.5	E	37.1	A	8.9	E	39.3
SR 4 between San Marco Boulevard and Bailey Road	F	A	8.8	E	40.8	A	9.0	E	42.4
SR 4 between Bailey Road and Railroad Avenue	F	A	7.8	D	33.8	A	8.3	D	34.4
Westbound									
SR 4 between Railroad Avenue and Bailey Road	F	D	32.8	B	16.6	D	33.1	B	17.2
SR 4 between Bailey Road and San Marco Boulevard	F	E	38.6	B	17.9	E	40.3	C	18.3
SR 4 between San Marco Boulevard and Willow Pass Road	F	E	38.6	C	18.3	E	41.5	C	18.9

(Continued on next page)

Table 4.12-24
Freeway Segment LOS – Long-Term (2035) Plus Project Conditions

Freeway Section	Criteria LOS	Long-Term (2035)				Long-Term (2035) Plus Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)
SR 4 between Willow Pass Road and Port Chicago Highway	F	F	150.7	C	23.2	F	194.0	C	24.0
SR 4 between Port Chicago Highway and SR 242	F	C	24.6	A	9.4	C	25.7	A	10.0
SR 4 between SR 242 and Solano Way	E	D	29.4	B	11.7	D	30.1	B	12.0
SR 4 between Solano Way and I 680	E	B	17.8	B	12.3	C	18.3	B	12.6

Notes:
Locations that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
[1] pcpmpl = passenger cars per mile per lane.

Source: Kimley-Horn and Associates, 2017.

Table 4.12-24
Freeway Segment LOS – Long-Term (2035) Plus Project Conditions

Freeway Section	Criteria LOS	Long-Term (2035)						Long-Term (2035) Plus Project					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
Northbound													
SR-242 between I-680 and Clayton Road off-ramp	E	A	0.15	6.2	C	0.68	24.7	A	0.16	6.4	C	0.70	24.6
SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp	E	A	0.15	6.3	**F**	**0.70**	**49.7**	A	0.16	6.6	**F**	**0.73**	**55.1**
SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-ramp	E	A	0.12	7.6	**F**	**0.53**	**85.1**	A	0.12	7.8	**F**	**0.54**	**91.1**
SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp	E	**F**	**1.34**	**45.0**	**F**	**0.81**	**83.2**	**F**	**1.34**	**45.0**	**F**	**0.83**	**84.0**
SR-242 between Grant Street off-ramp and Grant Street on-ramp	E	A	0.37	9.6	**F**	**0.83**	**83.8**	A	0.38	9.7	**F**	**0.85**	**84.4**
SR-242 between Grant Street on-ramp and Olivera Road off-ramp	E	B	0.66	12.2	**F**	**0.74**	**102.7**	B	0.67	12.4	**F**	**0.76**	**102.9**
SR-242 between Olivera Road off-ramp and SR-4 off-ramp	E	B	0.26	8.7	**F**	**1.27**	**14.1**	B	0.26	8.8	**F**	**1.31**	**14.1**
Southbound													
SR-242 between SR-4 on-ramp and Olivera Road on-ramp	F	F	1.04	48.9	C	0.69	21.2	F	1.07	49.3	C	0.70	22.0
SR-242 between Olivera Road on-ramp and Solano Way off-ramp	F	C	0.90	26.6	B	0.61	18.0	C	0.93	26.5	B	0.62	18.4
SR-242 between Solano Way off-ramp and Solano Way on-ramp	F	F	0.75	71.0	B	0.50	14.6	F	0.77	62.4	B	0.51	15.0
SR-242 between Solano Way on-ramp and Concord Avenue off-ramp	F	F	0.99	59.1	C	0.80	21.3	F	1.00	66.7	C	0.81	21.8
SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp	F	F	0.84	84.9	B	0.53	15.7	F	0.86	92.1	B	0.54	16.2
SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp	F	F	0.87	98.4	B	0.56	17.2	F	0.90	100.1	B	0.57	17.7
SR-242 between Clayton Road on-ramp and I-680	F	F	1.36	22.4	C	0.69	21.7	F	1.40	22.4	C	0.71	22.3
Eastbound													
SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp	E	B	0.42	12.2	**F**	**0.87**	**58.5**	B	0.41	12.7	**F**	**0.91**	**74.4**
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	E	A	0.31	9.2	**F**	**0.81**	**95.4**	A	0.32	9.5	**F**	**0.84**	**100.3**
SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp	E	B	0.39	11.4	**F**	**0.97**	**84.8**	B	0.39	11.8	**F**	**1.01**	**91.2**
SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp	F	A	0.23	8.1	F	0.88	98.4	A	0.24	8.4	F	0.91	99.3
SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp	F	A	0.17	5.9	F	0.84	118.5	A	0.18	6.3	F	0.88	118.9
SR-4 between SR-242 on-ramp and HOV Lane Begins	F	B	0.48	10.1	F	5.21	45.0	B	0.50	10.8	F	5.42	45.0
SR-4 between HOV Lane Begins and Lane Drop	F	A	0.23	7.9	A	0.90	6.7	A	0.25	8.3	A	0.94	6.7
SR-4 between Lane Drop and Port Chicago Highway on-ramp	F	A	0.23	7.9	A	0.90	6.7	A	0.25	8.3	A	0.94	6.7
SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp	F	A	0.35	9.9	F	2.59	45.0	B	0.36	10.3	F	2.81	45.0
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	F	B	0.39	13.4	F	1.47	10.3	B	0.41	14.0	F	1.53	9.9

(Continued on next page)

Table 4.12-24
Freeway Segment LOS – Long-Term (2035) Plus Project Conditions

Freeway Section	Criteria LOS	Long-Term (2035)						Long-Term (2035) Plus Project					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp	F	B	0.68	13.9	F	4.15	45.0	B	0.70	14.5	F	4.58	45.0
SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp	F	B	0.33	11.1	F	1.26	4.4	B	0.34	11.5	F	1.29	3.6
SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp	F	B	0.37	12.9	F	1.29	6.9	B	0.38	13.4	F	1.33	5.0
SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane	F	B	0.37	11.6	F	1.29	6.1	B	0.38	12.1	F	1.33	5.3
SR-4 between Add Lane and Bailey Road Diagonal off-ramp	F	B	0.32	10.9	A	0.97	6.6	B	0.33	11.3	F	1.00	4.9
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp	F	A	0.28	8.9	A	0.86	2.9	A	0.29	9.1	A	0.88	2.9
SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp	F	B	0.33	11.2	F	1.05	0.0	B	0.34	11.5	F	1.07	0.0
SR-4 between Bailey Road Diagonal on-ramp and Add Lane	F	A	0.33	10.5	F	1.05	6.4	A	0.34	10.9	F	1.07	6.7
SR-4 between Add Lane and Railroad Avenue off-ramp	F	A	0.33	11.0	A	0.93	1.8	A	0.35	11.7	A	0.95	4.6
Westbound													
SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp	F	F	0.95	86.6	B	0.49	14.7	F	0.95	89.2	B	0.50	15.1
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp	F	F	0.88	86.5	B	0.41	11.5	F	0.89	86.1	B	0.43	11.9
SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp	F	F	1.09	69.6	B	0.38	11.1	F	1.09	67.9	B	0.38	11.2
SR-4 between Bailey Road on-ramp and Lane Drop	F	F	0.82	85.0	A	0.28	7.9	F	0.82	85.1	A	0.29	8.0
SR-4 between Lane Drop and San Marco Boulevard off-ramp	F	F	1.28	52.2	B	0.48	15.6	F	1.30	55.6	B	0.50	16.1
SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp	F	F	1.20	65.7	B	0.41	12.4	F	1.22	69.6	B	0.43	12.7
SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp	F	F	1.20	30.7	B	0.41	11.6	F	1.22	45.0	B	0.43	11.9
SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp	F	F	0.98	67.2	B	0.42	11.6	F	1.01	69.2	B	0.43	12.1
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	F	F	1.47	74.8	B	0.55	17.0	F	1.51	74.8	B	0.57	17.7
SR-4 between Willow Pass Road on-ramp and HOV Lane Add	F	F	1.47	31.9	B	0.55	15.9	F	1.51	32.0	B	0.57	16.7
SR-4 between HOV Lane Add and Add Lane	F	F	1.29	28.4	B	0.47	13.3	F	1.32	28.8	B	0.49	13.9
SR-4 between Add Lane and Port Chicago Highway off-ramp	F	F	1.17	23.1	B	0.46	13.9	F	1.20	23.4	B	0.48	14.4
SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp	F	F	1.00	45.0	B	0.43	12.1	F	1.04	45.0	B	0.45	12.6
SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp	E	A	0.70	5.3	A	0.20	6.9	A	0.72	4.9	A	0.22	7.5
SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp	E	A	0.72	6.2	B	0.26	8.8	A	0.74	5.8	B	0.27	9.4
SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp	E	**F**	**1.39**	**45.0**	B	0.36	11.6	**F**	**1.49**	**45.0**	B	0.39	12.2

(Continued on next page)

Table 4.12-24
Freeway Segment LOS – Long-Term (2035) Plus Project Conditions

Freeway Section	Criteria LOS	Long-Term (2035)						Long-Term (2035) Plus Project					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)	LOS	d/c	Density[1] (pcpmpl)
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	E	A	0.76	7.1	A	0.28	9.4	A	0.78	6.7	A	0.30	10.0
SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp	E	**F**	**2.29**	**45.0**	B	0.35	12.4	**F**	**2.44**	**45.0**	B	0.37	13.0

Notes:
Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
[1] pcpmpl = passenger cars per mile per lane.

Source: Kimley-Horn and Associates, 2017~~9~~.

The congestion on NB SR-242 is due to the downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve the congestion. To improve the operations of the EB SR-4 interchange at Port Chicago Highway would entail adding additional lanes to this segment and for the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp. Any improvements would require cooperation and coordination with Caltrans and CCTA. Therefore, since the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway, the impact would remain *significant and unavoidable.*

~~Therefore, impacts to study freeway segments under Long-Term (2035) Plus Project Conditions would be ***less than significant***.~~

Mitigation Measure(s)
~~*None required.*~~
4.12-11 Implement Mitigation Measure 4.12-3.

4.12-12 Result in a projected future over-capacity freeway condition where current long-range planning studies show an under-capacity condition at a freeway ramp under Long-Term (2035) Plus Project Conditions. Based on the analysis below, the impact would be *less than significant*.

Traffic operations were evaluated at the study freeway ramps under Long-Term (2035) Plus Project traffic conditions. Ramp volumes were calculated by adding the proposed project trips to the Long-Term (2035) ramp volumes. Table 4.12-25 shows the peak hour LOS and density for each freeway ramp in the study area. Significant impacts for freeway ramps occur when the project worsens the LOS from an acceptable LOS to an unacceptable LOS or if the freeway ramp operates unacceptably without the project and the project increases the density. As shown in Table 4.12-25, all the freeway ramps would operate at an acceptable LOS under Long-Term (2035) Plus Project Conditions. Therefore, impacts to study freeway ramps under Long-Term (2035) Plus Project Conditions would be ***less than significant***.

Mitigation Measure(s)
None required.

Table 4.12-25
Freeway Ramp LOS – Long-Term (2035) Plus Project Conditions

Freeway Section	Criteria LOS	Long-Term (2035)				Long-Term (2035) Plus Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)	LOS	Density[1] (pcpmpl)
Eastbound SR 4									
Willow Pass Road Off-Ramp	F	A	8.3	F	39.7	A	8.8	F	41.0
Willow Pass Road On-Ramp	F	B	11.9	F	35.4	B	12.1	F	36.5
San Marco Boulevard Off-Ramp	F	B	16.1	F	42.6	B	16.5	F	44.2
SB San Marco Boulevard Loop On-Ramp	F	B	10.1	D	33.5	B	10.3	D	34.3
NB San Marco Boulevard Diagonal On-Ramp	F	A	9.8	D	30.6	B	10.2	D	31.4
SB Bailey Road Diagonal Off-Ramp	F	A	9.6	D	29.4	B	10.0	D	30.6
NB Bailey Road Loop Off-Ramp	F	B	10.3	C	26.5	B	10.4	C	26.5
Bailey Road On-Ramp	F	B	14.3	E	35.5	B	15.2	E	36.0
Westbound SR 4									
NB Bailey Road Diagonal Off-Ramp	F	D	29.8	B	16.9	D	30.0	B	17.4
SB Bailey Road Loop Off-Ramp	F	C	25.7	C	21.7	C	26.0	C	22.8
Bailey Road On-Ramp	F	E	36.3	B	16.5	E	37.3	B	17.2
San Marco Boulevard Off-Ramp	F	D	32.2	B	17.9	D	32.8	B	18.3
NB San Marco Boulevard Loop On-Ramp	F	E	36.1	C	23.4	E	37.7	C	24.1
SB San Marco Boulevard Diagonal On-Ramp	F	F	44.6	C	20.1	F	46.4	C	20.5
Willow Pass Road Off-Ramp	F	D	34.0	B	20.0	E	35.3	C	20.6
Willow Pass Road On-Ramp	F	F	56.9	C	23.2	F	59.9	C	24.1

Notes:
Locations that are operating below acceptable levels are shown in **BOLD** and significant impacts are **SHADED**.
[1] pcpmpl = passenger cars per mile per lane.

Source: Kimley-Horn and Associates, ~~2017~~2019.

APPENDIX A

TRAFFIC IMPACT STUDY

Faria Annexation Pittsburg, CA

PREPARED FOR:

CITY OF PITTSBURG

AUGUST 2019 | FINAL

Prepared By:

Kimley»Horn

WARNING!

The electronic data files ("Files") furnished by Kimley-Horn and Associates, Inc. to the intended receiver of the Files ("Receiving Party") are provided only for the convenience of Receiving Party and only for its sole use.

In the case of any defects in the Files or any discrepancies between the electronic Files and the hardcopy of the Files prepared by Kimley-Horn, the hardcopy shall govern. Only printed copies of documents conveyed by Kimley-Horn may be relied upon. Any use of the information obtained or derived from these electronic files will be at the Receiving Party's sole risk. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the Receiving Party agrees that it has 60 days to perform acceptance tests, after which it shall be deemed to have accepted the data transferred. Receiving Party accepts the Files on an "as is" basis with all faults. There are no express warranties made by Kimley-Horn with respect to the Files, and any implied warranties are excluded.

CONTENTS

Contents iii
Tables v
Figures vi
1. Introduction 1
    Study methodology 1
    Study Intersections Included in Analysis 7
2. Existing Conditions 9
    Existing Site Uses 9
    Existing Uses in Vicinity of Site 9
    Existing Roadway Network 9
    Existing Site Access 14
    Existing Lane Configurations and Traffic Control 14
    Existing Peak Hour Turning Movement Volumes 14
    Existing Transit Facilities 14
    Existing Bicycle and Pedestrian Facilities 17
    Existing Levels of Service at Study Interections 17
    Existing Levels of Service at Study Freeway Segments 20
    Existing Levels of Service at Study Freeway Ramps 22
3. Faria Annexation Residential Development Project 23
    Proposed Site Uses 23
    Project Trip Generation 23
    Internal Capture 23
    Project Trip Pass-By 23
    Project Trip Distribution and Assignment 24
4. Existing Plus Project Traffic Conditions 24
    Existing Plus Project Levels of Service at Study Intersections 24
    Existing Plus Project Levels of Service at Study Freeway Segments 27
    Existing Plus Project Levels of Service at Study Freeway Ramps 29
5. Long-Term (2035) Conditions 29
    Long-Term Lane Configurations and Traffic Control 29
    Year 2030 Forecast Model Volumes 31
6. Long-Term (2035) Traffic Conditions 32
    Long-Term Intersection level of Service 32
    Long-Term Levels of Service at Study Freeway Segments 34
    Long-Term Levels of Service at Study Freeway Ramps 36
    Long-Term Plus Project Levels of Service at Intersections 37
    Long-Term Plus Project Levels of Service at Study Freeway Segments 41
    Long-Term Plus Project Levels of Service at Study Freeway Ramps 43

7. MTSO's For all Scenarios....44
Delay Index....44
Average Speed, Average Stopped Delay, LOS, Volume to Capacity, HOV Usage....46
8. Potential Effects on Transit, Bicycle, and Pedestrian Mobility....51
9. Site Access and Circulation....52
10. Summary of Impacts and Recommended Mitigation....53
Significant Unless Mitigated....53
APPENDIX....89

TABLES

Table 1 – Intersection Level of Service Definitions 2
Table 2 - Freeway and Ramp Level of Service Definitions 3
Table 3 - East County MTSO's 4
Table 4 - Central County MTSO's 5
Table 5 - Existing Intersection Level of Service Summary 19
Table 6 - Existing Freeway Segment Level of Service Summary 21
Table 7 - Existing Freeway Ramp Level of Service Summary 22
Table 8 - Faria Annexation Residential Trip Generation 24
Table 9 - Existing Plus Project Intersection Level of Service Summary 26
Table 10 – Existing Plus Project Freeway Segment Level of Service Summary 28
Table 11 – Existing Plus Project Freeway Ramp Level of Service Summary 29
Table 12 – Long-Term (2035) Intersection Level of Service Summary 33
Table 13 – Long-term Freeway Segment Level of Service Summary 35
Table 14 – Long-term Freeway Ramp Level of Service Summary 37
Table 15 – Long-Term (2035) Plus Project Intersection Level of Service Summary 40
Table 16 – Long-term Plus Project Freeway Segment Level of Service Summary 42
Table 17 – Long-term Plus Project Freeway Ramp Level of Service Summary 43
Table 18 – Delay Index Summary 45
Table 19 – MTSO's Summary – Central County 47
Table 20 – HOV Lane Summary – SR-4 50
Table 21 – Existing Plus Project (Mitigated) Intersection Level of Service Summary 57
Table 22 – Long-term (2035) Plus Project (Mitigated) Intersection Level of Service Summary 67

FIGURES

Figure 1 – Project Location and Study Intersections....70
Figure 2 – Project Annexation Exhibit....71
Figure 3 – Existing (2017) Lane Geometry and Traffic Control....72
Figure 4 – Existing (2017) Peak Hour Turning Movement Volumes....74
Figure 5 – Project Trip Distribution....76
Figure 6 – Existing Condition New Project Generated Traffic Volumes....77
Figure 7 – Cumulative Condition New Project Generated Traffic Volumes....79
Figure 8 – Existing (2017) Plus Project Peak Hour Turning Movement Volumes....81
Figure 9 – Cumulative (2035) Lane Geometry and Traffic Control....83
Figure 10 – Cumulative (2035) Peak Hour Turning Movement Volumes....85
Figure 11 – Cumulative (2035) Plus Project Peak Hour Turning Movement Volumes....87

1. INTRODUCTION

Kimley-Horn and Associates, Inc. was retained by the City of Pittsburg to prepare a traffic study for the proposed Faria Annexation in Pittsburg, CA. Kimley-Horn worked on the traffic study for the original project in 2013. Since then, a new Notice of Preparation (NOP) has been released and Kimley-Horn is updating the traffic study. This updated traffic study entails new existing traffic counts and volumes, as well as following updated local guidelines.

The project has not changed significantly since 2013. It is still proposed that approximately 600 acres be annexed into the City of Pittsburg. The project proposes 1,500 single family residential units and the area would have road connections to Bailey Road, San Marcos Boulevard, and a future access to W. Leland Road via Santa Teresa Drive. The proposed project is adjacent to the Concord Naval Weapons Station property to the northeast.

Figure 1 illustrates the location of the project site in relation to the City of Pittsburg.

This traffic study was prepared based on discussions with, and criteria set forth by, the City of Pittsburg (City), the City of Concord, and Contra Costa Transportation Authority (CCTA). This study addresses the traffic and transportation effects of the proposed development to assist the project applicant and the City in project planning and determining conditions of approval for the project.

STUDY METHODOLOGY

DEVELOPMENT CONDITIONS

The updated Faria Annexation traffic study was based on the following development conditions:

- Existing Conditions – Based on current traffic counts in 2017 and existing roadway geometry and traffic control.
- Existing Plus Project Conditions – Based on current traffic counts and existing roadway geometry and traffic control, plus the traffic generated by the Faria Annexation residential development.
- Interim Baseline (2035) Conditions – Based on future year traffic forecasts from the Contra Costa Transportation Authority (CCTA) 2030 model. Future year corresponds with the approximate buildout of the City's General Plan. Includes road projects anticipated to be in place under the long-term condition.
- Interim Baseline (2035) Plus Project Conditions – Based on CCTA traffic forecasts and traffic generated by the Faria Annexation residential development. Future year corresponds with the approximate buildout of the City's General Plan. Includes road projects anticipated to be in place under the long-term condition.

FUNDING PROGRAMS

The City of Pittsburg has a local transportation mitigation fee (LTMF) for development projects within the City of Pittsburg. The fee was designed to aid in funding for capital improvement projects within the City limits, such as the extension of West Leland Road, and/or the widening of Avila Road, and Willow Pass Road. The fee can also be used for implementing signal interconnect on local roadways and installing traffic signals and other intersection improvements. The 2009 LTMF schedule states that for a single-family residential land use the LTMF fee is $7,123 with City administrative costs per dwelling unit. The City of

Concord has a similar program, the traffic mitigation fee (TMF) program that collects fees from developers to aid in the funding of capital improvement projects.

The East Contra Costa Regional Fee & Financing Authority (ECCRFFA) establishes a funding source for capital improvements projects in Eastern Contra Costa County. The fee was designed to pool monies for regional transportation improvements, such as the W. Leland Road extension, the SR-4 bypass, and the widening of State Route 4 (SR-4) through Pittsburg and Antioch. The 2017 ECCRFFA fee schedule states that for a single-family residential land use the Regional Transportation Development Impact Mitigation (RTDIM) fee is $21,395 per dwelling unit, with a temporary fee credit in 2017 of 15% or $3,209.

OPERATING CONDITIONS AND CRITERIA

Intersection Levels of Service

Analysis of project effects at intersections is based on the concept of Level of Service (LOS). The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the CCTALOS module for signalized intersections and in the *Highway Capacity Manual, 2000* (HCM) for unsignalized intersections. Both methodologies were analyzed within Traffix analysis software. **Table 1** relates the operational characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 1 – Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	≤ 10	≤ 10
B	Stable traffic. Traffic flows smoothly with few delays.	> 10 – 20	> 10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	> 20 – 35	> 15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	> 35 – 55	> 25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	> 55 – 80	> 35 – 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	> 80	> 50
Sources: Contra Costa Transportation Authority Technical Procedures 2006 and Transportation Research Board, Highway Capacity Manual 2010, National Research Council, 2010			

The LOS standards for each intersection are dependent on the type of roadway, as specified in the City of Pittsburg General Plan. For intersections in the City of Pittsburg:

- Major arterials are to operate at LOS D or better
- Intersections on Bailey Road between W. Leland Road and State Route 4 are to operate at LOS E or better
- Unsignalized intersections to operate at LOS E or better

For roadways in the City of Concord, the intersections and roadway segments are to operate at LOS D or better, as specified in the City of Concord General Plan [1]. However, in the Downtown area (as generally defined by Port Chicago Highway to the east, Mt. Diablo High School to the north, Cowell Road to the south, and Market Street to the west) and along City's transit routes, LOS E is acceptable.

Freeway and Ramp Levels of Service

Freeway segments and ramps in the study area were analyzed using HCM 6th Edition methodology per the Caltrans Guide to the Preparation of Traffic Impact Studies. The LOS for freeway segments is determined by density and the demand to capacity (d/c) ratio for each segment. For locations where the d/c is greater than 1.0, the LOS is LOS F. For locations where the d/c is less than or equal to 1.0, then **Table 2** relates the operational characteristics associated with each LOS category for freeway segments and ramps.

Table 2 - Freeway and Ramp Level of Service Definitions

Level of Service	Description	Freeway Segments – Density (pc/mi/ln)	Freeway Ramps – Density (pc/mi/ln)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	≤ 11	≤ 10
B	Stable traffic. Traffic flows smoothly with few delays.	11 – 18	10 – 20
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	18 – 26	20 – 28
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	26 – 35	28 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	35 – 45	> 35
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	> 45	Demand exceeds capacity
Sources: Contra Costa Transportation Authority Technical Procedures 2013 and Transportation Research Board, Highway Capacity Manual 2010, National Research Council, 2010			

[1] Concord 2030 General Plan, City of Concord, 2011.

Based on the Draft 2017 Update of the Contra Costa Congestion Management Program by CCTA, the following shows the LOS standards for freeway segments:

- EB and WB SR-4 (I-680 to SR-242) – LOS E
- EB and WB SR-4 (SR-242 to Loveridge Road) – LOS F
- NB SR-242 (I-680 to SR-4) – LOS E
- SB SR-242 (I-680 to SR-4) – LOS F

Multimodal Traffic Service Objectives

The Contra Costa Transportation Authority (CCTA) and its subsequent Regional Transportation Planning Committees have also set various standards on specific roadways, called Multi-Modal Transportation Service Objectives (MTSO's). These MTSO's are specific to each region and regulate the routes of regional significance. The study area incorporates facilities in the Central and East County.

For the East County, as outlined in the East County Action Plan for Routes of Regional Significance, **Table 3** summarizes the MTSO's evaluated. It should be noted that the MTSO's have changed. Roadway segment LOS and delay index are no longer required within the study area. The roadway segment LOS analysis only applies to rural roads since they are not governed by intersection delay. However, within the study area, there are no rural roadways as identified by the East County Action Plan.

Table 3 - East County MTSO's

MTSO	Corridors Applied To	MTSO Criteria
Delay Index (DI)	State Route 4	DI should not exceed 2.5 in the AM and PM peak hours.
HOV Lane Usage	State Route 4	HOV lane utilization should exceed 600 veh per lane in the peak direction in the peak hour.
Signalized Intersection LOS	Study Intersections	LOS should not exceed LOS D, except on Bailey Road where LOS E is acceptable.
Roadway Segment LOS	None within study area (there are no rural roads)	LOS should not exceed LOS D.

For the Central County, as outlined in the Central County Action Plan for Routes of Regional Significance, **Table 4** summarizes the MTSO's evaluated.

Table 4 - Central County MTSO's

MTSO	Corridors Applied To	MTSO Criteria
Delay Index (DI)	State Route 242	DI should not exceed 3.0 in the AM and PM peak hours
	State Route 4	DI should not exceed 5.0 in the AM and PM peak hours
Roadway Average Speed	Bailey Road	None
	Clayton Road	Speed > 15 mph
	Treat Boulevard	None
	Ygnacio Valley Road/Kirker Pass Road	None
Roadway Average Stopped Delay	Bailey Road and Concord Boulevard	3 signal cycles to clear
	Bailey Road and Clayton Road	3 signal cycles to clear
	Clayton Road and Ygnacio Valley Road/Kirker Pass Road	3 signal cycles to clear
	Clayton Road and Treat Boulevard/Denkinger Road	3 signal cycles to clear
	Treat Boulevard and Cowell Road	5 signal cycles to clear
	Treat Boulevard and Oak Grove Road	5 signal cycles to clear
Roadway LOS	Bailey Road	None
	Clayton Road	None
	Treat Boulevard	None
	Ygnacio Valley Road/Kirker Pass Road	None
Roadway v/c Ratio	Bailey Road	None
	Clayton Road	None
	Treat Boulevard	v/c <1.5
	Ygnacio Valley Road/Kirker Pass Road	v/c <1.5

Project Impacts

Project impacts are determined by comparing conditions with the proposed project to those without the proposed project. Significant impacts are created when traffic from the proposed project causes the LOS to fall below a specific threshold.

For study intersections within the City of Pittsburg, a significant impact occurs:

- If the intersection operates at an acceptable LOS without the project and degrades to an unacceptable LOS with the project.
- If the intersection operates at an unacceptable LOS without the project and experiences an increase in delay of five (5) seconds or more.

For study intersections within the City of Concord, a significant impact occurs:

- If the intersection operates at an acceptable LOS without the project and degrades to an unacceptable LOS with the project.
- If the intersection operates at an unacceptable LOS without the project and experiences an increase in v/c of 0.03 or more.

For freeway segments and ramps, a significant impact occurs:

- If the freeway segment or ramp operates at an acceptable LOS without the project and degrades to an unacceptable LOS with the project.
- If the freeway segment or ramp operates at an unacceptable LOS without the project and experiences an increase in density, and the project contributes more than one percent of the volume to the freeway segment or ramp.

For the traffic service objectives, a significant impact occurs:

- If the delay index operates at an acceptable delay index without the project and degrades to an unacceptable delay index with the project.
- If the delay index operates at an unacceptable delay index without the project and experiences an increase in delay index.
- If the roadway segment operates at an acceptable v/c without the project and degrades to an unacceptable v/c with the project.
- If the roadway segment operates at an unacceptable v/c without the project and experiences an increase in v/c.
- If the persons in vehicles in the HOV lane exceeds the established criteria without the project and is reduced to less than the established criteria with the project.
- If the roadway segment operates at an acceptable average speed without the project and degrades to an unacceptable average speed with the project.
- If the roadway segment operates at an unacceptable average speed without the project and experiences a decrease in average speed.
- If the intersection meets the acceptable number of signal cycles to clear without the project and increases the number of signal cycles to clear with the project.
- If the intersection meets the number of signal cycles to clear without the project and experiences an increase in the number of signal cycles to clear.

Mitigation may be required when traffic from the project causes a significant impact.

STUDY INTERSECTIONS INCLUDED IN ANALYSIS

The proposed project would generate new vehicular trips that would increase traffic volumes on the nearby street network. To assess changes in traffic conditions associated with the project, the following intersections, illustrated in **Figure 1**, were selected for evaluation in this traffic study:

1. Avila Road/Willow Pass Road
2. EB SR-4 Ramps/Willow Pass Road
3. WB SR-4 Ramps/Willow Pass Road
4. Rio Verde Circle/San Marco Boulevard
5. Santa Teresa Drive/San Marco Boulevard
6. W. Leland Road/San Marco Boulevard
7. EB SR-4 Ramps/San Marco Boulevard
8. WB SR-4 Ramp/San Marco Boulevard
9. Willow Pass Road/Port Chicago Highway
10. Willow Pass Road/Bailey Road
11. Willow Pass Road/Loftus Road
12. EB Willow Pass Road/Range Road
13. WB Willow Pass Road/Range Road
14. Willow Pass Road/Railroad Avenue
15. W. Leland Road/Alves Ranch Road
16. W. Leland Road/Woodhill Drive
17. W. Leland Road/Southwood Drive
18. W. Leland Road/Bailey Road
19. Maylard Street/Bailey Road
20. EB SR-4 Ramps/Bailey Road
21. WB SR-4 Ramp/Bailey Road
22. Canal Road/Bailey Road
23. W. Leland Road/Chestnut Drive
24. W. Leland Road/Jacqueline Drive
25. W. Leland Road/Montevideo Drive
26. W. Leland Road/Range Road
27. W. Leland Road/Dover Way
28. W. Leland Road/Burton Avenue
29. W. Leland Road/Crestview Drive
30. W. Leland Road/Railroad Avenue
31. EB SR-4 Ramps/Railroad Avenue
32. WB SR-4 Ramp/Railroad Avenue
33. Willow Pass Road/Olivera Road
34. Concord Boulevard/Farm Bureau Road
35. Concord Boulevard/Bailey Road
36. Bailey Road/Myrtle Drive
37. Clayton Road/Babel Lane
38. Clayton Road/Farm Bureau Road
39. Clayton Road/Treat Boulevard
40. Clayton Road/Bailey Road

41. Cowell Road/Treat Boulevard
42. W. Leland Road/Santa Teresa Drive (future intersection)
43. Bailey Road/Project Entrance (future intersection with project)
44. Treat Boulevard/Oak Grove Road (new intersection)
45. Willow Pass Road/Diamond Boulevard (new intersection)
46. Willow Pass Road/Market Street (new intersection)
47. Willow Pass Road/Galindo Street (new intersection)
48. Concord Boulevard/Port Chicago Highway (new intersection)
49. Kirker Pass Road/Oakhurst Drive/Concord Boulevard (new intersection)
50. Ygnacio Valley Road/Clayton Road (new intersection)

2. EXISTING CONDITIONS

EXISTING SITE USES

The Faria Annexation residential development is proposed to be built on 600 acres of vacant land to the northeast of the Concord Naval Weapons Station property.

EXISTING USES IN VICINITY OF SITE

The proposed project site is surrounded by residential homes to the northeast and the Concord Naval Weapons Station to the southeast. To the northwest is SR-4 and to the southeast is vacant land.

EXISTING ROADWAY NETWORK

Below is a description of the principal roadways included in this study.

SR 4

State Route 4 is an east-west freeway in Contra Costa County. SR-4 connects I-80 in the west to the SR-4 Bypass in the east. SR-4 provides access to multiple freeways within the Bay Area including I-80, I-680, SR-242, and SR-160. Within the study area, SR-4 is two lanes in each direction between I-680 and SR-242, and three to five lanes in each direction between SR-242 and Railroad Avenue. There also exists an HOV lane in the peak direction only during the peak hour (i.e. 5-9 AM in the westbound direction and 3-7 PM in the eastbound direction) from west of Port Chicago Highway to the eastern study limit near Railroad Avenue. Ramp metering was active during the peak hours in the peak directions for on-ramps on this study corridor. The speed limit on SR-4 is 65 mph.

ALVES RANCH ROAD

Alves Ranch Road is a two-lane local street with turn lanes serving residential areas south of W. Leland Road. The posted speed limit is 25 mph. It should be noted that Alves Ranch Road does not currently extend north of W. Leland Road, but is expected to in the future.

AVILA ROAD

Avila Road is a two-lane collector roadway with no medians or turn lanes serving industrial areas. Avila Road provides access to Willow Pass Road. It is also a parallel arterial to SR-4. The posted speed limit is 40 mph. It should be noted that in the future, Avila Road will be realigned and extended to connect to West Leland Road.

BABEL LANE

Babel Lane is a two-lane roadway serving residential areas south of Clayton Road. The posted speed limit is 35 mph.

BAILEY ROAD

Bailey Road is a two- to four-lane major arterial roadway within the City of Pittsburg. It has turn lanes and a raised median providing access to residential and commercial land uses. It also serves the Pittsburg-Bay

Point BART station. Further south in Concord, Bailey Road is a two-lane roadway between Clayton Road and Myrtle Drive. Bailey Road runs north-south within the project study area in Pittsburg from Willow Pass Road in the north to W. Leland Road in the south. Bailey Road runs northeast-southwest within the project study area in Concord from Myrtle Drive in the north to Clayton Road in the south. The posted speed limit is 30-35 mph along Bailey Road within the study area. It should be noted that Bailey Road would provide access to the proposed project. This access is at the southern portion of the project site.

BURTON AVENUE

Burton Avenue is a two-lane local street serving residential areas north and south of W. Leland Road. It also provides access to Los Medanos Elementary School west of Burton Avenue. The posted speed limit is 25 mph.

CANAL ROAD

Canal Road is a two-lane roadway serving commercial areas and a church. To the west of Bailey Road, Canal Road turns into Alves Lane and to the east of Bailey Road, Canal Road turns into Shooner Way. The posted speed limit is 35 mph.

CHESTNUT DRIVE

Chestnut Drive is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

CLAYTON ROAD

Clayton Road is a six-lane roadway with turn lanes and a raised median serving residential and commercial areas. To the west of Babel Lane, Clayton Road becomes two lanes in each direction with a two-way left turn lane (TWLTL). Clayton Road provides access to downtown Concord in the west and Ygnacio Valley Road in the east. The posted speed limit is 40 mph within the study area.

CRESTVIEW DRIVE

Crestview Drive is a roadway with one lane in each direction and a TWLTL. At segments where there is not a TWLTL, there are turn lanes. Crestview Drive serves residential areas north and south of W. Leland Road. The posted speed limit is 30 mph.

CONCORD BOULEVARD

Concord Boulevard is a two-lane roadway with turn lanes near Farm Bureau Road and a four-lane roadway with turn lanes near Bailey Road. Concord Boulevard provides access to residential land uses, Concord High School, and El Dorado Middle School between Farm Bureau Road and Bailey Road. To the west, Concord Boulevard provides access to downtown Concord. The posted speed limit is 35 mph along Concord Boulevard near Farm Bureau Road and Bailey Road.

COWELL ROAD

Cowell Road is a four-lane roadway south of Treat Boulevard and a two-lane roadway north of Treat Boulevard near the study area. Cowell Road provides access to downtown Concord to the west and Ygnacio Valley Road to the east. The posted speed limit is 35 mph near the study area.

DIAMOND BOULEVARD

Diamond Boulevard is a five-lane roadway with turn lanes and a raised median. Diamond Boulevard serves commercial uses to the north and south of Willow Pass Road.

DOVER WAY

Dover Way is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

EVORA ROAD

Evora Road is a three-lane roadway with a two-way left-turn lane within the study area. Evora Road provides access to residential land uses north of SR-4 and west of Willow Pass Road. Evora Road also serves as a parallel roadway to SR-4 for commuters avoiding congestion on SR-4. The posted speed limit is 45 mph near the study area.

FARM BUREAU ROAD

Farm Bureau Road is a two-lane roadway serving residential areas within the study area. Farm Bureau Road becomes Olivera Road north of Willow Pass Road. The posted speed limit is 30 mph.

GALINDO STREET

Galindo is a six-lane roadway serving residential areas within the study area. It has turn lanes throughout and a raised median south of Oak Street. Galindo becomes Concord Avenue north of Salvio Street and becomes Monument Boulevard south of Cowell Road. The posted speed limit is 30-35 mph.

JACQUELINE DRIVE

Jacqueline Drive is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

KIRKER PASS ROAD

Kirker Pass Road is a six-lane roadway with turn lanes and a raised median serving residential and commercial uses from Clayton Road to Clearbrook Drive. It is a four-lane roadway without turn lanes or a median north of Clearbrook Drive. Kirker Pass Road turns into Ygnacio Valley Road south of Clayton Road, and to into Railroad Avenue north of Buchanan Road. The posted speed limit is 45-55 mph.

WEST LELAND DRIVE

W. Leland Road is a four-lane major arterial roadway with turn lanes and a raised median from San Marco Boulevard to Woodhill Drive. East of Woodhill Drive, W. Leland Road is a four-lane major arterial roadway with turn lanes and no raised median between Woodhill Drive and Railroad Avenue. W. Leland Road runs east-west within the study area and provides access to residential land uses. W. Leland Road is parallel to SR-4 on the south side and can provide an alternate route for commuters when SR-4 is congested. The posted speed limit is 35-45 mph on W. Leland Road within the study area.

LOFTUS ROAD

Loftus Road is a two-lane local street serving residential areas south of Willow Pass Road. The posted speed limit is 25 mph.

MARKET STREET

Market Street is a four-lane roadway with a TWLTL north of Willow Pass Road. South of Willow Pass Road, Market Street is a two-lane roadway and turns into Meadow Lane. Market Street runs parallel to SR-242 within the study area and provides access to commercial uses. The posted speed limit is 35 mph.

MAYLARD STREET

Maylard Street is a two-lane local street off of Bailey Road. The Oak Hills Center is on the west side of the intersection of Maylard Street and Bailey Road. The posted speed limit is 25 mph.

MONTEVIDEO DRIVE

Montevideo Drive is a two-lane local street serving residential areas north and south of W. Leland Road. The posted speed limit is 25 mph.

MYRTLE DRIVE

Myrtle Drive is a two-lane roadway serving residential areas between Bailey Road and Kirker Pass Road. Myrtle Road provides access to Ayers Elementary School. The posted speed limit is 25 mph near Bailey Road.

OLIVERA ROAD

Olivera Road is a two-lane roadway with in the study area, serving Willow Pass Community Park and residential areas north of Willow Pass Road. Further to the northwest, Olivera Road connects to SR-242 and SR-4. Olivera Road becomes Farm Bureau Road south of Willow Pass Road. The posted speed limit is 35 mph near Willow Pass Road.

PORT CHICAGO HIGHWAY

Port Chicago Highway is a minor arterial roadway with two lanes in the southbound direction and one lane in the northbound direction near the study area at Willow Pass Road. Port Chicago Highway runs north-south near Willow Pass Road, providing access to residential areas. The posted speed limit is 35 mph in the study area.

RAILROAD AVENUE

Railroad Avenue is a four-lane major arterial roadway with turn lanes and a raised median serving commercial land uses. Railroad Avenue becomes a two-lane roadway north of East 10th Street. Railroad Avenue runs north-south within the study area and provides access to downtown Pittsburg in the north and becomes Kirker Pass Road in the south. The posted speed limit is 35 mph within the study area.

RANGE ROAD

Range Road is a two-lane roadway that is separated by SR-4. North of SR-4, Range Road provides access to residential areas and becomes Willow Pass Road near Parkside Drive. South of SR-4, Range Road is four-lane roadway near W. Leland Road. Range Road provides access to Rancho Medanos Junior High School. The posted speed limit is 35 mph near Willow Pass Road and 35 mph near W. Leland Road.

RIO VERDE CIRCLE

Rio Verde Circle is a two-lane local street serving residential areas off of San Marco Boulevard. Rio Verde Circle also provides access to Delta View Elementary School. The posted speed limit is 25 mph.

SAN MARCO BOULEVARD

San Marco Boulevard is a four-lane major arterial roadway with turn lanes and a raised median, but no shoulders, serving residential areas. San Marco Boulevard runs north-south, providing access to SR-4 in the north. San Marco Boulevard becomes Willow Pass Road north of SR-4. The posted speed limit is 40 mph. It should be noted that San Marco Boulevard would be extended and provide access to the proposed project.

SANTA TERESA DRIVE

Santa Teresa Drive is a two-lane local collector street with turn lanes and a raised median serving residential areas to the west of San Marco Boulevard. To the east of San Marco Boulevard, Santa Teresa Drive is a two-lane local street with no turn lanes or raised medians. The posted speed limit is 25 mph east of San Marco Boulevard and 30 mph west of San Marco Boulevard.

SOUTHWOOD DRIVE

Southwood Drive is a two-lane local street serving residential areas south of W. Leland Road. The posted speed limit is 25 mph.

TREAT BOULEVARD

Treat Boulevard is a four-lane roadway with turn lanes and a raised median serving residential and commercial areas. Treat Boulevard provides access to De La Salle High School, downtown Concord, and I-680 in the west. The posted speed limit is 40 mph within the study.

WILLOW PASS ROAD

Willow Pass Road is separated into two different segments - south of SR-4 and north of SR-4. The portion of Willow Pass Road south of SR-4 is a four-lane roadway within the study area between Avila Road and SR-4 Ramps. South of Avila Road, Willow Pass Road becomes a two-lane roadway until the City of Concord city limits, where it opens up to two lanes in each direction again. Willow Pass Road provides access to SR-4 in the north and the City of Concord and SR-242 in the south. The posted speed limit is 55 mph near SR-4 and 35 mph near Farm Bureau Road.

The portion of Willow Pass Road north of SR-4 is a six-lane roadway within the study area between the SR-4 Ramps and Port Chicago Highway. Willow Pass Road becomes two lanes in each direction with a center TWLTL between Port Chicago Highway and Bailey Road. Willow Pass Road becomes one lane in

each direction with a TWLTL between Bailey Road and Range Road. Willow Pass Road provides access to SR-4 in the west and Railroad Avenue in the east, where it becomes Parkside Drive. The posted speed limit is 40 mph between SR-4 and Port Chicago Highway, 35 mph between Port Chicago Highway and Bailey Road, and 30 to 35 mph between Bailey Road and Range Road.

WOODHILL DRIVE

Woodhill Drive is a two-lane local street serving residential areas south of W. Leland Road. The posted speed limit is 25 mph.

YGNACIO VALLEY ROAD

Ygnacio Valley Road is a six-lane roadway with turn lanes and a raised median within out study area. It is a four-lane roadway without turn lanes or a raised median south of Michigan Boulevard. To the north of Clayton Road, Ygnacio Valley Road becomes Kirker Pass Road. The posted speed limit is 45 mph.

EXISTING SITE ACCESS

There are currently no driveways for access to the existing vacant land for the proposed project as shown in **Figure 2**. The 600-acre land is undeveloped and the project would need to provide the infrastructure for access to the existing transportation network.

EXISTING LANE CONFIGURATIONS AND TRAFFIC CONTROL

Existing intersection lane configurations and traffic controls are illustrated in **Figure 3**.

EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES

Weekday intersection turning movement volumes were collected at project study area intersections in June 2017. Volumes were collected during the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak periods of a typical weekday. These volumes were collected during a typical weekday when school was in session and not near any major holidays.

AM and PM peak one-hour volumes are shown in **Figure 4**. Traffic volume data sheets are shown in the **Appendix.**

EXISTING TRANSIT FACILITIES

Transit service is provided by Tri-Delta Transit and the County Connection within the project study area.

TRI-DELTA TRANSIT

Tri-Delta Transit provides bus service in Bay Point and Pittsburg. Routes 200, 201, 300, 380, 381, 387, 388, 389, 390, 391, 392, 393, and 394 operate within the study area. Currently there are no bus routes that pass directly adjacent to the proposed project site because there is no roadway access to the vacant lot for the project site. There are no current bus routes along Avila Road, San Marco Boulevard south of W. Leland Road, and Bailey Road south of W. Leland Road. Tri-Delta Transit connects passengers to the Antioch Park and Ride (Hillcrest), Kaiser Medical Center, Pittsburg/Bay Point BART Station, Tri Delta

Transit Station, various local schools, Brentwood Park and Ride, the Streets of Brentwood and convenient connections to many locations in the City and connections to other local and regional transit routes.

Route 200 operates between the Pittsburg/Bay Point BART Station to the Amtrak station in Martinez. This route runs along SR-4, San Marco Boulevard, and W. Leland Road within the study area. This route operates on weekdays from 6:30 AM to 6:06 PM on a frequency of 58-minute to 82-minute headways.

Route 201 operates between the Pittsburg/Bay Point BART Station to the Concord BART station. This route runs along SR-4, Evora Road, Willow Pass Road, Bailey Road, and W. Leland Road within the study area. This route operates on weekdays from 5:10AM to 8:12 PM on a frequency of 28-minute to 62-minute headways.

Route 300 operates between the Pittsburg/Bay Point BART Station to the Brentwood Park and Ride. This route runs along SR-4 within the study area. This route operates on weekdays from 4:07 AM to 9:57 PM on a frequency of 10-minute to 55-minute headways.

Route 380 operates between the Pittsburg/Bay Point BART Station to the Antioch Park and Ride (Hillcrest). This route runs along Railroad Avenue, Willow Pass Road, Bailey Road, and W. Leland Road within the study area. This route operates on weekdays from 3:04 AM to 10:22 PM on a frequency of 22minute to 172-minute headways.

Route 381 operates between the Pittsburg Marina to Los Medanos Collage. This route runs along Railroad Avenue within the study area. This route operates on weekdays from 7:30 AM to 6:20 PM on a frequency of 30-minute headways.

Route 387 operates between the Pittsburg/Bay Point BART Station to the Tri-Delta Transit station. This route runs along Railroad Avenue, Willow Pass Road, Bailey Road, and W. Leland Road within the study area. This route operates on weekdays from 4:48 AM to 9:14 PM on a frequency of 20-minute to 68-minute headways.

Route 388 operates between the Pittsburg/Bay Point BART Station to the Kaiser Medical Center. This route runs along W. Leland Road and Railroad Avenue within the study area. This route operates on weekdays from 5:06 AM to 11:28 PM on a frequency of 28-minute to 99-minute headways.

Route 389 operates between the Pittsburg/Bay Point BART Station to the intersection of Wharf Drive and Shore Road. This route runs along W. Leland Road, Bailey Road, Willow Pass Road, and Evora Road within the study area. This route operates on weekdays from 4:40 AM to 9:25 PM on a frequency of 60-minute to 120-minute headways.

Route 390 operates between the Pittsburg/Bay Point BART Station to the Antioch Park and Ride (Hillcrest). This route runs along W. Leland Road within the study area. This route operates on weekdays eastbound from 4:13 PM to 8:30 PM (except for one trip that begins at 6:49 AM) on a frequency of 30-minute headways. This route operates on weekdays westbound from 3:50 AM to 7:58 AM on a frequency of 17-minute to 60-minute headways.

Route 391 operates between the Pittsburg/Bay Point BART Station to the Brentwood Park and Ride. This route runs along W. Leland Road, Bailey Road, SR-4, and Railroad Avenue within the study area. This route operates on weekdays from 4:03 AM to 1:14 AM on a frequency of 14-minute to 128-minute headways.

Route 392 operates between the Pittsburg/Bay Point BART Station to the Antioch Park and Ride (Hillcrest). This route runs along W. Leland Road, Bailey Road, Willow Pass Road, and Railroad Avenue within the study area. This route operates on Saturdays from 5:09 AM to 1:55 AM on a frequency of 49-minute to 125-minute headways and on Sundays from 6:12 AM to 1:28 AM on a frequency of 60-minute to 120-minute headways.

Route 393 operates between the Pittsburg/Bay Point BART Station to the Brentwood Park and Ride. This route runs along Evora Road, W. Leland Road, Bailey Road, Willow Pass Road, and Railroad Avenue within the study area. This route operates on Saturdays from 5:22 AM to 1:39 AM on a frequency of 60-minute to 80-minute headways and on Sundays from 6:24 AM to 1:49 AM on a frequency of 60-minute to 78-minute headways.

Route 394 operates between the Pittsburg/Bay Point BART Station to the Antioch Park and Ride (Hillcrest). This route runs along W. Leland Road, Bailey Road, Willow Pass Road, 10th Street, and Railroad Avenue within the study area. This route operates on weekends from 7:11 AM to 8:37 PM on a frequency of 56-minute to 60-minute headways.

THE COUNTY CONNECTION

The County Connection provides bus service in Concord. Routes 10, 11, 15, 19, and 20 operate within the study area. The County Connection connects passengers to the Antioch Park and Ride (Hillcrest), Kaiser Medical Center, Pittsburg/Bay Point BART Station, Tri Delta Transit Station, various local schools, Brentwood Park and Ride, the Streets of Brentwood and convenient connections to many locations in the City and connections to other local and regional transit routes.

Route 10 operates between the Concord BART Station to the intersection of Clayton Road and Marsh Creek Road. This route runs along Clayton Road and Kirker Pass Road within the study area. This route operates on weekdays from 5:06 AM to 11:03 PM on a frequency of 15-minute to 60-minute headways.

Route 11 operates between the Pleasant Hill BART Station to the intersection of Salvio Street and East Street. This route runs along Willow Pass Road, Market Street, Oak Grove Road, and Treat Boulevard within the study area. This route operates on weekdays from 6:00 AM to 8:00 PM on a frequency of 45-minute to 90-minute headways.

Route 15 operates between the Walnut Creek BART Station to the Concord BART Station. This route runs along Willow Pass Road, Port Chicago Highway, Clayton Road, and Treat Boulevard within the study area. This route operates on weekdays from 5:45 AM to 8:44 PM on a frequency of 60-minute headways.

Route 19 operates between the Pacheco AMTRAK station and Concord BART Station. This route runs along Willow Pass Road and Diamond Boulevard within the study area. This route operates on weekday from 6:15 AM to 8:00 PM on a frequency of 120-minute headways.

Route 20 operates between Diablo Valley College and the Concord BART Station. This route runs along Willow Pass Road and Concord Boulevard within the study area. This route operates on weekdays from 6:00 AM to 10:20 PM on a frequency of 30-minute headways.

EXISTING BICYCLE AND PEDESTRIAN FACILITIES

There are multiple existing and proposed bikeway facilities in Pittsburg, Bay Point, and Concord within the study area. Class I bicycle facilities are bike paths or trails, class II bicycle facilities are defined as bike lanes, and class III bicycle facilities are bike routes.

Class I bike paths located within the project study area include the Delta De Anza Regional Trail, a bike path along the East Bay Municipal Utility District (EBMUD) right of way in East County, and the Contra Costa County Trail. A Class I bike trail is proposed adjacent to San Marco Boulevard between W. Leland Road and Rio Verde Circle, as well as between Tomales Bay Drive and Rio Verde Circle.

There are Class II bike lanes located within the project study area on Concord Boulevard between Kirker Pass Road and west of Farm Bureau Road, W. Leland Road between west of San Marco Boulevard and Burton Avenue, Willow Pass Road between Port Chicago Highway and Loftus Road, Bailey Road between Willow Pass Road and W. Leland Road, and Crestview Drive between Olympia Drive and the Frontage Road. Class II bike lanes are proposed on the following locations within the project study area: Willow Pass Road between Evora Road and just north of Lynwood Drive, San Marco Boulevard between Rio Verde Circle and Bailey Road, Range Road between Willow Pass Road and SR-4, and Railroad Avenue between the Contra Costa Canal and California Avenue.

There are Class III bike routes located within the project study area on Willow Pass Road east of Loftus Road and on Bailey Road between the SR-4 EB Ramps and Highland Boulevard. Class III bike routes are proposed on the following locations within the project study area: Farm Bureau Road between Willow Pass Road and Clayton Road, W. Leland Road between Burton Road and Railroad Avenue, and Railroad Avenue between SR-4 and 10th Street.

Sidewalks and crosswalks are mostly provided throughout the study area in Pittsburg to allow for pedestrians to access nearby transit stops, residential uses, and commercial uses. There are no sidewalks along Avila Road, Willow Pass Road near Avila Road and the SR-4 Ramps, Range Road near Parkside Drive, sections of Farm Bureau Road between Willow Pass Road and Clayton Road, and a majority of Bailey Road between Myrtle Drive and Dessira Court.

EXISTING LEVELS OF SERVICE AT STUDY INTERSECTIONS

Traffic operations were evaluated at the study intersections under existing traffic conditions.

Results of the analysis are presented in **Table 5**, along with the minimum jurisdictional standard for acceptable levels of service (as previously described in Operating Conditions and Criteria). Additional detail of the analysis is provided in the **Appendix**.

As shown in **Table 5**, all the study intersections satisfy operational standards, except at the following intersections during the Existing conditions:

- #3 – WB SR-4 Ramps and Willow Pass Road (AM peak hour)
- #6 – Leland Road and San Marco Boulevard (AM peak hour)
- #8 – WB SR-4 Ramps and San Marco Boulevard (AM peak hour)
- #11 – Willow Pass Road and Loftus Road (AM peak hour)
- #18 – Leland Road and Bailey Road (AM peak hour)
- #23 – Leland Road and Chestnut Drive (AM peak hour)

- #24 – Leland Road and Jacqueline Drive (AM peak hour)
- #29 – Leland Road and Crestview Drive (AM peak hour)
- #31 – EB SR-4 Ramps and Railroad Avenue (PM peak hour)
- #35 – Concord Boulevard and Bailey Road (AM and PM peak hours)
- #36 – Bailey Road and Myrtle Drive (AM peak hour)
- #41 – Cowell Road and Treat Boulevard (AM and PM peak hours)
- #44 – Treat Boulevard and Oak Grove Road (PM peak hour)
- #49 – Kirker Pass Road and Oakhurst Drive (AM and PM peak hours)

The intersections listed above would operate below acceptable thresholds regardless of the proposed project. Analysis sheets are provided in the **Appendix**.

Table 5 - Existing Intersection Level of Service Summary

#	Intersection	Delay Criteria[1]	Intersection Control[2]	Existing					
				AM Peak			PM Peak		
				LOS	Delay	v/c	LOS	Delay	v/c
1	Avila Road / Willow Pass Road	D	SSSC	A	0.1	0.37	A	0.5	0.47
	Worst Approach			*B*	*10.5*	*0.03*	*C*	*23.8*	*0.13*
2	EB SR-4 Ramps / Willow Pass Road	E	AWSC	E	38.5		E	42.9	
3	WB SR-4 Ramps / Willow Pass Road	E	AWSC	**F**	**143.6**		C	19.2	
4	Rio Verde Circle / San Marco Boulevard	E	AWSC	B	11.9		A	8.2	
5	Santa Teresa Drive / San Marco Boulevard	D	Signal	C	28.3		B	15.9	
6	Leland Road / San Marco Boulevard	D	Signal	**F**	**245.0**		C	32.3	
7	EB SR-4 Ramps / San Marco Boulevard	D	Signal	A	9.5		B	13.7	
8	WB SR-4 Ramps / San Marco Boulevard	D	Signal	**F**	**168.2**		B	18.5	
9	Willow Pass Road / Port Chicago Highway	D	Signal	B	15.8		B	11.0	
10	Willow Pass Road / Bailey Road	D	Signal	C	27.9		D	39.8	
11	Willow Pass Road / Loftus Road	D	Signal	**F**	**107.2**		C	24.5	
12	EB Willow Pass Road / Range Road	E	SSSC	A	5.5		A	6.6	
	Worst Approach			*B*	*11.1*		*B*	*11.5*	
13	WB Willow Pass Road / Range Road	E	SSSC	A	0.2		A	0.5	
	Worst Approach			*A*	*0.8*		*A*	*0.8*	
14	Willow Pass Road / Railroad Avenue	D	Signal	C	23.1		C	20.6	
15	Leland Road / Alves Ranch Drive	D	Signal	B	11.8		A	9.7	
16	Leland Road / Woodhill Drive	D	Signal	A	8.2		A	7.8	
17	Leland Road / Southwood Drive	D	Signal	B	18.4		C	21.2	
18	Leland Road / Bailey Road	E	Signal	**F**	**97.6**		D	52.3	
19	Maylard Street / Bailey Road	E	Signal	B	11.6		B	18.1	
20	EB SR-4 Ramps / Bailey Road	E	Signal	C	22.4		D	35.2	
21	WB SR-4 Ramps / Bailey Road	E	Signal	C	25.2		B	19.3	
22	Canal Road / Bailey Road	D	Signal	B	13.5		B	10.9	
23	Leland Road / Chestnut Drive	D	Signal	**F**	**112.9**		C	27.8	
24	Leland Road / Jacqueline Drive	D	Signal	**E**	**75.2**		C	34.2	
25	Leland Road / Montevideo Drive	D	Signal	A	6.4		A	6.5	
26	Leland Road / Range Road	D	Signal	C	31.8		D	46.2	
27	Leland Road / Dover Way	D	Signal	C	28.9		C	33.1	
28	Leland Road / Burton Avenue	D	Signal	B	16.9		C	30.9	
29	Leland Road / Crestview Drive	D	Signal	**F**	**111.8**		D	39.0	
30	Leland Road / Railroad Avenue	D	Signal	D	52.1		D	45.3	
31	EB SR-4 Ramps / Railroad Avenue	D	Signal	C	25.4		**E**	**63.1**	
32	WB SR-4 Ramps / Railroad Avenue	D	Signal	D	41.3		C	30.9	
33	Willow Pass Road / Olivera Road	E	Signal	B	16.7	0.62	D	47.2	0.89
34	Concord Boulevard / Farm Bureau Road	D	Signal	C	25.4	0.73	C	26.5	0.74
35	Concord Boulevard / Bailey Road	D	Signal	**E**	**64.5**	**0.94**	**E**	**65.0**	**0.86**
36	Bailey Road / Myrtle Drive	D	SSSC	A	5.0	0.24	A	1.9	0.43
	Worst Approach			***F***	***62.2***	***0.57***	*C*	*19.8*	*0.30*
37	Clayton Road / Babel Lane	E	Signal	C	25.4	0.74	C	30.9	0.78
38	Clayton Road / Farm Bureau Road	E	Signal	C	24.0	0.77	B	16.0	0.60
39	Clayton Road / Treat Boulevard	E	Signal	D	46.0	0.82	E	55.2	0.84
40	Clayton Road / Bailey Road	E	Signal	C	32.4	0.77	C	32.5	0.66
41	Cowell Road / Treat Boulevard	D	Signal	**E**	**73.2**	**0.94**	**F**	**89.0**	**1.09**
42	Leland Road / Santa Teresa Drive	D	Signal	Future Intersection					
43	Bailey Road / Project Entrance	D	Signal	Future Intersection with Project					
44	Treat Boulevard / Oak Grove Road	E	Signal	E	59.7	0.94	**F**	**93.5**	**0.97**
45	Willow Pass Road / Diamond Boulevard	E	Signal	B	17.2	0.48	D	39.4	0.73
46	Willow Pass Road / Market Street	E	Signal	D	38.2	0.78	D	43.8	0.96
47	Willow Pass Road / Galindo Street	E	Signal	D	37.8	0.67	D	51.0	0.87
48	Concord Boulevard / Port Chicago Highway	E	Signal	**E**	**61.5**	**0.79**	C	23.6	0.52
49	Kirker Pass Road / Oakhurst Drive/Concord Boulevard	D	Signal	**F**	**665.4**	**1.03**	**F**	**341.6**	**0.90**
50	Ygnacio Valley Road / Clayton Road	E	Signal	D	39.3	0.67	D	47.1	0.73

[1] For all intersections, the LOS criteria is based on seconds of delay.

[2] Each study intersection is controlled by a traffic signal, a side-street stop-controlled (SSSC), or a all-way stop-controlled (AWSC).

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.

EXISTING LEVELS OF SERVICE AT STUDY FREEWAY SEGMENTS

Traffic operations were evaluated at the study freeway segments under existing traffic conditions. Freeway demand volumes for the Existing scenario were calculated by taking existing counts and adding the freeway unmet demands from existing queues. Existing counts were primarily from Caltrans existing annual average daily traffic (AADT) freeway volumes and converting them to directional peak hour volumes using K and D factors from the Caltrans website. The K factor is the percent of peak hour volume from daily volume and the D factor is the percent of the peak hour volume in the peak hour direction. For locations where these volumes were unavailable, counts were from other freeway studies in the area (e.g. I-680/SR 4 Interchange (Phase 3 – SR 4 Widening) report by Fehr and Peers). The freeway unmet demands were calculated by multiplying the bottleneck capacity with the delay experienced on the corridor. The delay along the corridor was determined from historical travel time data from the INRIX database. **Table 6** shows the peak hour LOS, d/c ratio, and density for each freeway section in the study area.

As shown in **Table 6**, all freeway segments operate at acceptable standards except for the following:

- NB SR-242 between the Clayton Road off-ramp and SR-4 in the PM peak hour
- EB SR-4 between I-680 and the SR-242 off-ramp in the PM peak hour
- WB SR-4 between the SR-242 off-ramp and the I-680 off-ramp in the AM peak hour

Additional detail of the analysis is provided in the **Appendix**.

Table 6 - Existing Freeway Segment Level of Service Summary

Freeway Section	Segment Type	Criteria	Existing					
			AM			PM		
		LOS	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*
Northbound								
SR-242 between I-680 and Clayton Road off-ramp	Diverge	E	A	0.10	3.1	C	0.67	24.5
SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp	Basic	E	A	0.10	3.4	**F**	0.70	**47.3**
SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-ramp	Merge	E	A	0.08	2.4	**F**	0.52	**81.7**
SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp	Weaving	E	C	0.75	21.2	**F**	0.80	**83.2**
SR-242 between Grant Street off-ramp and Grant Street on-ramp	Basic	E	A	0.24	8.0	**F**	0.82	**83.6**
SR-242 between Grant Street on-ramp and Olivera Road off-ramp	Weaving	E	A	0.37	8.6	**F**	0.73	**102.9**
SR-242 between Olivera Road off-ramp and SR-4 off-ramp	Diverge	E	A	0.17	6.6	**F**	1.26	**14.0**
Southbound								
SR-242 between SR-4 on-ramp and Olivera Road on-ramp	Basic	F	D	0.89	28.2	B	0.49	13.9
SR-242 between Olivera Road on-ramp and Solano Way off-ramp	Weaving	F	C	0.77	25.0	B	0.46	13.1
SR-242 between Solano Way off-ramp and Solano Way on-ramp	Basic	F	B	0.65	18.0	A	0.36	10.4
SR-242 between Solano Way on-ramp and Concord Avenue off-ramp	Weaving	F	F	0.85	52.0	B	0.78	15.8
SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp	Basic	F	F	0.72	78.5	A	0.35	10.1
SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp	Merge	F	F	0.75	96.6	B	0.37	11.4
SR-242 between Clayton Road on-ramp and I-680	Merge	F	F	1.17	22.3	B	0.50	15.6
Eastbound								
SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp	Diverge	E	C	0.77	27.1	**F**	**1.27**	**79.2**
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	C	0.60	18.3	**F**	**1.17**	**85.5**
SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp	Weaving	E	C	0.68	22.9	**F**	**1.45**	**45.5**
SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp	Diverge	F	B	0.44	17.8	F	1.30	51.4
SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp	Basic	F	B	0.34	11.5	F	1.23	75.1
SR-4 between SR-242 on-ramp and HOV Lane Begins	Weaving	F	B	0.46	12.2	F	4.18	45.0
SR-4 between HOV Lane Begins and Lane Drop	Basic	F	A	0.28	9.6	A	0.88	6.9
SR-4 between Lane Drop and Port Chicago Highway on-ramp	Basic	F	B	0.37	12.7	F	1.18	9.2
SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp	Weaving	F	B	0.46	16.1	F	1.51	45.0
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	B	0.37	12.9	F	1.24	10.8
SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp	Weaving	F	B	0.38	11.8	F	3.24	45.0
SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp	Basic	F	B	0.35	12.0	F	1.21	10.1
SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp	Merge	F	B	0.39	13.8	F	1.24	12.2
SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane	Basic	F	B	0.39	12.4	F	1.24	12.7
SR-4 between Add Lane and Bailey Road Diagonal off-ramp	Diverge	F	A	0.31	10.4	A	0.94	9.5
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp	Basic	F	A	0.29	9.2	A	0.89	8.1
SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp	Basic	F	B	0.36	11.9	F	1.09	6.7
SR-4 between Bailey Road Diagonal on-ramp and Add Lane	Basic	F	B	0.36	11.3	F	1.09	13.4
SR-4 between Add Lane and Railroad Avenue off-ramp	Diverge	F	A	0.34	11.4	A	0.95	9.5
Westbound								
SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp	Diverge	F	F	0.88	76.4	B	0.45	13.6
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp	Basic	F	F	0.81	73.4	A	0.39	10.9
SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp	Basic	F	F	0.95	29.6	B	0.46	13.4
SR-4 between Bailey Road on-ramp and Lane Drop	Basic	F	F	0.71	76.5	A	0.34	9.5
SR-4 between Lane Drop and San Marco Boulevard off-ramp	Diverge	F	F	1.00	62.1	B	0.51	16.3
SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp	Basic	F	F	0.99	75.2	B	0.44	13.2
SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp	Basic	F	F	0.99	30.8	B	0.44	12.4
SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp	Weaving	F	F	1.26	54.3	A	0.37	10.2
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	F	1.25	72.7	B	0.50	15.2
SR-4 between Willow Pass Road on-ramp and HOV Lane Add	Basic	F	F	1.25	31.3	B	0.50	14.2
SR-4 between HOV Lane Add and Add Lane	Basic	F	F	1.08	27.8	B	0.43	12.0
SR-4 between Add Lane and Port Chicago Highway off-ramp	Diverge	F	C	0.99	22.6	B	0.42	12.6
SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp	Basic	F	C	0.84	21.0	A	0.39	11.0
SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp	Basic	E	**F**	**1.10**	**12.6**	B	0.35	12.1
SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp	Merge	E	**F**	**1.13**	**15.6**	B	0.46	16.8
SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp	Weaving	E	**F**	**1.56**	**45.0**	C	0.65	21.5
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	**F**	**1.20**	**16.0**	B	0.50	16.9
SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp	Weaving	E	**F**	**1.61**	**45.0**	C	0.64	23.1

* pc/mi/ln = passenger car per mile per lane

Locations operating unacceptably are bolded.

EXISTING LEVELS OF SERVICE AT STUDY FREEWAY RAMPS

Traffic operations were evaluated at the study freeway ramps under existing traffic conditions. Ramp volumes were counted during the same time as the study intersections. Ramp metering was active during the data collection for the existing conditions and may affect the merge-diverge analysis. **Table 7** shows the peak hour LOS and density for each freeway ramp in the study area.

As shown in **Table 7**, all freeway ramps operate within acceptable operational standards. Additional detail of the analysis is provided in the **Appendix.**

Table 7 - Existing Freeway Ramp Level of Service Summary

Freeway Ramps	Criteria	Existing			
		AM		PM	
	LOS	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*
Eastbound SR-4					
Willow Pass Rd Off-ramp	F	A	5.2	F	35.2
Willow Pass Rd On-ramp	F	A	9.0	F	44.8
San Marco Blvd Off-ramp	F	A	8.6	D	34.2
SB San Marco Blvd Loop On-ramp	F	A	8.0	D	29.1
NB San Marco Blvd Diagonal On-ramp	F	A	5.5	C	26.5
SB Bailey Rd Diagonal Off-ramp	F	A	5.1	C	24.3
NB Bailey Rd Loop Off-ramp	F	A	7.3	C	26.2
Bailey Rd On-ramp	F	B	11.6	E	35.0
Westbound SR-4					
NB Bailey Rd Diagonal Off-ramp	F	C	27.3	B	15.3
SB Bailey Rd Loop Off-ramp	F	C	25.1	B	19.5
Bailey Rd On-ramp	F	C	24.3	B	14.1
San Marco Blvd Off-ramp	F	D	28.2	B	16.3
NB San Marco Blvd Loop On-ramp	F	E	36.7	B	17.4
SB San Marco Blvd Diagonal On-ramp	F	F	45.4	B	16.2
Willow Pass Rd Off-ramp	F	C	27.3	B	16.6
Willow Pass Rd On-ramp	F	E	37.3	C	20.3

* pc/mi/ln = passenger car per mile per lane

Locations operating unacceptably are bolded.

3. FARIA ANNEXATION RESIDENTIAL DEVELOPMENT PROJECT

PROPOSED SITE USES

As noted previously, the proposed Faria Annexation residential development would be constructed in the vacant lot to the northeast of the Concord Naval Weapons Station. The proposed development would consist of 1,500 single family residential homes.

PROJECT TRIP GENERATION

Trip generation for residential development projects is typically calculated based on rates contained in the Institute of Transportation Engineer's publication, *Trip Generation 9th Edition*[2]. *Trip Generation* is a standard reference used by jurisdictions throughout the country for the estimation of trip generation potential of proposed developments.

A trip is defined in *Trip Generation* as a single or one-directional vehicle movement with either the origin or destination at the project site. In other words, a trip can be either "to" or "from" the site. In addition, a single customer visit to a site is counted as two trips (i.e., one to and one from the site).

For purposes of determining the worst-case impacts of traffic on the surrounding street network, the trips generated by a proposed development are typically estimated between the hours of 7:00-9:00 AM and 4:00-6:00 PM on a typical weekday. This methodology is in harmony with the City's standard for the preparation of traffic impact studies.

The proposed single-family residential development is most appropriately classified as Single-Family Detached Housing (ITE Land Use 210).

INTERNAL CAPTURE

Internal capture reductions were considered, but since the project site would only be used for the residential homes and no other land uses, no internal capture reductions were taken.

PROJECT TRIP PASS-BY

The Faria Annexation residential development is unlikely to create any pass-by trips. Pass-by trips are typically calculated based on data published in ITE's *Trip Generation Handbook*[3] which includes weekday AM and PM information. This reference assumes no pass-by trips for this specific land use.

Trip generation was calculated based on the previous discussions and is reported in **Table 8**. Additional trip generation calculations are contained in the **Appendix.**

[2] *Trip Generation, 9th Edition*, Institute of Transportation Engineers, 2012.

[3] *Trip Generation Handbook, 2nd Edition*, Institute of Transportation Engineers, June 2004.

Table 8 - Faria Annexation Residential Trip Generation

Time Period	Land Use	Equation	Trips		
			In	Out	Total
Daily	Single-Family Detached Housing (1,500 DU)	Ln(T) = 0.92Ln(X) + 2.71	6,280	6,280	12,560
AM Peak	Single-Family Detached Housing (1,500 DU)	T = 0.70(X) + 9.74	265	795	1,060
PM Peak	Single-Family Detached Housing (1,500 DU)	Ln(T) = 0.90Ln(X) + 0.51	757	445	1,202

As noted in **Table 8**, the project would generate approximately 1,060 new peak AM trips and approximately 1,202 new peak PM trips.

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The Faria Annexation residential development project trip distribution is based on the County's travel forecast demand model provided by CCTA and as well as existing traffic patterns and field observations. A select zone analysis was run for the proposed project to determine the distribution of vehicle trips throughout the study area. The results were checked to ensure that trips were using San Marco Boulevard and Bailey Road to access the project site in the Existing Plus Project scenario and the Leland Road access in the Cumulative Plus Project scenario.

Figure 5 shows the traffic distribution for the proposed project assumed in this traffic report. Based on the assumed trip distribution, new vehicle trips generated by the Faria Annexation residential development were assigned to the street network in the Existing Plus Project scenario as shown in **Figure 6**. In the Cumulative Plus Project scenario, Leland Road will be extended to Avila Road, and the trip assignment would change. New vehicle trips generated by the Faria Annexation residential development were assigned to the street network in the Cumulative Plus Project scenario as shown in **Figure 7**.

4. EXISTING PLUS PROJECT TRAFFIC CONDITIONS

Traffic conditions were analyzed for the existing plus project scenario to determine the project's potential impacts to the surrounding transportation network.

EXISTING PLUS PROJECT LEVELS OF SERVICE AT STUDY INTERSECTIONS

Project traffic was added to the existing volumes at the study intersections and the volumes are shown in **Figure 8**. Traffic operations were evaluated under the Existing Plus Project Traffic Conditions. Results of the analysis are presented in **Table 9**. The project results in increased delay at some of the study intersections which did not function within acceptable standards even without the project. Intersections that did not meet acceptable standards without the project, and the project contributes to an increase in delay of five (5) or more seconds to intersections within the City of Pittsburg or an increase in v/c of 0.03 or more to intersections within the City of Concord, are considered significant impacts. Additional detail is provided in the **Appendix**.

As shown in **Table 9**, all the study intersections satisfy operational standards, except at the following intersections during the Existing Plus Project conditions:

- **#2 – EB SR-4 Ramps and Willow Pass Road (PM peak hour)**
    - PM Peak: Operates at LOS F, worsened from acceptable LOS E to unacceptable LOS F, and increased delay by five (5) seconds or more, **significant impact**.
- **#3 – WB SR-4 Ramps and Willow Pass Road (AM peak hour)**
    - AM Peak: Operates at LOS F and increased delay by five (5) seconds or more, **significant impact**.
- **#6 – W. Leland Road and San Marco Boulevard (AM peak hour)**
    - AM Peak: Operates at LOS F and increased delay by five (5) seconds or more, **significant impact**.
- **#8 – WB SR-4 Ramps and San Marco Boulevard (AM peak hour)**
    - AM Peak: Operates at LOS F and increased delay by five (5) seconds or more, **significant impact**.
- **#11 – Willow Pass Road and Loftus Road (AM peak hour)**
    - AM Peak: Operates at LOS F but increased delay by less than five (5) seconds, not a significant impact.
- **#18 – Leland Road and Bailey Road (AM peak hour)**
    - AM Peak: Operates at LOS F but increased delay by less than five (5) seconds, not a significant impact.
- **#23 – Leland Road and Chestnut Drive (AM peak hour)**
    - AM Peak: Operates at LOS F, but increased delay by less than five (5) seconds, not a significant impact.
- **#24 – Leland Road and Jacqueline Drive (AM peak hour)**
    - AM Peak: Operates at LOS E but increased delay by less than five (5) seconds, not a significant impact.
- **#29 – Leland Road and Crestview Drive (AM peak hour)**
    - AM Peak: Operates at LOS F but increased delay by less than five (5) seconds, not a significant impact.
- **#31 – EB SR-4 Ramps and Railroad Road (PM peak hour)**
    - PM Peak: Operates at LOS E, decreased delay, not a significant impact.
- **#35 – Concord Boulevard and Bailey Road (AM and PM peak hours)**
    - AM Peak: Worsened from LOS E to LOS F and increased in v/c by 0.03 or more, **significant impact**.
    - PM Peak: Worsened from LOS E to LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#36 – Bailey Road and Myrtle Drive (AM peak hour)**
    - AM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#41 – Cowell Road and Treat Boulevard (AM and PM peak hours)**
    - AM Peak: Operates at LOS E but increased in v/c by less than 0.03, not a significant impact.
    - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
- **#44 – Treat Boulevard and Oak Grove Road (PM peak hour)**
    - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
- **#49 – Kirker Pass Road and Oakhurst Drive (AM and PM peak hours)**
    - AM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
    - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.

Table 9 - Existing Plus Project Intersection Level of Service Summary

#	Intersection	Delay Criteria[1]	Intersection Control[2]	Existing						Existing + Project									
				AM Peak			PM Peak			AM Peak					PM Peak				
				LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	ΔDelay	v/c	Δv/c	LOS	Delay	ΔDelay	v/c	Δv/c
1	Avila Road / Willow Pass Road	D	SSSC	A	0.1	0.37	A	0.5	0.47	A	0.2	0.1	0.38	0.01	A	0.6	0.1	0.5	0.01
	Worst Approach			*B*	*10.5*	*0.03*	*C*	*23.8*	*0.13*	B	10.6	0.1	0.03	0.00	D	29.5	5.7	0.1	0.01
2	EB SR-4 Ramps / Willow Pass Road	E	AWSC	E	38.5		E	42.9		E	47.9	9.4			**F**	**50.8**	**7.9**		
3	WB SR-4 Ramps / Willow Pass Road	E	AWSC	**F**	**143.6**		C	19.2		**F**	**165.4**	**21.8**			C	22.7	3.5		
4	Rio Verde Circle / San Marco Boulevard	E	AWSC	B	11.9		A	8.2		C	24.5	12.6			B	12.3	4.1		
5	Santa Teresa Drive / San Marco Boulevard	D	Signal	C	28.3		B	15.9		D	37.7	9.4			B	15.0	-0.9		
6	Leland Road / San Marco Boulevard	D	Signal	**F**	**245.0**		C	32.3		**F**	**298.4**	**53.4**			C	33.4	1.1		
7	EB SR-4 Ramps / San Marco Boulevard	D	Signal	A	9.5		B	13.7		B	12.3	2.8			C	23.8	10.1		
8	WB SR-4 Ramps / San Marco Boulevard	D	Signal	**F**	**168.2**		B	18.5		**F**	**173.3**	**5.1**			B	19.8	1.3		
9	Willow Pass Road / Port Chicago Highway	D	Signal	B	15.8		B	11.0		B	16.5	0.7			B	11.1	0.1		
10	Willow Pass Road / Bailey Road	D	Signal	C	27.9		D	39.8		C	28.1	0.2			D	40.0	0.2		
11	Willow Pass Road / Loftus Road	D	Signal	**F**	**107.2**		C	24.5		**F**	**108.4**	**1.2**			C	25.3	0.8		
12	EB Willow Pass Road / Range Road	E	SSSC	A	5.5		A	6.6		A	5.8	0.3			A	6.7	0.1		
	Worst Approach			*B*	*11.1*		*B*	*11.5*		B	11.3	0.2			B	11.6	0.1		
13	WB Willow Pass Road / Range Road	E	SSSC	A	0.2		A	0.5		A	0.2	0.0			A	0.5	0.0		
	Worst Approach			*A*	*0.8*		*A*	*0.8*		A	0.8	0.0			A	0.9	0.1		
14	Willow Pass Road / Railroad Avenue	D	Signal	C	23.1		C	20.6		C	23.2	0.1			C	20.8	0.2		
15	Leland Road / Alves Ranch Drive	D	Signal	B	11.8		A	9.7		B	11.8	0.0			A	9.6	-0.1		
16	Leland Road / Woodhill Drive	D	Signal	A	8.2		A	7.8		A	8.2	0.0			A	7.7	-0.1		
17	Leland Road / Southwood Drive	D	Signal	B	18.4		C	21.2		B	18.9	0.5			C	21.2	0.0		
18	Leland Road / Bailey Road	E	Signal	**F**	**97.6**		D	52.3		**F**	**98.9**	**1.3**			E	63.9	11.6		
19	Maylard Street / Bailey Road	E	Signal	B	11.6		B	18.1		B	12.3	0.7			B	18.7	0.6		
20	EB SR-4 Ramps / Bailey Road	E	Signal	C	22.4		D	35.2		C	22.4	0.0			D	36.5	1.3		
21	WB SR-4 Ramps / Bailey Road	E	Signal	C	25.2		B	19.3		C	28.3	3.1			B	19.5	0.2		
22	Canal Road / Bailey Road	D	Signal	B	13.5		B	10.9		B	13.6	0.1			B	11.0	0.1		
23	Leland Road / Chestnut Drive	D	Signal	**F**	**112.9**		C	27.8		**F**	**115.9**	**3.0**			C	26.4	-1.4		
24	Leland Road / Jacqueline Drive	D	Signal	**E**	**75.2**		C	34.2		**E**	**78.7**	**3.5**			C	31.7	-2.5		
25	Leland Road / Montevideo Drive	D	Signal	A	6.4		A	6.5		A	6.6	0.2			A	6.7	0.2		
26	Leland Road / Range Road	D	Signal	C	31.8		D	46.2		C	31.4	-0.4			D	45.5	-0.7		
27	Leland Road / Dover Way	D	Signal	C	28.9		C	33.1		C	28.8	-0.1			C	31.9	-1.2		
28	Leland Road / Burton Avenue	D	Signal	B	16.9		C	30.9		B	17.9	1.0			C	29.8	-1.1		
29	Leland Road / Crestview Drive	D	Signal	**F**	**111.8**		D	39.0		**F**	**114.1**	**2.3**			D	38.5	-0.5		
30	Leland Road / Railroad Avenue	D	Signal	D	52.1		D	45.3		D	52.5	0.4			D	46.1	0.8		
31	EB SR-4 Ramps / Railroad Avenue	D	Signal	C	25.4		**E**	**63.1**		C	25.6	0.2			**E**	**63.0**	**-0.1**		
32	WB SR-4 Ramps / Railroad Avenue	D	Signal	D	41.3		C	30.9		D	41.3	0.0			C	30.7	-0.2		
33	Willow Pass Road / Olivera Road	E	Signal	B	16.7	0.62	D	47.2	0.89	B	17.0	0.3	0.63	0.01	D	50.9	3.7	0.9	0.02
34	Concord Boulevard / Farm Bureau Road	D	Signal	C	25.4	0.73	C	26.5	0.74	C	25.9	0.5	0.76	0.03	C	27.2	0.7	0.8	0.03
35	Concord Boulevard / Bailey Road	D	Signal	**E**	**64.5**	**0.94**	**E**	**65.0**	**0.86**	**F**	**100.9**	**36.4**	**1.04**	**0.10**	**F**	**88.0**	**23.0**	**1.0**	**0.13**
36	Bailey Road / Myrtle Drive	D	SSSC	A	5.0	0.24	A	1.9	0.43	B	13.0	8.0	0.30	0.07	A	2.4	0.5	0.5	0.11
	Worst Approach			***F***	***62.2***	***0.57***	*C*	*19.8*	*0.30*	**F**	**203.9**	**141.7**	**0.83**	**0.27**	D	29.1	9.3	0.4	0.13
37	Clayton Road / Babel Lane	E	Signal	C	25.4	0.74	C	30.9	0.78	C	25.5	0.1	0.75	0.01	C	31.3	0.4	0.8	0.00
38	Clayton Road / Farm Bureau Road	E	Signal	C	24.0	0.77	B	16.0	0.60	C	23.7	-0.3	0.78	0.01	B	16.2	0.2	0.6	0.00
39	Clayton Road / Treat Boulevard	E	Signal	D	46.0	0.82	E	55.2	0.84	D	47.7	1.7	0.83	0.01	E	57.5	2.3	0.9	0.04
40	Clayton Road / Bailey Road	E	Signal	C	32.4	0.77	C	32.5	0.66	D	43.2	10.8	0.87	0.10	C	33.6	1.1	0.7	0.02
41	Cowell Road / Treat Boulevard	D	Signal	**E**	**73.2**	**0.94**	**F**	**89.0**	**1.09**	**E**	**78.6**	**5.4**	**0.96**	**0.02**	**F**	**90.7**	**1.7**	**1.1**	**0.02**
42	Leland Road / Santa Teresa Drive	D	Signal	Future Intersection						Future Intersection									
43	Bailey Road / Project Entrance	D	Signal	Future Intersection with Project						C	30.8	30.8			B	10.8	10.8		
44	Treat Boulevard / Oak Grove Road	E	Signal	E	59.7	0.94	**F**	**93.5**	**0.97**	E	60.3	0.6	0.95	0.01	**F**	**96.4**	**2.9**	**1.0**	**0.02**
45	Willow Pass Road / Diamond Boulevard	E	Signal	B	17.2	0.48	D	39.4	0.73	B	17.2	0.0	0.48	0.00	D	39.5	0.1	0.7	0.01
46	Willow Pass Road / Market Street	E	Signal	D	38.2	0.78	D	43.8	0.96	D	39.6	1.4	0.79	0.01	D	44.1	0.3	1.0	0.00
47	Willow Pass Road / Galindo Street	E	Signal	D	37.8	0.67	D	51.0	0.87	D	37.6	-0.2	0.68	0.01	D	51.2	0.2	0.9	0.01
48	Concord Boulevard / Port Chicago Highway	E	Signal	E	61.5	0.79	C	23.6	0.52	E	75.3	13.8	0.81	0.02	C	24.7	1.1	0.5	0.02
49	Kirker Pass Road / Oakhurst Drive/Concord Boulevard	D	Signal	**F**	**665.4**	**1.03**	**F**	**341.6**	**0.90**	**F**	**664.0**	**-1.4**	**1.04**	**0.01**	**F**	**339.7**	**-1.9**	**0.9**	**0.01**
50	Ygnacio Valley Road / Clayton Road	E	Signal	D	39.3	0.67	D	47.1	0.73	D	39.2	-0.1	0.68	0.01	D	47.1	0.0	0.7	0.01

[1] For all intersections, the LOS criteria is based on seconds of delay.

[2] Each study intersection is controlled by a traffic signal, a side-street stop-controlled (SSSC), or a all-way stop-controlled (AWSC).

Note: Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.

EXISTING PLUS PROJECT LEVELS OF SERVICE AT STUDY FREEWAY SEGMENTS

Traffic operations were evaluated at the study freeway segments under existing plus project traffic conditions. Freeway volumes for the Existing plus Project scenario were calculated by adding the proposed project trips to the existing freeway volumes. **Table 10** shows the peak hour LOS, d/c ratio, and density for each freeway section in the study area. Significant impacts for freeway segments occur when the project worsens the level of service from an acceptable LOS to an unacceptable LOS or if the freeway segment operates unacceptably without the project and the project increases the density.

As shown in **Table 10**, all freeway segments satisfy the operational standards in the Existing plus Project scenario, except for the following:

- NB SR-242 between Clayton Road off-ramp and SR-4 in the PM peak hour
    - **Significant Impact between Clayton Road off-ramp and Olivera Road off-ramp**
- EB SR-4 between I-680 on-ramp and SR-242 off-ramp in the PM peak hour
    - **Significant Impact between Arnold Industrial Way off-ramp and Arnold industrial Way on-ramp**
- WB SR-4 between SR-242 off-ramp and I-680 off-ramp
    - Not a Significant Impact

Additional detail of the analysis is provided in the **Appendix**.

Table 10 – Existing Plus Project Freeway Segment Level of Service Summary

Freeway Section	Segment Type	Criteria	Existing						Existing + Project					
			AM			PM			AM			PM		
		LOS	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*
Northbound														
SR-242 between I-680 and Clayton Road off-ramp	Diverge	E	A	0.10	3.1	C	0.67	24.5	A	0.10	3.3	C	0.68	24.5
SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp	Basic	E	A	0.10	3.4	**F**	**0.70**	**47.3**	A	0.11	3.6	**F**	**0.71**	**51.3**
SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-ramp	Merge	E	A	0.08	2.4	**F**	**0.52**	**81.7**	A	0.08	2.6	**F**	**0.53**	**86.5**
SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp	Weaving	E	C	0.75	21.2	**F**	**0.80**	**83.2**	C	0.75	21.3	**F**	**0.81**	**83.9**
SR-242 between Grant Street off-ramp and Grant Street on-ramp	Basic	E	A	0.24	8.0	**F**	**0.82**	**83.6**	A	0.25	8.3	**F**	**0.84**	**84.0**
SR-242 between Grant Street on-ramp and Olivera Road off-ramp	Weaving	E	A	0.37	8.6	**F**	**0.73**	**102.9**	A	0.37	8.8	**F**	**0.74**	**103.0**
SR-242 between Olivera Road off-ramp and SR-4 off-ramp	Diverge	E	A	0.17	6.6	**F**	**1.26**	**14.0**	A	0.17	6.8	**F**	**1.28**	**14.0**
Southbound														
SR-242 between SR-4 on-ramp and Olivera Road on-ramp	Basic	F	D	0.89	28.2	B	0.49	13.9	D	0.92	29.6	B	0.51	14.4
SR-242 between Olivera Road on-ramp and Solano Way off-ramp	Weaving	F	C	0.77	25.0	B	0.46	13.1	C	0.80	25.8	B	0.47	13.4
SR-242 between Solano Way off-ramp and Solano Way on-ramp	Basic	F	B	0.65	18.0	A	0.36	10.4	B	0.67	17.9	A	0.37	10.7
SR-242 between Solano Way on-ramp and Concord Avenue off-ramp	Weaving	F	F	0.85	52.0	B	0.78	15.8	F	0.86	57.9	B	0.78	16.2
SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp	Basic	F	F	0.72	78.5	A	0.35	10.1	F	0.75	83.0	A	0.36	10.5
SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp	Merge	F	F	0.75	96.6	B	0.37	11.4	F	0.77	97.8	B	0.39	11.9
SR-242 between Clayton Road on-ramp and I-680	Merge	F	F	1.17	22.3	B	0.50	15.6	F	1.21	22.3	B	0.52	16.0
Eastbound														
SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp	Diverge	E	C	0.77	27.1	**F**	**1.27**	**79.2**	C	0.79	28.1	**F**	**1.35**	**78.0**
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	C	0.60	18.3	**F**	**1.17**	**85.5**	C	0.63	19.4	**F**	**1.25**	**86.0**
SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp	Weaving	E	C	0.68	22.9	**F**	**1.45**	**45.5**	C	0.71	23.8	**F**	**1.57**	**45.0**
SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp	Diverge	F	B	0.44	17.8	F	1.30	51.4	B	0.46	18.7	F	1.37	29.1
SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp	Basic	F	B	0.34	11.5	F	1.23	75.1	B	0.36	12.3	F	1.31	67.3
SR-4 between SR-242 on-ramp and HOV Lane Begins	Weaving	F	B	0.46	12.2	F	4.18	45.0	B	0.49	13.1	F	4.34	45.0
SR-4 between HOV Lane Begins and Lane Drop	Basic	F	A	0.28	9.6	A	0.88	6.9	A	0.30	10.2	A	0.92	7.1
SR-4 between Lane Drop and Port Chicago Highway on-ramp	Basic	F	B	0.37	12.7	F	1.18	9.2	B	0.40	13.5	F	1.22	9.4
SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp	Weaving	F	B	0.46	16.1	F	1.51	45.0	B	0.48	17.1	F	1.59	45.0
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	B	0.37	12.9	F	1.24	10.8	B	0.39	13.6	F	1.28	10.9
SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp	Weaving	F	B	0.38	11.8	F	3.24	45.0	B	0.41	12.6	F	3.52	45.0
SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp	Basic	F	B	0.35	12.0	F	1.21	10.1	B	0.37	12.6	F	1.23	9.7
SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp	Merge	F	B	0.39	13.8	F	1.24	12.2	B	0.41	14.4	F	1.27	11.7
SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane	Basic	F	B	0.39	12.4	F	1.24	12.7	B	0.41	13.0	F	1.26	12.3
SR-4 between Add Lane and Bailey Road Diagonal off-ramp	Diverge	F	A	0.31	10.4	A	0.94	9.5	A	0.32	10.9	A	0.96	9.3
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp	Basic	F	A	0.29	9.2	A	0.89	8.1	A	0.30	9.5	A	0.90	7.4
SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp	Basic	F	B	0.36	11.9	F	1.09	6.7	B	0.37	12.5	F	1.09	5.7
SR-4 between Bailey Road Diagonal on-ramp and Add Lane	Basic	F	B	0.36	11.3	F	1.09	13.4	B	0.37	11.7	F	1.09	12.7
SR-4 between Add Lane and Railroad Avenue off-ramp	Diverge	F	A	0.34	11.4	A	0.95	9.5	A	0.36	12.1	A	0.96	8.9
Westbound														
SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp	Diverge	F	F	0.88	76.4	B	0.45	13.6	F	0.89	78.5	B	0.47	14.0
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp	Basic	F	F	0.81	73.4	A	0.39	10.9	F	0.82	75.6	B	0.41	11.3
SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp	Basic	F	F	0.95	29.6	B	0.46	13.4	F	0.95	60.2	B	0.46	13.4
SR-4 between Bailey Road on-ramp and Lane Drop	Basic	F	F	0.71	76.5	A	0.34	9.5	F	0.71	86.0	A	0.34	9.6
SR-4 between Lane Drop and San Marco Boulevard off-ramp	Diverge	F	F	1.00	62.1	B	0.51	16.3	F	1.02	65.8	B	0.52	16.8
SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp	Basic	F	F	0.99	75.2	B	0.44	13.2	F	1.01	74.5	B	0.45	13.5
SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp	Basic	F	F	0.99	30.8	B	0.44	12.4	F	1.01	31.1	B	0.45	12.7
SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp	Weaving	F	F	1.26	54.3	A	0.37	10.2	F	1.28	53.8	A	0.38	10.6
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	F	1.25	72.7	B	0.50	15.2	F	1.29	72.8	B	0.52	15.8
SR-4 between Willow Pass Road on-ramp and HOV Lane Add	Basic	F	F	1.25	31.3	B	0.50	14.2	F	1.28	31.4	B	0.52	14.8
SR-4 between HOV Lane Add and Add Lane	Basic	F	F	1.08	27.8	B	0.43	12.0	F	1.11	28.2	B	0.44	12.4
SR-4 between Add Lane and Port Chicago Highway off-ramp	Diverge	F	C	0.99	22.6	B	0.42	12.6	F	1.02	22.8	B	0.44	13.0
SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp	Basic	F	C	0.84	21.0	A	0.39	11.0	C	0.87	21.7	B	0.41	11.4
SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp	Basic	E	**F**	**1.10**	**12.6**	B	0.35	12.1	**F**	**1.13**	**11.9**	B	0.38	13.1
SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp	Merge	E	**F**	**1.13**	**15.6**	B	0.46	16.8	**F**	**1.16**	**14.7**	B	0.49	17.9
SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp	Weaving	E	**F**	**1.56**	**45.0**	C	0.65	21.5	**F**	**1.60**	**45.0**	C	0.68	22.7
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	**F**	**1.20**	**16.0**	B	0.50	16.9	**F**	**1.23**	**15.3**	B	0.53	17.9
SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp	Weaving	E	**F**	**1.61**	**45.0**	C	0.64	23.1	**F**	**1.68**	**45.0**	C	0.66	24.3

* pc/mi/ln = passenger car per mile per lane

Locations operating unacceptably are bolded and significant project impacts are highlighted.

EXISTING PLUS PROJECT LEVELS OF SERVICE AT STUDY FREEWAY RAMPS

Traffic operations were evaluated at the study freeway ramps under existing plus project traffic conditions. Ramp volumes were calculated by adding the proposed project trips to the existing ramp volumes. **Table 11** shows the peak hour LOS and density for each freeway ramp in the study area. Since all the freeway ramps have a LOS threshold of LOS F, there are no significant impacts.

It should be noted that there are a few ramps that operate at LOS F in the AM and PM peaks. Additional detail of the analysis is provided in the **Appendix.**

Table 11 – Existing Plus Project Freeway Ramp Level of Service Summary

Freeway Ramps	Criteria	Existing				Existing + Project			
		AM		PM		AM		PM	
	LOS	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*
Eastbound SR-4									
Willow Pass Rd Off-ramp	F	A	5.2	F	35.2	A	5.7	F	37.6
Willow Pass Rd On-ramp	F	A	9.0	F	44.8	B	17.2	F	47.0
San Marco Blvd Off-ramp	F	A	8.6	D	34.2	A	9.3	E	36.1
SB San Marco Blvd Loop On-ramp	F	A	8.0	D	29.1	A	8.1	D	29.6
NB San Marco Blvd Diagonal On-ramp	F	A	5.5	C	26.5	A	5.8	C	27.1
SB Bailey Rd Diagonal Off-ramp	F	A	5.1	C	24.3	A	5.5	C	26.5
NB Bailey Rd Loop Off-ramp	F	A	7.3	C	26.2	A	7.4	C	26.1
Bailey Rd On-ramp	F	B	11.6	E	35.0	B	11.3	E	35.5
Westbound SR-4									
NB Bailey Rd Diagonal Off-ramp	F	C	27.3	B	15.3	C	27.5	B	15.8
SB Bailey Rd Loop Off-ramp	F	C	25.1	B	19.5	C	22.8	C	20.6
Bailey Rd On-ramp	F	C	24.3	B	14.1	C	25.3	B	14.8
San Marco Blvd Off-ramp	F	D	28.2	B	16.3	D	28.7	B	16.8
NB San Marco Blvd Loop On-ramp	F	E	36.7	B	17.4	E	38.1	B	18.2
SB San Marco Blvd Diagonal On-ramp	F	F	45.4	B	16.2	F	45.7	B	16.7
Willow Pass Rd Off-ramp	F	C	27.3	B	16.6	D	28.6	B	17.4
Willow Pass Rd On-ramp	F	E	37.3	C	20.3	E	38.5	C	21.0

* pc/mi/ln = passenger car per mile per lane

Locations operating unacceptably are bolded and significant project impacts are highlighted.

5. LONG-TERM (2035) CONDITIONS

The Long-term (2035) scenario was analyzed to determine if there are any potential significant impacts from the proposed project on the future transportation network within the study area.

LONG-TERM LANE CONFIGURATIONS AND TRAFFIC CONTROL

There are roadway improvements planned in the study area for the Long-term (2035) as identified by the City of Pittsburg and the City of Concord. The following summarizes the future intersection improvements and roadway improvements that would affect the study area:

- Intersection #1 – At the intersection of Avila Road and Willow Pass Road, the westbound approach will have two left turn lanes and one right turn lane. The southbound approach will be restriped to include a left turn lane and two through lanes. The intersection will also be signalized.
- Intersection #2 – At the intersection of Willow Pass Road and SR-4 EB Ramps, the southbound approach will be widened to include a left turn lane. The intersection will also be signalized.
- Intersection #3 – At the intersection of Willow Pass Road and SR-4 WB Ramps, the northbound approach will be widened to include a left turn lane and two through lanes. The intersection will also be signalized.
- Intersection #6 – At the intersection of San Marco Boulevard and W. Leland Road, the northbound approach will be widened to include an additional left turn lane and add an exclusive right turn lane. The existing westbound yielding right turn lane will be a free right turn lane. The free right turn lane will have its own auxiliary lane on the northbound departure.
- Intersection #11 – At the intersection of Willow Pass Road and Loftus Road, the westbound approach will be widened to include an additional through lane.
- Intersection #15 – At the intersection of Leland Road and Alves Ranch Road, the southbound approach will be striped as a left turn lane and a shared through-right turn lane. This approach did not exist in the Existing condition.
- Intersection #18 – At the intersection of Bailey Road and W. Leland Road, the eastbound approach will be widened to include an additional left turn lane and add an exclusive right turn lane.
- Intersection #33 – At the intersection of Olivera Road and Willow Pass Road, the northbound and southbound approaches will be widened to add an additional northbound through lane and an additional southbound through lane.
- Intersection #34 – At the intersection of Farm Bureau Road and Concord Boulevard, the northbound and southbound approaches will be widened to add an additional northbound through lane and an additional southbound through lane.
- Intersection #38 – At the intersection of Farm Bureau Road and Clayton Road, the southbound approach will be widened to include an additional southbound lane that drops into the southbound right turn lane.
- Intersection #42 – The intersection of Leland Road and Santa Teresa Drive will be a new intersection in the Long-term. The intersection will be used by the San Marco Plan development. The eastbound approach will be two through lanes and a right turn lane. The westbound approach will be two through lanes and one left turn lane. The northbound approach will be one left turn lane and one right turn lane.
- Intersection #43 – The intersection of Bailey Road and the Project entrance will be a new intersection in the Long-term. The intersection will extend San Marco Boulevard to Bailey Road. The eastbound approach will be one left turn lane and one right turn lane. The northbound approach will be one left turn lane and one through lane. The southbound approach will be one right turn lane and one through lane.

In the Long-term (2035) scenario, W. Leland Road is planned to be extended from San Marco Boulevard to Avila Road and Avila Road will be improved to the City's major arterial standards (i.e. a 4-lane roadway with a raised median), regardless of whether the proposed Faria Annexation residential development occurs or not. In addition, James Donlon Boulevard is planned to be extended from Somersville Road to Kirker Pass Road. Although this roadway is not within the study area the extension would affect the volume distribution in the Long-term. Another major roadway improvement is the extension of San Marco Boulevard from its existing terminus to Bailey Road. This roadway will be a two-lane roadway.

Figure 9 illustrates the intersection geometry and traffic control assumed in the Long-term (2035) analysis.

YEAR 2030 FORECAST MODEL VOLUMES

Year 2030 roadway link volumes from the CCTA Travel Demand Forecast model were obtained. The model was used to plot bi-directional AM and PM peak hour traffic volumes on each segment along roadways within the study area. Model output was used to compare 2010 base year volumes and year 2030 model forecasts to determine the annual incremental growth in traffic volumes at study intersections. Year 2035 turning movement volumes were calculated by adding the growth increment to the existing traffic counts to calculate the final adjusted roadway link forecast volume. Final adjusted forecast volumes were then converted to Long-term (2035) intersection turning movement volumes using a traffic modeling standard process commonly referred to as the Furness method. The Furness method uses an iterative process to derive future turning movement volumes based on future year roadway link volumes and an initial estimate of turning percentages (obtained from the existing intersection turning movement counts).

6. LONG-TERM (2035) TRAFFIC CONDITIONS

Traffic operations were evaluated under the following long-term conditions:

- Long-Term (2035) Conditions
- Long-Term (2035) plus Project Conditions

LONG-TERM INTERSECTION LEVEL OF SERVICE

Long-term (2035) traffic volumes were evaluated at study intersections and are presented in **Figure 10**. As shown in **Table 12**, the following study intersections do not function within acceptable standards under this analysis scenario:

- #1 – Avila Road and Willow Pass Road (PM peak hour)
- #3 – WB SR-4 Ramps and Willow Pass Road (AM peak hour)
- #6 – W. Leland Road and San Marco Boulevard (AM and PM peak hours)
- #7 – EB SR-4 Ramps and San Marco Boulevard (PM peak hour)
- #8 – WB SR-4 Ramps and San Marco Boulevard (AM peak hour)
- #10 – Willow Pass Road and Bailey Road (AM and PM peak hours)
- #14 – Willow Pass Road and Railroad Avenue (AM peak hour)
- #17 – W. Leland Road and Southwood Drive (AM peak hour)
- #18 – W. Leland Road and Bailey Road (AM peak hour)
- #23 – W. Leland Road and Chestnut Drive (AM peak hour)
- #24 – W. Leland Road and Jacqueline Drive (AM peak hour)
- #26 – W. Leland Road and Range Road (AM peak hour)
- #27 – W. Leland Road and Dover Way (AM peak hour)
- #28 – W. Leland Road and Burton Avenue (AM peak hour)
- #29 – W. Leland Road and Crestview Drive (AM and PM peak hours)
- #30 – W. Leland Road and Railroad Avenue (AM and PM peak hours)
- #31 – EB SR-4 Ramps and Railroad Avenue (PM peak hour)
- #35 – Concord Boulevard and Bailey Road (AM and PM peak hours)
- #36 – Bailey Road and Myrtle Drive (PM peak hour)
- #38 – Clayton Road and Farm Bureau Road (AM and PM peak hours)
- #39 – Clayton Road and Treat Boulevard (AM and PM peak hours)
- #40 – Clayton Road and Bailey Road (AM peak hour)
- #41 – Cowell Road and Treat Boulevard (AM and PM peak hours)
- #44 – Treat Boulevard and Oak Grove Road (AM and PM peak hours)
- #47 – Willow Pass Road and Galindo Street (PM peak hour)
- #48 – Concord Boulevard and Port Chicago Highway (AM peak hour)
- #49 – Kirker Pass Road and Oakhurst Drive/Concord Boulevard (AM and PM peak hours)
- #50 – Ygnacio Valley Road and Clayton Road (AM and PM peak hours)

The intersections listed above would operate below acceptable thresholds regardless of the proposed project. Analysis sheets are provided in the **Appendix**.

Table 12 – Long-Term (2035) Intersection Level of Service Summary

#	Intersection	Delay Criteria[1]	Intersection Control[2]	Long-term (2035)					
				AM Peak			PM Peak		
				LOS	Delay	v/c	LOS	Delay	v/c
1	Avila Road / Willow Pass Road	D	Signal	C	25.5	0.83	**F**	**104.6**	**1.10**
2	EB SR-4 Ramps / Willow Pass Road	E	Signal	B	11.7		C	24.9	
3	WB SR-4 Ramps / Willow Pass Road	E	Signal	**F**	**343.6**		B	15.9	
4	Rio Verde Circle / San Marco Boulevard	E	AWSC	D	32.3		A	9.2	
5	Santa Teresa Drive / San Marco Boulevard	D	Signal	C	34.5		B	18.5	
6	Leland Road / San Marco Boulevard	D	Signal	**F**	**79.8**		**F**	**143.1**	
7	EB SR-4 Ramps / San Marco Boulevard	D	Signal	D	47.6		**E**	**56.3**	
8	WB SR-4 Ramps / San Marco Boulevard	D	Signal	**F**	**338.8**		C	30.4	
9	Willow Pass Road / Port Chicago Highway	D	Signal	B	13.6		B	11.0	
10	Willow Pass Road / Bailey Road	D	Signal	**F**	**146.6**		**F**	**110.6**	
11	Willow Pass Road / Loftus Road	D	Signal	C	27.7		B	19.0	
12	EB Willow Pass Road / Range Road	E	SSSC	A	6.9		A	9.1	
	Worst Approach			B	12.4		B	14.0	
13	WB Willow Pass Road / Range Road	E	SSSC	A	0.2		A	0.4	
	Worst Approach			A	0.6		A	0.6	
14	Willow Pass Road / Railroad Avenue	D	Signal	**E**	**58.0**		C	31.4	
15	Leland Road / Alves Ranch Drive	D	Signal	C	32.5		C	22.0	
16	Leland Road / Woodhill Drive	D	Signal	B	13.5		B	12.1	
17	Leland Road / Southwood Drive	D	Signal	**F**	**92.9**		D	47.0	
18	Leland Road / Bailey Road	E	Signal	**F**	**165.8**		E	66.8	
19	Maylard Street / Bailey Road	E	Signal	C	21.8		C	26.2	
20	EB SR-4 Ramps / Bailey Road	E	Signal	C	24.9		D	41.6	
21	WB SR-4 Ramps / Bailey Road	E	Signal	D	48.2		C	23.0	
22	Canal Road / Bailey Road	D	Signal	C	32.2		B	12.8	
23	Leland Road / Chestnut Drive	D	Signal	**F**	**230.4**		C	25.9	
24	Leland Road / Jacqueline Drive	D	Signal	**F**	**179.7**		C	27.6	
25	Leland Road / Montevideo Drive	D	Signal	B	11.3		A	5.3	
26	Leland Road / Range Road	D	Signal	**E**	**70.0**		C	33.8	
27	Leland Road / Dover Way	D	Signal	**F**	**83.8**		C	25.8	
28	Leland Road / Burton Avenue	D	Signal	**F**	**95.7**		C	30.0	
29	Leland Road / Crestview Drive	D	Signal	**F**	**202.7**		**E**	**60.2**	
30	Leland Road / Railroad Avenue	D	Signal	**F**	**183.8**		**F**	**172.8**	
31	EB SR-4 Ramps / Railroad Avenue	D	Signal	C	27.6		**F**	**94.8**	
32	WB SR-4 Ramps / Railroad Avenue	D	Signal	D	41.9		D	35.5	
33	Willow Pass Road / Olivera Road	E	Signal	D	51.0	0.97	E	67.7	1.00
34	Concord Boulevard / Farm Bureau Road	D	Signal	D	47.4	0.96	D	36.1	0.90
35	Concord Boulevard / Bailey Road	D	Signal	**F**	**204.7**	**1.34**	**F**	**120.8**	**1.21**
36	Bailey Road / Myrtle Drive	D	SSSC	A	4.3	N/A	**F**	**281.4**	**1.59**
	Worst Approach			B	10.4	N/A	**F**	**OVRFL**	**3.33**
37	Clayton Road / Babel Lane	E	Signal	C	31.1	0.79	C	31.3	0.85
38	Clayton Road / Farm Bureau Road	E	Signal	**F**	**90.1**	**1.03**	**F**	**87.3**	**0.92**
39	Clayton Road / Treat Boulevard	E	Signal	**F**	**83.5**	**0.98**	**F**	**102.2**	**1.04**
40	Clayton Road / Bailey Road	E	Signal	**F**	**198.6**	**1.28**	C	33.5	0.74
41	Cowell Road / Treat Boulevard	D	Signal	**F**	**89.8**	**1.02**	**F**	**124.5**	**1.20**
42	Leland Road / Santa Teresa Drive	D	Signal	A	9.2		A	7.1	
43	Bailey Road / Project Entrance	D	Signal	B	16.3		A	5.9	
44	Treat Boulevard / Oak Grove Road	E	Signal	**F**	**237.7**	**1.48**	**F**	**272.5**	**1.48**
45	Willow Pass Road / Diamond Boulevard	E	Signal	B	18.0	0.52	D	41.1	0.74
46	Willow Pass Road / Market Street	E	Signal	D	40.6	0.89	D	49.5	1.01
47	Willow Pass Road / Galindo Street	E	Signal	D	54.7	0.84	**F**	**111.7**	**1.11**
48	Concord Boulevard / Port Chicago Highway	E	Signal	**F**	**130.0**	**0.89**	C	23.1	0.60
49	Kirker Pass Road / Oakhurst Drive/Concord Boulevard	D	Signal	**F**	**699.3**	**1.24**	**F**	**336.6**	**1.05**
50	Ygnacio Valley Road / Clayton Road	E	Signal	**F**	**289.0**	**1.19**	**F**	**108.7**	**1.01**

[1] For all intersections, the LOS criteria is based on seconds of delay.

[2] Each study intersection is controlled by a traffic signal, a side-street stop-controlled (SSSC), or a all-way stop-controlled (AWSC).

OVRFL - Intersection delay exceeds 500 seconds and is considered overflow.

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.

LONG-TERM LEVELS OF SERVICE AT STUDY FREEWAY SEGMENTS

Traffic operations were evaluated at the study freeway segments under Long-term traffic conditions. Freeway volumes for the Long-term scenario were calculated by determining the annual growth increment from the CCTA travel demand forecast model and applying that growth increment to the existing freeway segment volumes.

In the Long-term scenario, the following freeway segments will be widened per the CCTA travel demand forecast model:

- EB SR-4 between I-680 and Solano Way (Arnold Industrial Way) – widened from two lanes to four lanes
- EB SR-4 between Solano Way (Arnold Industrial Way) and SR-242 – widened from two lanes to four lanes
- EB SR-4 between SR-242 and Port Chicago Highway – widened from four lanes to five lanes
- WB SR-4 between SR-242 and Solano Way (Arnold Industrial Way) – widened from two lanes to four lanes
- WB SR-4 between Solano Way (Arnold Industrial Way) and I-680 – widened from two lanes to four lanes

Table 13 shows the peak hour LOS, d/c ratio, and density for each freeway section in the study area. As shown in **Table 13**, all freeway segments operate at acceptable standards except for the following:

- NB SR-242 between the Concord Avenue diagonal on-ramp and Grant Street off-ramp in the AM peak hour
- NB SR-242 between the Clayton Road off-ramp and SR-4 in the PM peak hour
- EB SR-4 between I-680 and the SR-242 off-ramp in the PM peak hour
- WB SR-4 between the SR-242 off-ramp and the Arnold Industrial Way off-ramp; and between the Arnold Industrial Way on-ramp and the I-680 off-ramp in the AM peak hour

Additional detail of the analysis is provided in the **Appendix**.

Table 13 – Long-term Freeway Segment Level of Service Summary

Freeway Section	Segment Type	Criteria	Long-term (2035)					
			AM			PM		
		LOS	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*
Northbound								
SR-242 between I-680 and Clayton Road off-ramp	Diverge	E	A	0.15	6.2	C	0.68	24.7
SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp	Basic	E	A	0.15	6.3	**F**	**0.70**	**49.7**
SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-ramp	Merge	E	A	0.12	7.6	**F**	**0.53**	**85.1**
SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp	Weaving	E	**F**	**1.34**	**45.0**	**F**	**0.81**	**83.2**
SR-242 between Grant Street off-ramp and Grant Street on-ramp	Basic	E	A	0.37	9.6	**F**	**0.83**	**83.8**
SR-242 between Grant Street on-ramp and Olivera Road off-ramp	Weaving	E	B	0.66	12.2	**F**	**0.74**	**102.7**
SR-242 between Olivera Road off-ramp and SR-4 off-ramp	Diverge	E	B	0.26	8.7	**F**	**1.27**	**14.1**
Southbound								
SR-242 between SR-4 on-ramp and Olivera Road on-ramp	Basic	F	F	1.04	48.9	C	0.69	21.2
SR-242 between Olivera Road on-ramp and Solano Way off-ramp	Weaving	F	C	0.90	26.6	B	0.61	18.0
SR-242 between Solano Way off-ramp and Solano Way on-ramp	Basic	F	F	0.75	71.0	B	0.50	14.6
SR-242 between Solano Way on-ramp and Concord Avenue off-ramp	Weaving	F	F	0.99	59.1	C	0.80	21.3
SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp	Basic	F	F	0.84	84.9	B	0.53	15.7
SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp	Merge	F	F	0.87	98.4	B	0.56	17.2
SR-242 between Clayton Road on-ramp and I-680	Merge	F	F	1.36	22.4	C	0.69	21.7
Eastbound								
SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp	Diverge	E	B	0.42	12.2	**F**	**0.87**	**58.5**
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	A	0.31	9.2	**F**	**0.81**	**95.4**
SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp	Weaving	E	B	0.39	11.4	**F**	**0.97**	**84.8**
SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp	Diverge	F	A	0.23	8.1	F	0.88	98.4
SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp	Basic	F	A	0.17	5.9	F	0.84	118.5
SR-4 between SR-242 on-ramp and HOV Lane Begins	Weaving	F	B	0.48	10.1	F	5.21	45.0
SR-4 between HOV Lane Begins and Lane Drop	Basic	F	A	0.23	7.9	A	0.90	6.7
SR-4 between Lane Drop and Port Chicago Highway on-ramp	Basic	F	A	0.23	7.9	A	0.90	6.7
SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp	Weaving	F	A	0.35	9.9	F	2.59	45.0
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	B	0.39	13.4	F	1.47	10.3
SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp	Weaving	F	B	0.68	13.9	F	4.15	45.0
SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp	Basic	F	B	0.33	11.1	F	1.26	4.4
SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp	Merge	F	B	0.37	12.9	F	1.29	6.9
SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane	Basic	F	B	0.37	11.6	F	1.29	6.1
SR-4 between Add Lane and Bailey Road Diagonal off-ramp	Diverge	F	B	0.32	10.9	A	0.97	6.6
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp	Basic	F	A	0.28	8.9	A	0.86	2.9
SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp	Basic	F	B	0.33	11.2	F	1.05	0.0
SR-4 between Bailey Road Diagonal on-ramp and Add Lane	Basic	F	A	0.33	10.5	F	1.05	6.4
SR-4 between Add Lane and Railroad Avenue off-ramp	Diverge	F	A	0.33	11.0	A	0.93	1.8
Westbound								
SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp	Diverge	F	F	0.95	86.6	B	0.49	14.7
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp	Basic	F	F	0.88	86.5	B	0.41	11.5
SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp	Basic	F	F	1.09	69.6	B	0.38	11.1
SR-4 between Bailey Road on-ramp and Lane Drop	Basic	F	F	0.82	85.0	A	0.28	7.9
SR-4 between Lane Drop and San Marco Boulevard off-ramp	Diverge	F	F	1.28	52.2	B	0.48	15.6
SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp	Basic	F	F	1.20	65.7	B	0.41	12.4
SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp	Basic	F	F	1.20	30.7	B	0.41	11.6
SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp	Weaving	F	F	0.98	67.2	B	0.42	11.6
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	F	1.47	74.8	B	0.55	17.0
SR-4 between Willow Pass Road on-ramp and HOV Lane Add	Basic	F	F	1.47	31.9	B	0.55	15.9
SR-4 between HOV Lane Add and Add Lane	Basic	F	F	1.29	28.4	B	0.47	13.3
SR-4 between Add Lane and Port Chicago Highway off-ramp	Diverge	F	F	1.17	23.1	B	0.46	13.9
SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp	Basic	F	F	1.00	45.0	B	0.43	12.1
SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp	Basic	E	A	0.70	5.3	A	0.20	6.9
SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp	Merge	E	A	0.72	6.2	B	0.26	8.8
SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp	Weaving	E	**F**	**1.39**	**45.0**	B	0.36	11.6
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	A	0.76	7.1	A	0.28	9.4
SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp	Weaving	E	**F**	**2.29**	**45.0**	B	0.35	12.4

* pc/mi/ln = passenger car per mile per lane

Locations operating unacceptably are bolded.

LONG-TERM LEVELS OF SERVICE AT STUDY FREEWAY RAMPS

Traffic operations were evaluated at the study freeway ramps under Long-term traffic conditions. Ramp volumes for the Long-term scenario were calculated by determining the annual growth increment from the CCTA travel demand forecast model and applying that growth increment to the existing freeway ramp volumes. **Table 14** shows the peak hour LOS and density for each freeway ramp in the study area.

As shown in **Table 14**, all freeway ramps operate under acceptable LOS. Additional detail of the analysis is provided in the **Appendix**.

Table 14 – Long-term Freeway Ramp Level of Service Summary

Freeway Ramps	Criteria	Long-term (2035)			
		AM		PM	
	LOS	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*
Eastbound SR-4					
Willow Pass Rd Off-ramp	F	A	8.3	F	39.7
Willow Pass Rd On-ramp	F	B	11.9	F	35.4
San Marco Blvd Off-ramp	F	B	16.1	F	42.6
SB San Marco Blvd Loop On-ramp	F	B	10.1	D	33.5
NB San Marco Blvd Diagonal On-ramp	F	A	9.8	D	30.6
SB Bailey Rd Diagonal Off-ramp	F	A	9.6	D	29.4
NB Bailey Rd Loop Off-ramp	F	B	10.3	C	26.5
Bailey Rd On-ramp	F	B	14.3	E	35.5
Westbound SR-4					
NB Bailey Rd Diagonal Off-ramp	F	D	29.8	B	16.9
SB Bailey Rd Loop Off-ramp	F	C	25.7	C	21.7
Bailey Rd On-ramp	F	E	36.3	B	16.5
San Marco Blvd Off-ramp	F	D	32.2	B	17.9
NB San Marco Blvd Loop On-ramp	F	E	36.1	C	23.4
SB San Marco Blvd Diagonal On-ramp	F	F	44.6	C	20.1
Willow Pass Rd Off-ramp	F	D	34.0	B	20.0
Willow Pass Rd On-ramp	F	F	56.9	C	23.2

* pc/mi/ln = passenger car per mile per lane
Locations operating unacceptably are bolded.

LONG-TERM PLUS PROJECT LEVELS OF SERVICE AT INTERSECTIONS

Long-Term (2035) plus project traffic conditions were evaluated at the study intersections and are shown in **Figure 11**. As shown in **Table 15**, the project results in increased delay at some of the study intersections which did not function within acceptable standards even without the project. Intersections that did not meet acceptable standards without the project, and the project contributes more than one percent of the volume to the intersection are considered significant impacts. Additional detail is provided in the **Appendix**.

As shown in **Table 15**, all the study intersections satisfy operational standards, except at the following intersections during the Long-term (2035) Plus Project conditions:

- **#1 – Avila Road and Willow Pass Road (PM peak hour)**
  - PM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#3 – WB SR-4 Ramps and Willow Pass Road (AM peak hour)**
  - AM Peak: Operates at LOS F and increased in delay by five (5) seconds or more, **significant impact**.
- **#4 – Rio Verde Circle and San Marco Boulevard (AM peak hour)**
  - AM Peak: Worsened from LOS D to LOS F and increased in delay by five (5) seconds or more, **significant impact**.
- **#6 – W. Leland Road and San Marco Boulevard (AM and PM peak hours)**

    - AM Peak: Operates at LOS F and increased in delay by five (5) seconds or more, **significant impact**.
    - PM Peak: Operates at LOS F but increased in delay by less than five (5) seconds, not a significant impact.
- **#7 – EB SR-4 Ramps and San Marco Boulevard (AM and PM peak hours)**
    - AM Peak: Worsened from LOS D to LOS E and increased in delay by five (5) seconds or more, **significant impact**.
    - PM Peak: Operates at LOS E and increased in delay by five (5) seconds or more, **significant impact**.
- **#8 – WB SR-4 Ramps and San Marco Boulevard (AM peak hour)**
    - AM Peak: Operates at LOS F but increased in delay by less than five (5) seconds, not a significant impact.
- **#10 – Willow Pass Road and Bailey Road (AM and PM peak hours)**
    - AM Peak: Operates at LOS F but increased in delay by less than five (5) seconds, not a significant impact.
    - PM Peak: Operates at LOS F but increased in delay by less than five (5) seconds, not a significant impact.
- **#14 – Willow Pass Road and Railroad Avenue (AM peak hour)**
    - AM Peak: Operates at LOS E but increased in delay by less than five (5) seconds, not a significant impact.
- **#17 – W. Leland Road and Southwood Drive (AM peak hour)**
    - AM Peak: Operates at LOS F but increased in delay by less than five (5) seconds, not a significant impact.
- **#18 – W. Leland Road and Bailey Road (AM and PM peak hours)**
    - AM Peak: Operates at LOS F and increased in delay by five (5) seconds or more, **significant impact**.
    - PM Peak: Worsened from acceptable LOS E to unacceptable LOS F and increased in delay by five (5) seconds or more, **significant impact**.
- **#23 – W. Leland Road and Chestnut Drive (AM peak hour)**
    - AM Peak: Operates at LOS F but increased in delay by less than five (5) seconds, not a significant impact.
- **#24 – W. Leland Road and Jacqueline Drive (AM peak hour)**
    - AM Peak: Operates at LOS F but increased in delay by less than five (5) seconds, not a significant impact.
- **#26 – W. Leland Road and Range Road (AM peak hour)**
    - AM Peak: Operates at LOS E but increased in delay by less than five (5) seconds, not a significant impact.
- **#27 – W. Leland Road and Dover Way (AM peak hour)**
    - AM Peak: Operates at LOS F E but increased in delay by less than five (5) seconds, not a significant impact.
- **#28 – W. Leland Road and Burton Avenue (AM peak hour)**
    - AM Peak: Operates at LOS F and increased in delay by five (5) seconds or more, **significant impact**.
- **#29 – W. Leland Road and Crestview Drive (AM and PM peak hours)**
    - AM Peak: Operates at LOS F and increased in delay by five (5) seconds or more, **significant impact**.
    - PM Peak: Operates at LOS E but increased in delay by less than five (5) seconds, not a

significant impact.

- **#30 – W. Leland Road and Railroad Avenue (AM and PM peak hours)**
  - AM Peak: Operates at LOS F, decreased delay, not a significant impact.
  - PM Peak: Operates at LOS F, decreased delay, not a significant impact.
- **#31 – EB SR-4 Ramps and Railroad Avenue (PM peak hour)**
  - PM Peak: Operates at LOS F, decreased delay, not a significant impact.
- **#35 – Concord Boulevard and Bailey Road (AM and PM peak hours)**
  - AM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
  - PM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#36 – Bailey Road and Myrtle Drive (AM and PM peak hours)**
  - AM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
  - PM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#38 – Clayton Road and Farm Bureau Road (AM and PM peak hours)**
  - AM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
  - PM Peak: Operates at LOS F but no change in v/c, not a significant impact.
- **#39 – Clayton Road and Treat Boulevard (AM and PM peak hours)**
  - AM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
  - PM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#40 – Clayton Road and Bailey Road (AM peak hour)**
  - AM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#41 – Cowell Road and Treat Boulevard (AM and PM peak hours)**
  - AM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
  - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
- **#43 – Bailey Road and Project Entrance (AM peak hour)**
  - AM Peak: Worsened from LOS B to LOS F and increased in delay by five (5) seconds or more, **significant impact**.
- **#44 – Treat Boulevard and Oak Grove Road (AM and PM peak hours)**
  - AM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
  - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
- **#47 – Willow Pass Road and Galindo Street (PM peak hour)**
  - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
- **#48 – Concord Boulevard and Port Chicago Highway (AM peak hour)**
  - AM Peak: Operates at LOS F and increased in v/c by 0.03 or more, **significant impact**.
- **#49 – Kirker Pass Road and Oakhurst Drive/Concord Boulevard (AM and PM peak hours)**
  - AM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
  - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
- **#50 – Ygnacio Valley Road and Clayton Road (AM and PM peak hours)**
  - AM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.
  - PM Peak: Operates at LOS F but increased in v/c by less than 0.03, not a significant impact.

Table 15 – Long-Term (2035) Plus Project Intersection Level of Service Summary

#	Intersection	Delay Criteria[1]	Intersection Control[2]	Long-term (2035)						Long-term (2035) + Project									
				AM Peak			PM Peak			AM Peak					PM Peak				
				LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	Δ Delay	v/c	Δ v/c	LOS	Delay	Δ Delay	v/c	Δ v/c
1	Avila Road / Willow Pass Road	D	Signal	C	25.5	0.83	**F**	**104.6**	**1.10**	C	30.0	4.5	0.85	0.02	**F**	**121.7**	**17.1**	**1.16**	**0.06**
2	EB SR-4 Ramps / Willow Pass Road	E	Signal	B	11.7		C	24.9		B	12.0	0.3			C	26.3	1.4		
3	WB SR-4 Ramps / Willow Pass Road	E	Signal	**F**	**343.6**		B	15.9		**F**	**358.2**	**14.6**			B	16.6	0.7		
4	Rio Verde Circle / San Marco Boulevard	E	AWSC	D	32.3		A	9.2		**F**	**67.4**	**35.1**			B	13.8	4.6		
5	Santa Teresa Drive / San Marco Boulevard	D	Signal	C	34.5		B	18.5		D	46.6	12.1			B	18.3	-0.2		
6	Leland Road / San Marco Boulevard	D	Signal	**F**	**79.8**		**F**	**143.1**		**F**	**89.8**	**10.0**			**F**	**147.0**	**3.9**		
7	EB SR-4 Ramps / San Marco Boulevard	D	Signal	D	47.6		**E**	**56.3**		**E**	**62.3**	**14.7**			**E**	**78.6**	**22.3**		
8	WB SR-4 Ramps / San Marco Boulevard	D	Signal	**F**	**338.8**		C	30.4		**F**	**341.6**	**2.8**			C	32.0	1.6		
9	Willow Pass Road / Port Chicago Highway	D	Signal	B	13.6		B	11.0		B	13.9	0.3			B	11.2	0.2		
10	Willow Pass Road / Bailey Road	D	Signal	**F**	**146.6**		**F**	**110.6**		**F**	**146.9**	**0.3**			**F**	**111.6**	**1.0**		
11	Willow Pass Road / Loftus Road	D	Signal	C	27.7		B	19.0		C	27.8	0.1			B	19.2	0.2		
12	EB Willow Pass Road / Range Road	E	SSSC	A	6.9		A	9.1		A	7.2	0.3			A	9.3	0.2		
	Worst Approach			B	12.4		B	14.0		B	12.7	0.3			B	14.3	0.3		
13	WB Willow Pass Road / Range Road	E	SSSC	A	0.2		A	0.4		A	0.2	0.0			A	0.4	0.0		
	Worst Approach			A	0.6		A	0.6		A	0.6	0.0			A	0.7	0.1		
14	Willow Pass Road / Railroad Avenue	D	Signal	**E**	**58.0**		C	31.4		**E**	**58.2**	**0.2**			C	31.9	0.5		
15	Leland Road / Alves Ranch Drive	D	Signal	C	32.5		C	22.0		C	32.7	0.2			C	22.1	0.1		
16	Leland Road / Woodhill Drive	D	Signal	B	13.5		B	12.1		B	13.6	0.1			B	12.2	0.1		
17	Leland Road / Southwood Drive	D	Signal	**F**	**92.9**		D	47.0		**F**	**96.2**	**3.3**			D	47.9	0.9		
18	Leland Road / Bailey Road	E	Signal	**F**	**165.8**		E	66.8		**F**	**174.8**	**9.0**			**F**	**104.0**	**37.2**		
19	Maylard Street / Bailey Road	E	Signal	C	21.8		C	26.2		C	21.4	-0.4			C	26.5	0.3		
20	EB SR-4 Ramps / Bailey Road	E	Signal	C	24.9		D	41.6		C	24.6	-0.3			E	55.2	13.6		
21	WB SR-4 Ramps / Bailey Road	E	Signal	D	48.2		C	23.0		D	53.9	5.7			C	24.3	1.3		
22	Canal Road / Bailey Road	D	Signal	C	32.2		B	12.8		C	32.3	0.1			B	13.1	0.3		
23	Leland Road / Chestnut Drive	D	Signal	**F**	**230.4**		C	25.9		**F**	**232.3**	**1.9**			C	28.1	2.2		
24	Leland Road / Jacqueline Drive	D	Signal	**F**	**179.7**		C	27.6		**F**	**182.1**	**2.4**			C	27.3	-0.3		
25	Leland Road / Montevideo Drive	D	Signal	B	11.3		A	5.3		B	11.9	0.6			A	5.4	0.1		
26	Leland Road / Range Road	D	Signal	**E**	**70.0**		C	33.8		**E**	**72.4**	**2.4**			C	33.5	-0.3		
27	Leland Road / Dover Way	D	Signal	**F**	**83.8**		C	25.8		**F**	**87.3**	**3.5**			C	25.0	-0.8		
28	Leland Road / Burton Avenue	D	Signal	**F**	**95.7**		C	30.0		**F**	**115.5**	**19.8**			C	31.9	1.9		
29	Leland Road / Crestview Drive	D	Signal	**F**	**202.7**		**E**	**60.2**		**F**	**208.3**	**5.6**			**E**	**64.0**	**3.8**		
30	Leland Road / Railroad Avenue	D	Signal	**F**	**183.8**		**F**	**172.8**		**F**	**165.7**	**-18.1**			**F**	**171.2**	**-1.6**		
31	EB SR-4 Ramps / Railroad Avenue	D	Signal	C	27.6		**F**	**94.8**		C	27.9	0.3			**F**	**94.7**	**-0.1**		
32	WB SR-4 Ramps / Railroad Avenue	D	Signal	D	41.9		D	35.5		D	41.9	0.0			D	35.4	-0.1		
33	Willow Pass Road / Olivera Road	E	Signal	D	51.0	0.97	E	67.7	1.00	D	53.5	2.5	0.99	0.02	E	71.2	3.5	1.01	0.01
34	Concord Boulevard / Farm Bureau Road	D	Signal	D	47.4	0.96	D	36.1	0.90	D	49.6	2.2	0.99	0.03	D	37.3	1.2	0.93	0.03
35	Concord Boulevard / Bailey Road	D	Signal	**F**	**204.7**	**1.34**	**F**	**120.8**	**1.21**	**F**	**251.4**	**46.7**	**1.44**	**0.10**	**F**	**157.5**	**36.7**	**1.35**	**0.14**
36	Bailey Road / Myrtle Drive	D	SSSC	A	4.3	N/A	**F**	**281.4**	**1.59**	**F**	**231.8**	**227.5**	**N/A**	**N/A**	**F**	**379.8**	**98.4**	**1.93**	**0.34**
	Worst Approach			B	10.4	N/A	**F**	**OVRFL**	**3.33**	**F**	**OVRFL**	**N/A**	**N/A**	**N/A**	**F**	**OVRFL**	**N/A**	**N/A**	**N/A**
37	Clayton Road / Babel Lane	E	Signal	C	31.1	0.79	C	31.3	0.85	C	31.2	0.1	0.80	0.01	C	31.6	0.3	0.86	0.01
38	Clayton Road / Farm Bureau Road	E	Signal	**F**	**90.1**	**1.03**	**F**	**87.3**	**0.92**	**F**	**92.1**	**2.0**	**1.04**	**0.01**	**F**	**86.8**	**-0.5**	**0.92**	**0.00**
39	Clayton Road / Treat Boulevard	E	Signal	**F**	**83.5**	**0.98**	**F**	**102.2**	**1.04**	**F**	**89.0**	**5.5**	**0.99**	**0.01**	**F**	**122.7**	**20.5**	**1.08**	**0.04**
40	Clayton Road / Bailey Road	E	Signal	**F**	**198.6**	**1.28**	C	33.5	0.74	**F**	**229.4**	**30.8**	**1.37**	**0.09**	C	34.5	1.0	0.76	0.02
41	Cowell Road / Treat Boulevard	D	Signal	**F**	**89.8**	**1.02**	**F**	**124.5**	**1.20**	**F**	**96.0**	**6.2**	**1.04**	**0.02**	**F**	**129.0**	**4.5**	**1.22**	**0.02**
42	Leland Road / Santa Teresa Drive	D	Signal	A	9.2		A	7.1		B	12.2	3.0			A	8.1	1.0		
43	Bailey Road / Project Entrance	D	Signal	B	16.3		A	5.9		**F**	**129.4**	**113.1**			B	16.6	10.7		
44	Treat Boulevard / Oak Grove Road	E	Signal	**F**	**237.7**	**1.48**	**F**	**272.5**		**F**	**237.9**	**0.2**	**1.49**	**0.01**	**F**	**276.6**	**4.1**	**1.50**	**0.02**
45	Willow Pass Road / Diamond Boulevard	E	Signal	B	18.0	0.52	D	41.1	0.74	B	17.9	-0.1	0.52	0.00	D	41.2	0.1	0.75	0.01
46	Willow Pass Road / Market Street	E	Signal	D	40.6	0.89	D	49.5	1.01	D	40.7	0.1	0.90	0.01	D	49.8	0.3	1.02	0.01
47	Willow Pass Road / Galindo Street	E	Signal	D	54.7	0.84	**F**	**111.7**	**1.11**	D	54.4	-0.3	0.85	0.01	**F**	**111.8**	**0.1**	**1.13**	**0.02**
48	Concord Boulevard / Port Chicago Highway	E	Signal	**F**	**130.0**	**0.89**	C	23.1	0.60	**F**	**147.8**	**17.8**	**0.92**	**0.03**	C	24.2	1.1	0.62	0.02
49	Kirker Pass Road / Oakhurst Drive/Concord Boulevard	D	Signal	**F**	**699.3**	**1.24**	**F**	**336.6**	**1.05**	**F**	**693.9**	**-5.4**	**1.25**	**0.01**	**F**	**334.5**	**-2.1**	**1.06**	**0.01**
50	Ygnacio Valley Road / Clayton Road	E	Signal	**F**	**289.0**	**1.19**	**F**	**108.7**	**1.01**	**F**	**288.1**	**-0.9**	**1.20**	**0.01**	**F**	**110.2**	**1.5**	**1.01**	**0.00**

[1] For all intersections, the LOS criteria is based on seconds of delay.

[2] Each study intersection is controlled by a traffic signal, a side-street stop-controlled (SSSC), or a all-way stop-controlled (AWSC).

OVRFL - Intersection delay exceeds 500 seconds and is considered overflow.

Note: Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.

LONG-TERM PLUS PROJECT LEVELS OF SERVICE AT STUDY FREEWAY SEGMENTS

Traffic operations were evaluated at the study freeway segments under Long-term plus project traffic conditions. Freeway volumes for the Long-term plus Project scenario were calculated by adding the proposed project trips to the Long-term freeway volumes. **Table 16** shows the peak hour LOS and density for each freeway section in the study area. Significant impacts for freeway segments occur when the project worsens the level of service from an acceptable LOS to an unacceptable LOS or if the freeway segment operates unacceptably without the project and the project increases the density.

As shown in **Table 16**, all freeway segments satisfy the operational standards in the Long-term plus Project scenario, except for the following:

- NB SR-242 between the Concord Avenue diagonal on-ramp and Grant Street off-ramp in the AM peak hour
    - Not a Significant Impact
- NB SR-242 between Clayton Road off-ramp and SR-4 in the PM peak hour
    - **Significant Impact between Clayton Road off-ramp and Olivera Road off-ramp**
- EB SR-4 between I-680 on-ramp and SR-242 off-ramp in the PM peak hour
    - **Significant Impact**
- WB SR-4 between the SR-242 off-ramp and the Arnold Industrial Way off-ramp; and between the Arnold Industrial Way on-ramp and the I-680 off-ramp in the AM peak hour
    - Not a Significant Impact

Additional detail of the analysis is provided in the **Appendix**.

Table 16 – Long-term Plus Project Freeway Segment Level of Service Summary

Freeway Section	Segment Type	Criteria	Long-term (2035)						Long-term (2035) + Project					
			AM			PM			AM			PM		
		LOS	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*	LOS	d/c	Density (pc/mi/ln)*
Northbound														
SR-242 between I-680 and Clayton Road off-ramp	Diverge	E	A	0.15	6.2	C	0.68	24.7	A	0.16	6.4	C	0.70	24.6
SR-242 between Clayton Road off-ramp and Concord Avenue Loop on-ramp	Basic	E	A	0.15	6.3	**F**	**0.70**	**49.7**	A	0.16	6.6	**F**	**0.73**	**55.1**
SR-242 between Concord Avenue Loop on-ramp and Concord Avenue Diagonal on-	Merge	E	A	0.12	7.6	**F**	**0.53**	**85.1**	A	0.12	7.8	**F**	**0.54**	**91.1**
SR-242 between Concord Avenue Diagonal on-ramp and Grant Street off-ramp	Weaving	E	**F**	**1.34**	**45.0**	**F**	**0.81**	**83.2**	**F**	**1.34**	**45.0**	**F**	**0.83**	**84.0**
SR-242 between Grant Street off-ramp and Grant Street on-ramp	Basic	E	A	0.37	9.6	**F**	**0.83**	**83.8**	A	0.38	9.7	**F**	**0.85**	**84.4**
SR-242 between Grant Street on-ramp and Olivera Road off-ramp	Weaving	E	B	0.66	12.2	**F**	**0.74**	**102.7**	B	0.67	12.4	**F**	**0.76**	**102.9**
SR-242 between Olivera Road off-ramp and SR-4 off-ramp	Diverge	E	B	0.26	8.7	**F**	**1.27**	**14.1**	B	0.26	8.8	**F**	**1.31**	**14.1**
Southbound														
SR-242 between SR-4 on-ramp and Olivera Road on-ramp	Basic	F	F	1.04	48.9	C	0.69	21.2	F	1.07	49.3	C	0.70	22.0
SR-242 between Olivera Road on-ramp and Solano Way off-ramp	Weaving	F	C	0.90	26.6	B	0.61	18.0	C	0.93	26.5	B	0.62	18.4
SR-242 between Solano Way off-ramp and Solano Way on-ramp	Basic	F	F	0.75	71.0	B	0.50	14.6	F	0.77	62.4	B	0.51	15.0
SR-242 between Solano Way on-ramp and Concord Avenue off-ramp	Weaving	F	F	0.99	59.1	C	0.80	21.3	F	1.00	66.7	C	0.81	21.8
SR-242 between Concord Avenue off-ramp and Concord Avenue on-ramp	Basic	F	F	0.84	84.9	B	0.53	15.7	F	0.86	92.1	B	0.54	16.2
SR-242 between Concord Avenue on-ramp and Clayton Road on-ramp	Merge	F	F	0.87	98.4	B	0.56	17.2	F	0.90	100.1	B	0.57	17.7
SR-242 between Clayton Road on-ramp and I-680	Merge	F	F	1.36	22.4	C	0.69	21.7	F	1.40	22.4	C	0.70	22.3
Eastbound														
SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp	Diverge	E	B	0.42	12.2	**F**	**0.87**	**58.5**	B	0.41	12.7	**F**	**0.91**	**74.4**
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	A	0.31	9.2	**F**	**0.81**	**95.4**	A	0.32	9.5	**F**	**0.84**	**100.3**
SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp	Weaving	E	B	0.39	11.4	**F**	**0.97**	**84.8**	B	0.39	11.8	**F**	**1.01**	**91.2**
SR-4 between SR-242 off-ramp and Port Chicago Highway off-ramp	Diverge	F	A	0.23	8.1	F	0.88	98.4	A	0.24	8.4	F	0.91	99.3
SR-4 between Port Chicago Highway off-ramp and SR-242 on-ramp	Basic	F	A	0.17	5.9	F	0.84	118.5	A	0.18	6.3	F	0.88	118.9
SR-4 between SR-242 on-ramp and HOV Lane Begins	Weaving	F	B	0.48	10.1	F	5.21	45.0	B	0.50	10.8	F	5.42	45.0
SR-4 between HOV Lane Begins and Lane Drop	Basic	F	A	0.23	7.9	A	0.90	6.7	A	0.25	8.3	A	0.94	6.7
SR-4 between Lane Drop and Port Chicago Highway on-ramp	Basic	F	A	0.23	7.9	A	0.90	6.7	A	0.25	8.3	A	0.94	6.7
SR-4 between Port Chicago Highway on-ramp and Willow Pass Road off-ramp	Weaving	F	A	0.35	9.9	F	2.59	45.0	B	0.36	10.3	F	2.81	45.0
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	B	0.39	13.4	F	1.47	10.3	B	0.41	14.0	F	1.53	9.9
SR-4 between Willow Pass Road on-ramp and San Marco Blvd off-ramp	Weaving	F	B	0.68	13.9	F	4.15	45.0	B	0.70	14.5	F	4.58	45.0
SR-4 between San Marco Blvd off-ramp and San Marco Blvd Loop on-ramp	Basic	F	B	0.33	11.1	F	1.26	4.4	B	0.34	11.5	F	1.29	3.6
SR-4 between San Marco Blvd Loop on-ramp and San Marco Blvd Diagonal on-ramp	Merge	F	B	0.37	12.9	F	1.29	6.9	B	0.38	13.4	F	1.33	5.0
SR-4 between San Marco Blvd Diagonal on-ramp and Add Lane	Basic	F	B	0.37	11.6	F	1.29	6.1	B	0.38	12.1	F	1.33	5.3
SR-4 between Add Lane and Bailey Road Diagonal off-ramp	Diverge	F	B	0.32	10.9	A	0.97	6.6	B	0.33	11.3	F	1.00	4.9
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop on-ramp	Basic	F	A	0.28	8.9	A	0.86	2.9	A	0.29	9.1	A	0.88	2.9
SR-4 between Bailey Road Loop on-ramp and Bailey Road Diagonal on-ramp	Basic	F	B	0.33	11.2	F	1.05	0.0	B	0.34	11.5	F	1.07	0.0
SR-4 between Bailey Road Diagonal on-ramp and Add Lane	Basic	F	A	0.33	10.5	F	1.05	6.4	A	0.34	10.9	F	1.07	6.7
SR-4 between Add Lane and Railroad Avenue off-ramp	Diverge	F	A	0.33	11.0	A	0.93	1.8	A	0.35	11.7	A	0.95	4.6
Westbound														
SR-4 between Railroad Avenue on-ramp and Bailey Road Diagonal off-ramp	Diverge	F	F	0.95	86.6	B	0.49	14.7	F	0.95	89.2	B	0.50	15.1
SR-4 between Bailey Road Diagonal off-ramp and Bailey Road Loop off-ramp	Basic	F	F	0.88	86.5	B	0.41	11.5	F	0.89	86.1	B	0.43	11.9
SR-4 between Bailey Road Loop off-ramp and Bailey Road on-ramp	Basic	F	F	1.09	69.6	B	0.38	11.1	F	1.09	67.9	B	0.38	11.2
SR-4 between Bailey Road on-ramp and Lane Drop	Basic	F	F	0.82	85.0	A	0.28	7.9	F	0.82	85.1	A	0.29	8.0
SR-4 between Lane Drop and San Marco Boulevard off-ramp	Diverge	F	F	1.28	52.2	B	0.48	15.6	F	1.30	55.6	B	0.50	16.1
SR-4 between San Marco Boulevard off-ramp and Willow Pass Road Loop on-ramp	Basic	F	F	1.20	65.7	B	0.41	12.4	F	1.22	69.6	B	0.43	12.7
SR-4 between Willow Pass Road Loop on-ramp and San Marco Blvd Diagonal on-ramp	Basic	F	F	1.20	30.7	B	0.41	11.6	F	1.22	45.0	B	0.43	11.9
SR-4 between San Marco Blvd Diagonal on-ramp and Willow Pass Road off-ramp	Weaving	F	F	0.98	67.2	B	0.42	11.6	F	1.01	69.2	B	0.43	12.1
SR-4 between Willow Pass Road off-ramp and Willow Pass Road on-ramp	Basic	F	F	1.47	74.8	B	0.55	17.0	F	1.51	74.8	B	0.57	17.7
SR-4 between Willow Pass Road on-ramp and HOV Lane Add	Basic	F	F	1.47	31.9	B	0.55	15.9	F	1.51	32.0	B	0.57	16.7
SR-4 between HOV Lane Add and Add Lane	Basic	F	F	1.29	28.4	B	0.47	13.3	F	1.32	28.8	B	0.49	13.9
SR-4 between Add Lane and Port Chicago Highway off-ramp	Diverge	F	F	1.17	23.1	B	0.46	13.9	F	1.20	23.4	B	0.48	14.4
SR-4 between Port Chicago Highway off-ramp and SR-242 off-ramp	Basic	F	F	1.00	45.0	B	0.43	12.1	F	1.04	45.0	B	0.45	12.6
SR-4 between SR-242 off-ramp and Port Chicago Highway on-ramp	Basic	E	A	0.70	5.3	A	0.20	6.9	A	0.72	4.9	A	0.22	7.5
SR-4 between Port Chicago Highway on-ramp and SR-242 on-ramp	Merge	E	A	0.72	6.2	B	0.26	8.8	A	0.74	5.8	B	0.27	9.4
SR-4 between SR-242 on-ramp and Arnold Industrial Way off-ramp	Weaving	E	**F**	**1.39**	**45.0**	B	0.36	11.6	**F**	**1.49**	**45.0**	B	0.38	12.2
SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp	Basic	E	A	0.76	7.1	A	0.28	9.4	A	0.78	6.7	A	0.30	10.0
SR-4 between Arnold Industrial Way on-ramp and I-680 off-ramp	Weaving	E	**F**	**2.29**	**45.0**	B	0.35	12.4	**F**	**2.44**	**45.0**	B	0.37	13.0

* pc/mi/ln = passenger car per mile per lane

Locations operating unacceptably are bolded and significant project impacts are highlighted.

LONG-TERM PLUS PROJECT LEVELS OF SERVICE AT STUDY FREEWAY RAMPS

Traffic operations were evaluated at the study freeway ramps under Long-term plus project traffic conditions. Ramp volumes were calculated by adding the proposed project trips to the Long-term ramp volumes. **Table 17** shows the peak hour LOS and density for each freeway ramp in the study area. Significant impacts for freeway ramps occur when the project worsens the level of service from an acceptable LOS to an unacceptable LOS or if the freeway ramp operates unacceptably without the project and the project increases the density.

As shown in **Table 17**, all the freeway ramps operate under acceptable LOS. Additional detail of the analysis is provided in the **Appendix**.

Table 17 – Long-term Plus Project Freeway Ramp Level of Service Summary

Freeway Ramps	Criteria	Long-term (2035)				Long-term (2035) + Project			
		AM		PM		AM		PM	
	LOS	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*	LOS	Density (pc/mi/ln)*
Eastbound SR-4									
Willow Pass Rd Off-ramp	F	A	8.3	F	39.7	A	8.8	F	41.0
Willow Pass Rd On-ramp	F	B	11.9	F	35.4	B	12.1	F	36.5
San Marco Blvd Off-ramp	F	B	16.1	F	42.6	B	16.5	F	44.2
SB San Marco Blvd Loop On-ramp	F	B	10.1	D	33.5	B	10.3	D	34.3
NB San Marco Blvd Diagonal On-ramp	F	A	9.8	D	30.6	B	10.2	D	31.4
SB Bailey Rd Diagonal Off-ramp	F	A	9.6	D	29.4	B	10.0	D	30.6
NB Bailey Rd Loop Off-ramp	F	B	10.3	C	26.5	B	10.4	C	26.5
Bailey Rd On-ramp	F	B	14.3	E	35.5	B	15.2	E	36.0
Westbound SR-4									
NB Bailey Rd Diagonal Off-ramp	F	D	29.8	B	16.9	D	30.0	B	17.4
SB Bailey Rd Loop Off-ramp	F	C	25.7	C	21.7	C	26.0	C	22.8
Bailey Rd On-ramp	F	E	36.3	B	16.5	E	37.3	B	17.2
San Marco Blvd Off-ramp	F	D	32.2	B	17.9	D	32.8	B	18.3
NB San Marco Blvd Loop On-ramp	F	E	36.1	C	23.4	E	37.7	C	24.1
SB San Marco Blvd Diagonal On-ramp	F	F	44.6	C	20.1	F	46.4	C	20.5
Willow Pass Rd Off-ramp	F	D	34.0	B	20.0	E	35.3	C	20.6
Willow Pass Rd On-ramp	F	F	56.9	C	23.2	F	59.9	C	24.1

* pc/mi/ln = passenger car per mile per lane

Locations operating unacceptably are bolded and significant project impacts are highlighted.

7. MTSO'S FOR ALL SCENARIOS

Multi-modal transportation service objectives (MTSO's) were analyzed for all the analysis scenarios. In Contra Costa County, there are action plans for each region (East County and Central County for this project) that describe the MTSO's that are needed to be analyzed. **Table 3** on page 4 lists the MTSO's for the East County and **Table 4** on page 5 lists the MTSO's for the Central County.

DELAY INDEX

The delay index (DI) is defined as the ratio between the peak congested travel time and the uncongested travel time along a roadway facility. The DI criteria for each roadway facility are listed in **Tables 3 and 4**. It should be noted that the delay index only pertains to the freeway segments in the Central and East Counties. The delay index for the freeway segments was calculated using HCS7 software using HCM 6th Edition methodology, consistent with the freeway analysis. Travel times were determined under peak congestion and also under uncongested conditions.

Table 18 summarizes the delay index for the freeways in the study area.

All freeway study segments meet the delay index criteria, except for the following locations:

- EB SR-4 in the East County operates at a delay index of 5.1 in the PM peak hour in the Existing conditions and the addition of project traffic increases the delay index to 5.4 (criteria = 2.5 or better) – **Significant Impact**
- EB SR-4 in the East County operates at a delay index of 7.9 in the PM peak hour in the Long-term conditions and the addition of project traffic increases the delay index to 8.7 (criteria = 2.5 or better) – **Significant Impact**
- WB SR-4 in the East County operates at a delay index of 3.0 in the AM peak hour in the Existing conditions and the addition of project traffic results in the same delay index of 3.0 (criteria = 2.5 or better) – Not a Significant Impact
- WB SR-4 in the East County operates at a delay index of 3.3 in the AM peak hour in the Long-term conditions and the addition of project traffic increases the delay index to 3.4 (criteria = 2.5 or better) – **Significant Impact**
- EB SR-4 in the Central County operates at a delay index of 6.2 in the PM peak hour in the Long-term conditions and the addition of project traffic increases the delay index to 6.7 (criteria = 5.0 or better) – **Significant Impact**
- NB SR-242 in the Central County operates at a delay index of 3.4 in the PM Peak hour in the Existing conditions and the addition of project traffic increases the delay index to 3.5 (criteria = 3.0 or better) – **Significant Impact**
- NB SR-242 in the Central County operates at a delay index of 3.4 in the in the PM peak hour in the Long-term conditions and the addition of project traffic increases the delay index to 3.5 (criteria = 3.0 or better) – **Significant Impact**

Table 18 – Delay Index Summary

County	Roadway Segment	Distance (mi)	Uncongested Travel Time (sec)		Existing				Existing + Project				Long-term				Long-term + Project			
					AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			AM Peak	PM Peak	CTT (sec)	DI	CTT (sec)	DI	CTT (sec)	DI	CTT (sec)	DI	CTT (sec)	DI	CTT (sec)	DI	CTT (sec)	DI	CTT (sec)	DI
East	Eastbound SR-4	2.99	2.39	2.39	2.58	1.1	12.15	**5.1**	2.59	1.1	12.82	**5.4**	2.65	1.1	18.90	**7.9**	2.65	1.1	20.78	**8.7**
	Westbound SR-4	3.53	2.82	2.82	8.35	**3.0**	2.93	1.0	8.52	**3.0**	2.93	1.0	9.30	**3.3**	2.94	1.0	9.68	**3.4**	2.95	1.0
Central	Eastbound SR-4	4.43	3.55	3.55	4.10	1.2	12.38	3.5	4.11	1.2	12.49	3.5	3.94	1.1	22.09	**6.2**	3.94	1.1	23.76	**6.7**
	Westbound SR-4	3.63	2.90	2.90	5.51	1.9	3.17	1.1	5.79	2.0	3.18	1.1	11.29	3.9	3.13	1.1	12.30	4.2	3.13	1.1
	Northbound SR-242	2.50	2.00	2.00	2.41	1.2	6.70	**3.4**	2.40	1.2	6.90	**3.5**	2.99	1.5	6.80	**3.4**	2.98	1.5	7.09	**3.5**
	Southbound SR-242	2.23	1.78	1.78	4.47	2.5	1.97	1.1	4.64	2.6	1.97	1.1	5.80	**3.3**	2.02	1.1	5.90	**3.3**	2.03	1.1

Note: CTT = Congested Travel Time
Locations operating unacceptably are bolded.

AVERAGE SPEED, AVERAGE STOPPED DELAY, LOS, VOLUME TO CAPACITY, HOV USAGE

Other MTSO's analyzed per the CCTA established criteria include average speed, average stopped delay, arterial LOS, volume to capacity, and HOV usage.

For arterial roadways, the average speed is determined from the Synchro analysis. The only roadway corridor that has a specified average speed threshold is Clayton Road with an average speed of 15 mph or better. There are no specific standards mentioned for average speeds for the other corridors and therefore the speeds are used for comparison purposes only.

The average stopped delay is determined from the Synchro analysis for each arterial roadway and is measured in the number of cycle lengths to clear the intersection. This was calculated by taking the average intersection delay divided by the cycle length, resulting in the number of cycles for a vehicle to get through the intersection. The specified average stopped delay threshold is lasted in **Table 4.**

The arterial roadway LOS is determined from the Synchro analysis for each roadway. There are no specified arterial LOS for each of the listed roadways. Instead, the LOS threshold is listed for specific intersections. Therefore, the arterial LOS are used for comparison purposes only.

The volume to capacity (v/c) is the ratio of the traffic volume on a specified corridor to the corridor's operational capacity. The capacity for each roadway is mentioned in the CCTA Countywide Travel Demand Model. The v/c thresholds are only mentioned for Treat Boulevard and Ygnacio Valley Road/Kirker Pass Road. Therefore, the v/c ratios for the other corridors are used for comparison purposes only.

The HOV usage is determined by the Caltran's HOV lane utilization report. The most recent version of this report that includes the study corridors is from 2010. Future HOV lane usage was determined by using the CCTA model to estimate the future growth rate for the HOV lane and applying that rate to the existing HOV volume. The same vehicle occupancy percentages in 2010 were assumed for the future scenario to determine the persons in vehicle using the HOV lane. The HOV lane utilization shall exceed 600 vehicles per lane in the peak direction during the peak hour.

Table 19 summarizes the MTSO's listed above for the routes of regional significance in the Central County.

Table 19 – MTSO's Summary – Central County

Corridor	Measure of Effectiveness	Direction/ Cross-Street	Threshold	Existing		Existing + Project		Long-term		Long-term + Project	
				AM	PM	AM	PM	AM	PM	AM	PM
Bailey Road	Average Speed (mph)	NB	None	18	18	18	13	18	15	17	12
		SB	None	21	20	22	20	22	20	22	20
	Average Stopped Delay	Concord Blvd	3.0	0.3	0.3	0.5	0.5	1.2	0.8	1.7	1.0
		Clayton Rd	3.0	0.2	0.2	0.3	0.2	1.4	0.2	1.6	0.2
	LOS	NB	None	D	D	D	E	D	D	D	E
		SB	None	C	C	C	C	C	C	C	C
	v/c	NB	None	0.19	0.53	0.22	0.60	0.20	0.55	0.23	0.62
		SB	None	0.55	0.41	0.63	0.45	1.10	0.45	1.18	0.49
Clayton Road	Average Speed (mph)	EB	15	30	29	30	29	30	28	30	28
		WB	15	31	29	29	28	22	27	22	27
	Average Stopped Delay	Bailey Rd	3.0	0.2	0.2	0.3	0.2	1.4	0.2	1.6	0.2
		Ygnacio Valley Rd	3.0	0.3	0.3	0.3	0.3	1.9	0.7	1.9	0.7
		Treat Blvd	3.0	0.3	0.4	0.3	0.4	0.6	0.7	0.6	0.9
	LOS	EB	None	B	B	B	B	B	B	B	B
		WB	None	B	B	B	B	D	B	D	C
	v/c	EB	None	0.24	0.68	0.25	0.68	0.29	0.82	0.30	0.83
		WB	None	0.68	0.35	0.75	0.35	0.75	0.45	0.76	0.45
Treat Boulevard	Average Speed (mph)	NB	None	27	28	26	27	27	22	27	21
		SN	None	26	28	25	28	23	27	21	26
	Average Stopped Delay	Clayton Rd	3.0	0.3	0.4	0.3	0.4	0.6	0.7	0.6	0.9
		Cowell Rd	5.0	0.5	0.5	0.5	0.6	0.6	0.9	0.6	0.9
		Oak Grove Rd	5.0	0.4	0.5	0.4	0.7	1.6	1.9	1.6	2.0
	LOS	NB	None	C	C	C	C	C	D	C	D
		SB	None	B	B	B	B	C	B	C	B
	v/c	NB	1.5	0.24	0.89	0.25	0.91	0.42	1.01	0.43	1.04
		SB	1.5	0.81	0.33	0.83	0.35	0.89	0.59	0.91	0.60
Ygnacio Valley Rd	Average Speed (mph)	NB	None	18	3	18	3	17	3	17	3
		SB	None	16	29	15	29	14	23	14	23
	Average Stopped Delay	Clayton Rd	3.0	0.3	0.3	0.3	0.3	1.9	0.7	1.9	0.7
	LOS	NB	None	D	F	D	F	D	F	D	F
		SB	None	E	B	E	B	E	C	E	C
	v/c	NB	1.50	0.20	0.73	0.20	0.74	0.30	0.91	0.30	0.92
		SB	1.50	0.68	0.28	0.68	0.28	0.82	0.39	0.83	0.40

Note: Roadway segments that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.
v/c = volume-to-capacity ratio

BAILEY ROAD

As shown in **Table 19**, the average speed on northbound Bailey Road is 13 mph or greater in the Existing and Existing plus Project scenarios. For southbound Bailey Road the average speed is 20 mph or greater in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the average speeds for northbound Bailey Road are 12 mph or greater and for southbound Bailey Road are 20 mph or better. In the Central County Action Plan, Bailey Road does not have a specified average speed threshold. Therefore, these values are listed for comparison purposes only.

The average stopped delay for the intersection of Bailey Road and Concord Boulevard is 1.7 cycles or less for all scenarios. This meets the established criteria of three cycles of better for this intersection. The average stopped delay for the intersection of Bailey Road and Clayton Road is 1.6 cycles or less for all scenarios. This meets the established criteria of three cycles of better for this intersection.

The arterial LOS on northbound Bailey Road is LOS E or better for all scenarios and on southbound Bailey Road is LOS C for all scenarios. Since there is no LOS threshold specified, these values are listed for comparison purposes only.

The volume to capacity ratio on northbound Bailey Road is 0.60 or less for the Existing and Existing plus Project scenarios. For southbound Bailey Road the v/c ratio is 0.63 or less in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the v/c ratio for northbound

Bailey Road is 0.62 or less. In the Long-term and Long-term plus project scenarios, the v/c ratio for southbound Bailey Road is 1.18 or less. Since there is no v/c threshold specified, these values are listed for comparison purposes only.

CLAYTON ROAD

As shown in **Table 19**, the average speed on eastbound Clayton Road is 29 mph or greater in the Existing and Existing plus Project scenarios. For westbound Clayton Road the average speed is 28 mph or greater in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the average speeds for eastbound Clayton Road are 28 mph or greater and for westbound Clayton Road are 22 mph or better. In the Central County Action Plan, the specified average speed threshold is 15 mph. Therefore, these segments meet the thresholds.

The average stopped delay for the intersection of Clayton Road and Bailey Road is 1.6 cycles or less for all scenarios. This meets the established criteria of three cycles of better for this intersection. The average stopped delay for the intersection of Clayton Road and Ygnacio Valley Road is 1.9 cycles or less for all scenarios. This meets the established criteria of three cycles of better for this intersection. The average stopped delay for the intersection of Clayton Road and Treat Boulevard is 0.9 cycles or less for all scenarios. This meets the established criteria of three cycles of better for this intersection.

The arterial LOS on eastbound Clayton Road is LOS B for all scenarios and on westbound Clayton Road is LOS D or better for all scenarios. Since there is no LOS threshold specified, these values are listed for comparison purposes only.

The volume to capacity ratio on eastbound Clayton Road is 0.68 or less for the Existing and Existing plus Project scenarios. For westbound Clayton Road the v/c ratio is 0.75 or less in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the v/c ratio for eastbound Clayton Road is 0.83 or less. In the Long-term and Long-term plus project scenarios, the v/c ratio for westbound Clayton Road is 0.76 or less. Since there is no v/c threshold specified, these values are listed for comparison purposes only.

TREAT BOULEVARD

As shown in **Table 19**, the average speed on northbound Treat Boulevard is 26 mph or greater in the Existing and Existing plus Project scenarios. For southbound Treat Boulevard the average speed is 25 mph or greater in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the average speeds for northbound Treat Boulevard are 21 mph or greater and for southbound Treat Boulevard are 21 mph or better. In the Central County Action Plan, Treat Boulevard does not have a specified average speed threshold. Therefore, these values are listed for comparison purposes only.

The average stopped delay for the intersection of Treat Boulevard and Clayton Road is 0.9 cycles or less for all scenarios. This meets the established criteria of three cycles of better for this intersection. The average stopped delay for the intersection Treat Boulevard and Cowell Road is 0.9 cycles or less for all scenarios. This meets the established criteria of five cycles of better for this intersection. The average stopped delay for the intersection Treat Boulevard and Oak Grove Road is 1.9 cycles or less for all scenarios. This meets the established criteria of five cycles of better for this intersection.

The arterial LOS on northbound Treat Boulevard is LOS D or better for all scenarios and on southbound Treat Boulevard is LOS C for all scenarios. Since there is no LOS threshold specified, these values are listed for comparison purposes only.

The volume to capacity ratio on northbound Treat Boulevard is 0.91 or less for the Existing and Existing plus Project scenarios. For southbound Treat Boulevard the v/c ratio is 0.83 or less in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the v/c ratio for northbound Treat Boulevard is 1.04 or less. In the Long-term and Long-term plus project scenarios, the v/c ratio for southbound Treat Boulevard is 0.91 or less. Since there is no v/c threshold specified, these values are listed for comparison purposes only.

YGNACIO VALLEY ROAD

As shown in **Table 19**, the average speed on northbound Ygnacio Valley Road is 3 mph or greater in the Existing and Existing plus Project scenarios. For southbound Ygnacio Valley Road the average speed is 15 mph or greater in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the average speeds for northbound Ygnacio Valley Road are 3 mph or greater and for southbound Ygnacio Valley Road are 14 mph or better. In the Central County Action Plan, Ygnacio Valley Road does not have a specified average speed threshold. Therefore, these values are listed for comparison purposes only.

The average stopped delay for the intersection of Ygnacio Valley Road and Clayton Road is 1.9 cycles or less for all scenarios. This meets the established criteria of three cycles of better for this intersection.

The arterial LOS on northbound Ygnacio Valley Road is LOS F or better for all scenarios and on southbound Ygnacio Valley Road is LOS E for all scenarios. Since there is no LOS threshold specified, these values are listed for comparison purposes only.

The volume to capacity ratio on northbound Ygnacio Valley Road is 0.74 or less for the Existing and Existing plus Project scenarios. For southbound Ygnacio Valley Road the v/c ratio is 0.68 or less in the Existing and Existing plus Project scenarios. In the Long-term and Long-term plus project scenarios, the v/c ratio for northbound Ygnacio Valley Road is 0.92 or less. In the Long-term and Long-term plus project scenarios, the v/c ratio for southbound Ygnacio Valley Road is 0.83 or less. Since there is no v/c threshold specified, these values are listed for comparison purposes only.

SR-4

HOV lane usage was observed for SR-4 within the study corridor. **Table 20** summarizes the persons using the HOV lane in the peak direction for each scenario.

Table 20 – HOV Lane Summary – SR-4

Scenario	Peak	Direction	Vehicles using HOV Lane	Persons using HOV Lane
Existing	AM	WB	1,755	3,608
	PM	EB	703	1,470
Existing + Project	AM	WB	1,823	3,747
	PM	EB	737	1,539
Long-Term (2035)	AM	WB	2,001	4,109
	PM	EB	1,612	3,328
Long-Term (2035) + Project	AM	WB	2,001	4,109
	PM	EB	1,646	3,397

As shown in **Table 20**, the number of vehicles in the HOV lane exceeds the 600-vehicle utilization goal for each peak direction and scenario.

MTSO SUMMARY

The specified thresholds for all the MTSO's for the roadways within the study area are met, except for the delay indices for the freeways mentioned. In many cases, there were no specified thresholds, and therefore those values were shown for comparison purposes.

8. POTENTIAL EFFECTS ON TRANSIT, BICYCLE, AND PEDESTRIAN MOBILITY

The project was evaluated to determine if it would likely conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks) or generate pedestrian, bicycle, or transit travel demand that would not be accommodated by transit, bicycle, or pedestrian facilities and plans.

Due to the remote nature of the Faria Annexation residential development, residents have the option of driving or bicycling, but most would likely drive. There are no existing transit routes adjacent to the proposed project entrances along San Marco Boulevard, Bailey Road, or Avila Road. But the Pittsburg BART station is approximately two miles from the project entrances, and some residents would likely drive to BART and commute from this BART Station.

According to the 2011-2015 U.S. Census[4], 10.5 percent of Pittsburg residents use transit to travel to work. This typically represents the highest level of transit ridership during the day. However, there are no transit routes providing access to the proposed project site, so it is not anticipated that residents would use the transit facilities. Therefore, the project impact on the transit service is determined to be less than significant.

There are existing sidewalks on San Marco Boulevard near the proposed project entrance which would provide pedestrian connectivity to the adjacent land uses along San Marco Boulevard. There are no pedestrian facilities along Avila Road, but there are also few destinations for pedestrians along Avila Road. Along Bailey Road, near the proposed project entrance, there are no pedestrian facilities, but there are also no nearby destinations that pedestrians would want to access.

Cyclists would be able to access the residential development using the proposed bike lanes along San Marco Boulevard between Rio Verde Circle and Bailey Road. There exists a Class I bike path parallel to San Marco Boulevard from Rio Verde Circle to El Cajon Court. However, there remains a gap between El Cajon Court and W Leland Road with no bicycle facilities. If this gap were fixed, the bicycle facilities would provide connectivity to the existing bike lanes along W. Leland Road from San Marco Boulevard to Burton Avenue. There are not anticipated to be bicycle facilities at the other two proposed project entrances.

[4] *American Factfinder*, U.S. Census Bureau, 2013.

9. SITE ACCESS AND CIRCULATION

The Faria Annexation project is in its preliminary planning stage and does not have a detailed site plan. Therefore, on-site circulation and access was not evaluated.

There are three access points for the project that would connect to existing streets: along San Marco Boulevard, along Bailey Road, and along Santa Teresa Drive to W. Leland Road in the future. The access along Bailey Road would be a signalized intersection with full access. The access along San Marco Boulevard connects to the existing dead end just south of Rio Verde Circle. The operations of the signalized intersections are discussed in the intersection level of service sections for each scenario.

10. SUMMARY OF IMPACTS AND RECOMMENDED MITIGATION

Based on the results of the traffic analysis the following impacts are noted. Impacts are identified as being significant unless mitigated.

The intersections which require mitigation are listed below:

- #1 – Avila Road/Willow Pass Road – (Long-term plus Project only)
- #2 – EB SR-4 Ramps/Willow Pass Road – (Existing plus Project only)
- #3 – WB SR-4 Ramps/Willow Pass Road – (Existing plus Project, Long-term plus Project)
- #4 – Rio Verde Circle/San Marco Boulevard – (Long-term plus Project only)
- #6 – W. Leland Road/San Marco Boulevard – (Existing plus Project, Long-term plus Project)
- #7 – EB SR-4 Ramps/San Marco Boulevard – (Long-term plus Project only)
- #8 – WB SR-4 Ramps/San Marco Boulevard – (Existing plus Project only)
- #18 – W. Leland Road/Bailey Road – (Long-term plus Project)
- #28 – W. Leland Road/Burton Avenue – (Long-term plus Project only)
- #29 – W. Leland Road/Crestview Drive – (Long-term plus Project)
- #35 – Concord Boulevard/Bailey Road – (Existing plus Project, Long-term plus Project)
- #36 – Bailey Road/Myrtle Drive – (Existing plus Project, Long-term plus Project)
- #39 – Clayton Road/Treat Boulevard – (Long-term plus Project)
- #40 – Clayton Road/Bailey Road – (Long-term plus Project only)
- #43 – Bailey Road/Project Entrance – (Long-term plus Project)
- #48 – Concord Boulevard/Port Chicago Highway – (Long-term plus Project)

The freeway segments which require mitigation are listed below:

- NB SR-242 between Clayton Road off-ramp and Olivera Road off-ramp – (Existing plus Project, Long-term plus Project)
- EB SR-4 between I-680 on-ramp and Arnold Industrial Way off-ramp – (Long-term plus Project)
- EB SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp – (Existing plus Project, Long-term plus Project)
- EB SR-4 between Arnold Industrial Way on-ramp and SR-242 off-ramp – (Long-term plus Project)

There are no freeway ramps which require mitigation.

SIGNIFICANT UNLESS MITIGATED

EXISTING PLUS PROJECT MITIGATIONS

Impacts #1 through #6 are intersection impacts that occur in the Existing plus Project scenario. **Table 21** on page 57 shows the Existing, Existing plus Project, and mitigated Existing plus Project levels of service and delays. **Impacts #7 through #8** are freeway related impacts.

Impact 1: Intersection Existing Plus Project (Intersection #2)

The EB SR-4 Ramps/Willow Pass Road intersection operates at LOS E during the PM peak hour, which is acceptable under the Existing condition. The intersection would then worsen to an unacceptable LOS F due to the proposed project. This is a significant impact.

Mitigation 1

To mitigate the project impacts expected to occur in the Existing plus Project condition, the intersection should be signalized, a southbound left turn lane should be added, the shared southbound through-left lane should be restriped to be a through lane, and the eastbound approach should be restriped to be an eastbound left turn lane and a shared eastbound through-right lane. The intersection meets the peak hour traffic signal warrant in the Existing plus Project scenario. As shown in **Table 21**, the proposed mitigation is anticipated to improve the operations at the EB SR-4 Ramps/Willow Pass Road intersection to LOS B in the PM peak hour. The intersection would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg and thereby would reduce the impact to less than significant.

Since the mitigation is already planned in the Capital Improvement Program for the 2015 Update to the Contra Costa CMP (Project 1028), although no funding sources have been identified, the project shall pay its fair-share fee. In addition, there is no timeframe for the completion of this project. Modifying the intersection would reduce the impact to less than significant.

Impact 2: Intersection Existing Plus Project (Intersection #3)

The WB SR-4 Ramps/Willow Pass Road intersection operates at LOS F during the AM peak hour, which is unacceptable under the Existing condition. The intersection would experience an increase in delay by five (5) seconds or more during the AM peak hour due to the proposed project. This is a significant impact.

Mitigation 2

To mitigate the project impacts expected to occur in the Existing plus Project condition, the intersection should be signalized, a northbound left turn lane should be added, the northbound shared through-left turn lane should be restriped to be a through lane, and the westbound approach should be restriped to be two westbound left turn lanes and a shared westbound through-right lane. The intersection meets the peak hour traffic signal warrant in the Existing plus Project scenario. As shown in **Table 21**, the proposed mitigation is anticipated to improve the operations at the WB SR-4 Ramps/Willow Pass Road intersection to LOS E in the AM peak hour. The intersection would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg, but would operate at better than without project conditions and thereby would reduce the impact to less than significant.

Since the mitigation is already planned in the Capital Improvement Program for the 2015 Update to the Contra Costa CMP (Project 1028), although no funding sources have been identified, the project shall pay its fair-share fee. In addition, there is no timeframe for the completion of this project. Modifying the intersection would reduce the impact to less than significant.

Impact 3: Intersection Existing Plus Project (Intersection #6)

The W. Leland Road/San Marco Boulevard intersection operates at LOS F during the AM peak hour, which is unacceptable under the Existing condition. The intersection would increase in delay by five (5) seconds or more with the addition of the proposed project. This is a significant impact.

Mitigation 3

To mitigate the project impacts expected to occur in the Existing plus Project condition, the WB SR-4 loop on-ramp from NB San Marco Boulevard would need to be modified. There is currently ramp metering implemented for this on-ramp in the AM peak period. This results in on-ramp queues that extend onto NB San Marco Boulevard and onto WB Leland Road. Even if there were no ramp metering at this location, the on-ramp volume and freeway volumes at this location are high enough to cause this congestion. Therefore, there is no feasible solution to this LOS impact. As shown in **Table 21**, the operations at the W. Leland Road/San Marco Boulevard intersection would continue to operate at an unacceptable LOS F in the AM peak hour. In addition, any improvements would involve cooperation with Caltrans and could not be guaranteed by the City of Pittsburg. Therefore, the impact would be **Significant and Unavoidable**.

Impact 4: Intersection Existing Plus Project (Intersection #8)

The WB SR-4 Ramps/San Marco Boulevard intersection operates at LOS F during the AM peak hour, which is unacceptable under the Existing condition. The intersection would increase in delay by five (5) seconds or more with the addition of the proposed project. This is a significant impact.

Mitigation 4

To mitigate the project impacts expected to occur in the Existing plus Project condition, the WB SR-4 diagonal on-ramp from SB San Marco Boulevard would need to be modified. There is currently ramp metering implemented for this on-ramp in the AM peak period. This results in on-ramp queues that extend onto SB San Marco Boulevard and onto WB Willow Pass Road. Even if there were no ramp metering at this location, the on-ramp volume and freeway volumes at this location are high enough to cause this congestion. Therefore, there is no feasible solution to this LOS impact. As shown in **Table 21**, the operations at the WB SR-4 Ramps/San Marco Boulevard intersection would continue to operate at an unacceptable LOS F in the AM peak hour. In addition, any improvements would involve cooperation with Caltrans and could not be guaranteed by the City of Pittsburg. Therefore, the impact would be **Significant and Unavoidable**.

Impact 5: Intersection Existing Plus Project (Intersection #35)

The Concord Boulevard/Bailey Road intersection operates at LOS E during the AM and PM peak hours, which is unacceptable under the Existing condition. The intersection would degrade to LOS F during the AM and PM peak hours due to the proposed project with an increase in v/c by 0.03 or more. This is a significant impact.

Mitigation 5

To mitigate the project impacts expected to occur in the Existing plus Project condition, the southbound approach should be widened and restriped to include a southbound left turn lane, a southbound through lane, and a southbound right turn lane. The northbound approach should be widened to be a northbound left turn lane and a shared through-right turn lane. In addition, the northbound and southbound approach should be modified from split phasing to protected phasing. Each intersection approach cannot be further widened due to the available right-of-way and adjacent properties. As shown in **Table 21**, the proposed mitigation is anticipated to improve the operations at the Concord Boulevard/Bailey Road intersection to LOS E in the AM and PM peak hours. In both the AM and PM peak hour, the v/c is still increased by 0.03 or more with the mitigation and therefore this remains a significant impact.

Since the mitigation is already planned in the Concord CIP (Project 2049), the project shall pay its fair-share fee. The funding identified for this project is from traffic mitigation fees, grant funds, and Concord-owned ROW. The impact still remains even with the mitigation in both the AM and PM peak hours, therefore the impact remains as **Significant and Unavoidable**.

Impact 6: Intersection Existing Plus Project (intersection #36)

The Bailey Road/Myrtle Drive intersection operates at LOS F on the worst approach during the AM peak hour, which is unacceptable under the Existing condition. The intersection would increase in v/c by 0.03 or more with the proposed project. This is a significant impact.

Mitigation 6

To mitigate the project impacts expected to occur in the Existing plus Project condition, the intersection should be signalized, a southbound left turn lane should be added, and the shared southbound through-left lane should be restriped to be a through lane. It should be noted that the intersection does not meet the peak hour traffic signal warrant in the Existing plus Project scenario (two vehicles less than the threshold on the minor street approach), but does meet the warrant in the Long-term scenario. As shown in **Table 21**, the proposed mitigation is anticipated to improve the operations at the Bailey Road/Myrtle Drive intersection to LOS B in the AM peak hour. The intersection would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord and thereby would reduce the impact to less than significant.

Since the mitigation is already planned in the Concord CIP (Project 2049), the project shall pay its fair-share fee. The funding identified for this project is from traffic mitigation fees, grant funds, and Concord-owned ROW. In addition, there is no timeframe for the completion of this project. Modifying the intersection would reduce the impact to less than significant.

Table 21 – Existing Plus Project (Mitigated) Intersection Level of Service Summary

#	Intersection	Delay Criteria[1]	Intersection Control[2]	Existing						Existing + Project										Existing + Project (Mitigated)									
				AM Peak			PM Peak			AM Peak					PM Peak					AM Peak					PM Peak				
				LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	ΔDelay	v/c	Δv/c	LOS	Delay	ΔDelay	v/c	Δv/c	LOS	Delay	ΔDelay	v/c	Δv/c	LOS	Delay	ΔDelay	v/c	Δv/c
1	Avila Road / Willow Pass Road	D	SSSC	A	0.1	0.37	A	0.5	0.47	A	0.2	0.1	0.38	0.01	A	0.6	0.1	0.48	0.01										
	Worst Approach			*B*	*10.5*	*0.03*	*C*	*23.8*	*0.13*	B	10.6	0.1	0.03	0.00	D	29.5	5.7	0.14	0.01										
2	EB SR-4 Ramps / Willow Pass Road	E	AWSC	E	38.5		E	42.9		E	47.9	9.4			**F**	**50.8**	**7.9**								B	10.7	-32.2		
3	WB SR-4 Ramps / Willow Pass Road	E	AWSC	**F**	**143.6**		C	19.2		**F**	**165.4**	**21.8**			C	22.7	3.5			**E**	**66.2**	**-77.4**							
4	Rio Verde Circle / San Marco Boulevard	E	AWSC	B	11.9		A	8.2		C	24.5	12.6			B	12.3	4.1												
5	Santa Teresa Drive / San Marco Boulevard	D	Signal	C	28.3		B	15.9		D	37.7	9.4			B	15.0	-0.9												
6	Leland Road / San Marco Boulevard	D	Signal	**F**	**245.0**		C	32.3		**F**	**298.4**	**53.4**			C	33.4	1.1			**F**	**298.4**	**53.4**							
7	EB SR-4 Ramps / San Marco Boulevard	D	Signal	A	9.5		B	13.7		B	12.3	2.8			C	23.8	10.1												
8	WB SR-4 Ramps / San Marco Boulevard	D	Signal	**F**	**168.2**		B	18.5		**F**	**173.3**	**5.1**			B	19.8	1.3			**F**	**173.3**	**5.1**							
9	Willow Pass Road / Port Chicago Highway	D	Signal	B	15.8		B	11.0		B	16.5	0.7			B	11.1	0.1												
10	Willow Pass Road / Bailey Road	D	Signal	C	27.9		D	39.8		C	28.1	0.2			D	40.0	0.2												
11	Willow Pass Road / Loftus Road	D	Signal	**F**	**107.2**		C	24.5		**F**	**108.4**	**1.2**			C	25.3	0.8												
12	EB Willow Pass Road / Range Road	E	SSSC	A	5.5		A	6.6		A	5.8	0.3			A	6.7	0.1												
	Worst Approach			*B*	*11.1*		*B*	*11.5*		B	11.3	0.2			B	11.6	0.1												
13	WB Willow Pass Road / Range Road	E	SSSC	A	0.2		A	0.5		A	0.2	0.0			A	0.5	0.0												
	Worst Approach			*A*	*0.8*		*A*	*0.8*		A	0.8	0.0			A	0.9	0.1												
14	Willow Pass Road / Railroad Avenue	D	Signal	C	23.1		C	20.6		C	23.2	0.1			C	20.8	0.2												
15	Leland Road / Alves Ranch Drive	D	Signal	B	11.8		A	9.7		B	11.8	0.0			A	9.6	-0.1												
16	Leland Road / Woodhill Drive	D	Signal	A	8.2		A	7.8		A	8.2	0.0			A	7.7	-0.1												
17	Leland Road / Southwood Drive	D	Signal	B	18.4		C	21.2		B	18.9	0.5			C	21.2	0.0												
18	Leland Road / Bailey Road	E	Signal	**F**	**97.6**		D	52.3		**F**	**98.9**	**1.3**			E	63.9	11.6												
19	Maylard Street / Bailey Road	E	Signal	B	11.6		B	18.1		B	12.3	0.7			B	18.7	0.6												
20	EB SR-4 Ramps / Bailey Road	E	Signal	C	22.4		D	35.2		C	22.4	0.0			D	36.5	1.3												
21	WB SR-4 Ramps / Bailey Road	E	Signal	C	25.2		B	19.3		C	28.3	3.1			B	19.5	0.2												
22	Canal Road / Bailey Road	D	Signal	B	13.5		B	10.9		B	13.6	0.1			B	11.0	0.1												
23	Leland Road / Chestnut Drive	D	Signal	**F**	**112.9**		C	27.8		**F**	**115.9**	**3.0**			C	26.4	-1.4												
24	Leland Road / Jacqueline Drive	D	Signal	**E**	**75.2**		C	34.2		**E**	**78.7**	**3.5**			C	31.7	-2.5												
25	Leland Road / Montevideo Drive	D	Signal	A	6.4		A	6.5		A	6.6	0.2			A	6.7	0.2												
26	Leland Road / Range Road	D	Signal	C	31.8		D	46.2		C	31.4	-0.4			D	45.5	-0.7												
27	Leland Road / Dover Way	D	Signal	C	28.9		C	33.1		C	28.8	-0.1			C	31.9	-1.2												
28	Leland Road / Burton Avenue	D	Signal	B	16.9		C	30.9		B	17.9	1.0			C	29.8	-1.1												
29	Leland Road / Crestview Drive	D	Signal	**F**	**111.8**		D	39.0		**F**	**114.1**	**2.3**			D	38.5	-0.5												
30	Leland Road / Railroad Avenue	D	Signal	D	52.1		D	45.3		D	52.5	0.4			D	46.1	0.8												
31	EB SR-4 Ramps / Railroad Avenue	D	Signal	C	25.4		**E**	**63.1**		C	25.6	0.2			**E**	**63.0**	**-0.1**												
32	WB SR-4 Ramps / Railroad Avenue	D	Signal	D	41.3		C	30.9		D	41.3	0.0			C	30.7	-0.2												
33	Willow Pass Road / Olivera Road	E	Signal	B	16.7	0.62	D	47.2	0.89	B	17.0	0.3	0.63	0.01	D	50.9	3.7	0.91	0.02										
34	Concord Boulevard / Farm Bureau Road	D	Signal	C	25.4	0.73	C	26.5	0.74	C	25.9	0.5	0.76	0.03	C	27.2	0.7	0.77	0.03										
35	Concord Boulevard / Bailey Road	D	Signal	**E**	**64.5**	**0.94**	**E**	**65.0**	**0.86**	**F**	**100.9**	**36.4**	**1.04**	**0.10**	**F**	**88.0**	**23.0**	**0.99**	**0.13**	**E**	**67.1**	**2.6**	**1.04**	**0.10**	**E**	**56.1**	**-8.9**	**0.97**	**0.11**
36	Bailey Road / Myrtle Drive	D	SSSC	A	5.0	0.24	A	1.9	0.43	B	13.0	8.0	0.30	0.07	A	2.4	0.5	0.54	0.11										
	Worst Approach			***F***	***62.2***	***0.57***	*C*	*19.8*	*0.30*	**F**	**203.9**	**141.7**	**0.83**	**0.27**	D	29.1	9.3	0.43	0.13	B	16.8	-45.4	0.92	0.35					
37	Clayton Road / Babel Lane	E	Signal	C	25.4	0.74	C	30.9	0.78	C	25.5	0.1	0.75	0.01	C	31.3	0.4	0.78	0.00										
38	Clayton Road / Farm Bureau Road	E	Signal	C	24.0	0.77	B	16.0	0.60	C	23.7	-0.3	0.78	0.01	B	16.2	0.2	0.60	0.00										
39	Clayton Road / Treat Boulevard	E	Signal	D	46.0	0.82	E	55.2	0.84	D	47.7	1.7	0.83	0.01	E	57.5	2.3	0.88	0.04										
40	Clayton Road / Bailey Road	E	Signal	C	32.4	0.77	C	32.5	0.66	D	43.2	10.8	0.87	0.10	C	33.6	1.1	0.68	0.02										
41	Cowell Road / Treat Boulevard	D	Signal	**E**	**73.2**	**0.94**	**F**	**89.0**	**1.09**	**E**	**78.6**	**5.4**	**0.96**	**0.02**	**F**	**90.7**	**1.7**	**1.11**	**0.02**										
42	Leland Road / Santa Teresa Drive	D	Signal	Future Intersection						Future Intersection																			
43	Bailey Road / Project Entrance	D	Signal	Future Intersection with Project						C	30.8	30.8			B	10.8	10.8												
44	Treat Boulevard / Oak Grove Road	E	Signal	E	59.7	0.94	**F**	**93.5**	**0.97**	E	60.3	0.6	0.95	0.01	**F**	**96.4**	**2.9**	**0.99**	**0.02**										
45	Willow Pass Road / Diamond Boulevard	E	Signal	B	17.2	0.48	D	39.4	0.73	B	17.2	0.0	0.48	0.00	D	39.5	0.1	0.74	0.01										
46	Willow Pass Road / Market Street	E	Signal	D	38.2	0.78	D	43.8	0.96	D	39.6	1.4	0.79	0.01	D	44.1	0.3	0.96	0.00										
47	Willow Pass Road / Galindo Street	E	Signal	D	37.8	0.67	D	51.0	0.87	D	37.6	-0.2	0.68	0.01	D	51.2	0.2	0.88	0.01										
48	Concord Boulevard / Port Chicago Highway	E	Signal	E	61.5	0.79	C	23.6	0.52	E	75.3	13.8	0.81	0.02	C	24.7	1.1	0.54	0.02										
49	Kirker Pass Road / Oakhurst Drive/Concord Bo	D	Signal	**F**	**665.4**	**1.03**	**F**	**341.6**	**0.90**	**F**	**664.0**	**-1.4**	**1.04**	**0.01**	**F**	**339.7**	**-1.9**	**0.91**	**0.01**										
50	Ygnacio Valley Road / Clayton Road	E	Signal	D	39.3	0.67	D	47.1	0.73	D	39.2	-0.1	0.68	0.01	D	47.1	0.0	0.74	0.01										

[1] For all intersections, the LOS criteria is based on seconds of delay.

[2] Each study intersection is controlled by a traffic signal, a side-street stop-controlled (SSSC), or a all-way stop-controlled (AWSC).

Note: Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.

Impact 7: Freeway Existing Plus Project Impacts

The following freeway segments are significantly impacted by the proposed project in the Existing plus Project scenario:

- NB SR-242 between Clayton Road off-ramp and Olivera Road – PM peak hour
- EB SR-4 between Arnold Industrial Way off-ramp and Arnold Industrial Way on-ramp – PM peak hour

Each of these freeway segments operate at LOS F in the PM peak hour. The project adds vehicle trips to each segment and increases the density of the freeway segment. This is a significant impact.

Mitigation 7

There are no feasible mitigations to improve the LOS and densities for the freeway segments on NB SR-242 and EB SR-4 in the PM peak hour. The congestion on NB SR-242 is due to the downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve this congestion. To improve the operations of the EB SR-4 interchange at Port Chicago Highway would entail adding additional lanes to this segment and for the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp. As mitigation, this project should pay its East Contra Costa Regional Fee. Any improvements would require cooperation and coordination with Caltrans and CCTA. Therefore, since the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway, the impact is **Significant and Unavoidable**.

Impact 8: MTSO Existing Plus Project Impacts

The following MTSO segments are significantly impacted by the proposed project in the Existing plus Project scenario:

- EB SR-4 in the East County – PM peak hour
- NB SR-242 in the Central County – PM peak hour

Each of these freeway segments exceed the allowable delay index and the project adds vehicle trips that worsen the delay index. The project increases the delay index for EB SR-4 in the PM peak hour from an unacceptable 5.1 to 5.4. The project increases the delay index for NB SR-242 in the PM peak hour from an unacceptable 3.4 to 3.5. This is a significant impact.

Mitigation 8

Similar to the freeway impacts in Impact #15, there are no feasible mitigations to improve the delay index for the freeway segments on NB SR-242 and EB SR-4 in the PM peak hour. The congestion on NB SR-242 is due to the downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve this congestion. To improve the operations of the EB SR-4 interchange at Port Chicago Highway would entail adding additional lanes to this segment and for the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp. As mitigation, this project should pay its East Contra

Costa Regional Fee. Any improvements would require cooperation and coordination with Caltrans and CCTA. Therefore, since the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway, the impact is **Significant and Unavoidable**.

LONG-TERM (2035) PLUS PROJECT MITIGATIONS

Impacts #9 through #22 are intersection impacts that occur in the Long-term (2035) plus Project scenario. **Table 22** on page 767 shows the Long-term (2035), Long-term (2035) plus Project, and mitigated Long-term (2035) plus Project levels of service and delays. **Impacts #23 through #24** are freeway related impacts.

Impact 9: Intersection Long-Term (2035) Plus Project (Intersection #1)

The Avila Road/Willow Pass Road intersection will operate at LOS F during the PM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase in v/c by 0.03 or more with the proposed project. This is a significant impact.

Mitigation 9

To mitigate the project impacts expected to occur in the Long-term plus Project condition, a northbound right turn lane should be added, as well as a northbound right turn overlap phase. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Avila Road/Willow Pass Road intersection to LOS E in the PM peak hour. Although the intersection would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord in the PM peak hour, the intersection would decrease in v/c with the mitigation and operate at better than without project conditions, thereby reducing the impact to less than significant.

Since the project did not trigger the unacceptable level of service (i.e. already operated at LOS F without the project) and the proposed mitigation improves the intersection operations with a decrease in v/c, the project shall be responsible for a proportionate share of the mitigation costs. Modifying the intersection would reduce the impact to less than significant. However, any improvements would involve cooperation with the City of Concord and could not be guaranteed by the City of Pittsburg. Therefore, the impact would be **Significant and Unavoidable**.

Impact 10: Intersection Long-Term (2035) Plus Project (Intersection #3)

The WB SR-4 Ramps/Willow Pass Road intersection will operate at LOS F during the AM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase in delay by five (5) seconds or more with the addition of the proposed project. This is a significant impact.

Mitigation 10

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the southbound right turn lane should be converted to a free right turn lane. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the WB SR-4 Ramps/Willow Pass Road intersection to LOS F in the AM peak hour. Although the intersection would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg in the AM peak hour, the intersection would operate at better than without project conditions and thereby would reduce the impact to less than significant.

Since the project did not trigger the unacceptable level of service (i.e. already operated at LOS F without the project) and the proposed mitigation improves the intersection operations to better than the without project conditions, the project shall be responsible for a proportionate share of the

mitigation costs. It should be noted that intersection improvements are already planned in the CIP for the 2015 Update to the Contra Costa CMP (Project 1832) for this intersection, although no funding sources have been identified. In addition, there is no timeframe for the completion of this project. Modifying the intersection would reduce the impact to less than significant.

Impact 11: Intersection Long-Term (2035) Plus Project (Intersection #4)

The Rio Verde Circle/San Marco Boulevard intersection will operate at LOS D during the AM peak hour, which is acceptable under the Long-term without Project condition. The intersection would worsen to an unacceptable LOS F with the addition of the proposed project. This is a significant impact.

Mitigation 11

To mitigate the project impacts expected to occur in the Long-term plus Project condition, an eastbound left turn lane should be added. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Rio Verde Circle/San Marco Boulevard intersection to an acceptable LOS E in the AM peak hour. The intersection would meet the LOS requirement of LOS E or better for an unsignalized intersection in the City of Pittsburg in the AM peak hour, and thereby would reduce the impact to less than significant.

Since the project did trigger the unacceptable level of service, the project shall be responsible for the entirety of the mitigation costs. Modifying the intersection would reduce the impact to less than significant.

Impact 12: Intersection Long-Term (2035) Plus Project (Intersection #6)

The W Leland Road/San Marco Boulevard intersection will operate at LOS F during the AM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase in delay by five (5) seconds or more with the addition of the proposed project. This is a significant impact.

Mitigation 12

Similar to Mitigation #3, to mitigate the project impacts expected to occur in the Cumulative plus Project condition, the WB SR-4 loop on-ramp from NB San Marco Boulevard would need to be modified. There is currently ramp metering implemented for this on-ramp in the AM peak period. This results in on-ramp queues that extend onto NB San Marco Boulevard and onto WB Leland Road. Even if there were no ramp metering at this location, the on-ramp volume and freeway volumes at this location are high enough to cause this congestion. Therefore, there is no feasible solution to this LOS impact. As shown in **Table 22**, the operations at the W. Leland Road/San Marco Boulevard intersection would continue to operate at an unacceptable LOS F in the AM peak hour. In addition, any improvements would involve cooperation with Caltrans and could not be guaranteed by the City of Pittsburg. Therefore, the impact would be **Significant and Unavoidable**.

Impact 13: Intersection Long-Term (2035) Plus Project (Intersection #7)

The EB SR-4 Ramps/San Marco Boulevard intersection will operate at an acceptable LOS D during the AM peak hour and an unacceptable LOS E in the PM peak hour under the Long-term without Project condition.

The intersection would worsen the operations to an unacceptable LOS E in the AM peak hour and increase the delay by five (5) seconds or more in the PM peak hour with the addition of the proposed project. This is a significant impact.

Mitigation 13

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the eastbound approach should be restriped to be an eastbound left turn lane, a shared eastbound left-right turn lane, and an eastbound right turn lane. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the EB SR-4 Ramps/San Marco Boulevard intersection to an acceptable LOS B in the AM peak hour and an acceptable LOS C in the PM peak hour. The intersection would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg, and thereby would reduce the impact to less than significant.

Since the project did trigger the unacceptable level of service in the AM peak hour, the project shall be responsible for the entirety of the mitigation costs. Modifying the intersection would reduce the impact to less than significant.

Impact 14: Intersection Long-Term (2035) Plus Project (Intersection #18)

The W Leland Road/Bailey Road intersection will operate at LOS F during the AM peak hour and LOS E in the PM peak hour, which is unacceptable in the AM peak hour under the Long-term without Project condition. The intersection and increase the delay by five (5) seconds or more in the AM peak hour and worsen the operations to an unacceptable LOS F in the PM peak hour with the addition of the proposed project. This is a significant impact.

Mitigation 14

To mitigate the project impacts expected to occur in the Long-term plus Project condition, a northbound right turn lane should be striped and the shared northbound through-right lane should be restriped to be through lane. In addition, a southbound right turn overlap phase and a westbound right turn overlap phase should be implemented. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the W Leland Road/Bailey Road intersection to LOS F in the AM peak hour and an acceptable LOS E in the PM peak hour. Although, the intersection would not meet the LOS requirement of LOS E or better for a signalized intersection in the City of Pittsburg in the AM peak hour, the intersection would operate better than the without project conditions, and thereby would reduce the impact to less than significant.

Since the project did trigger the unacceptable level of service in the PM peak hour, the project shall be responsible for the entirety of the mitigation costs. It should be noted that other intersection improvements are already planned in the CIP for the 2015 Update to the Contra Costa CMP (Project 0914) for this intersection, although no funding sources have been identified. In addition, there is no timeframe for the completion of this project. Modifying the intersection would reduce the impact to less than significant.

Impact 15: Intersection Long-Term (2035) Plus Project (Intersection #28)

The W Leland Road/Burton Avenue intersection will operate at LOS F during the AM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase in delay by five (5) seconds or more with the addition of the proposed project. This is a significant impact.

Mitigation 15

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the intersection timing splits should be optimized. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the W Leland Road/Burton Avenue intersection to an acceptable LOS B in the AM peak hour. The intersection would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg in the AM peak hour, and thereby would reduce the impact to less than significant.

Since the mitigation is included in the Pittsburg CIP (Project S-16) as a general citywide on-going signal retiming project, the project shall pay its fair-share fee. The funding identified for this project is $135,000 from the gas tax. Optimizing the timing splits at the intersection would reduce the impact to less than significant.

Impact 16: Intersection Long-Term (2035) Plus Project (Intersection #29)

The W Leland Road/Crestview Drive intersection will operate at LOS F during the AM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase in delay by five (5) seconds or more with the addition of the proposed project. This is a significant impact.

Mitigation 16

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the eastbound left turn phase and westbound left turn phase should be changed from protected to permitting phasing. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the W Leland Road/Crestview Drive intersection to LOS E in the AM peak hour. Although, the intersection would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg, the intersection would operate better than the without project conditions and thereby would reduce the impact to less than significant.

Since the project did not trigger the unacceptable level of service (i.e. already operated at LOS F without the project) and the proposed mitigation improves the intersection operations to better than the without project conditions, the project shall be responsible for a proportionate share of the mitigation costs. Modifying the intersection would reduce the impact to less than significant.

Impact 17: Intersection Long-Term (2035) Plus Project (Intersection #35)

The Concord Boulevard/Bailey Road intersection will operate at LOS F during the AM and PM peak hours, which is unacceptable under the Long-term without Project condition. The intersection would increase the v/c by 0.03 or more with the addition of the proposed project. This is a significant impact.

Mitigation 17

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the southbound approach should be widened and restriped to include a southbound left turn lane, a southbound through lane, and a southbound right turn lane. In addition, the northbound approach should be widened to be a northbound left turn lane and a shared through-right turn lane (same as Mitigation #5). As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Concord Boulevard/Bailey Road intersection to LOS F in the AM and PM peak hours. The v/c is still increased by 0.03 or more in the AM peak hour and decreases in the PM peak hour with the mitigation from without project conditions. Therefore, the intersection would remain an impact in the AM peak hour and would reduce the impact to less than significant in the PM peak hour.

Since the project did not trigger the unacceptable level of service (i.e. already operated at LOS F without the project) and the proposed mitigation improves the intersection operations to better than the without project conditions, the project shall be responsible for a proportionate share of the mitigation costs. Modifying the intersection would reduce the impact to less than significant. However, since this intersection is located in the City of Concord, the City of Pittsburg cannot guarantee the completion of the improvements and therefore is considered **Significant and Unavoidable**.

Impact 18: Intersection Long-Term (2035) Plus Project (Intersection #36)

The Bailey Road/Myrtle Drive intersection will operate at LOS B for the worst approach in the AM peak hour and LOS F in the PM peak hour, which is unacceptable in the PM peak hour under the Long-term without Project condition. The intersection would worsen the operations to an unacceptable LOS F in the AM peak hour and increase the v/c by 0.03 or more in the PM peak hour with the addition of the proposed project. This is a significant impact.

Mitigation 18

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the intersection should be signalized, a southbound left turn lane should be added, and the shared southbound through-left lane should be restriped to be a through lane (same as Mitigation #6). As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Bailey Road/Myrtle Drive intersection to LOS F in the AM and PM peak hours. Although, the intersection would not meet the LOS requirement of LOS D or better for a signalized intersection in the City of Concord in the AM and PM peak hours, the intersection v/c would decrease with the mitigation and thereby would reduce the impact to less than significant. However, in the AM peak hour, the intersection would still operate at a worse LOS F than the without project, and therefore would remain an impact. Each intersection approach cannot be further widened due to the available right-of-way and adjacent properties.

Similar to Mitigation #6, since the mitigation is already planned in the Concord CIP (Project 2049), the project shall pay its fair-share fee. The funding identified for this project is from traffic mitigation fees, grant funds, and Concord-owned ROW. In addition, there is no timeframe for the completion of this project. Modifying the intersection would reduce the impact to less than significant in the PM peak hour, but would remain **Significant and Unavoidable** in the AM peak hour.

Impact 19: Intersection Long-Term (2035) Plus Project (Intersection #39)

The Clayton Road/Treat Boulevard intersection will operate at LOS F during the PM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase the v/c by 0.03 or more with the addition of the proposed project. This is a significant impact.

Mitigation 19

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the intersection timing splits should be optimized. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Clayton Road/Treat Boulevard intersection to LOS F in the PM peak hour. Although, the intersection would not meet the LOS requirement of LOS E or better for a signalized intersection in the City of Concord, the intersection v/c does not change from without project conditions, and thereby would reduce the impact to less than significant.

Since the project did not trigger the unacceptable level of service (i.e. already operated at LOS F without the project) and the proposed mitigation improves the intersection operations with no change in v/c, the project shall be responsible for a proportionate share of the mitigation costs. Modifying the intersection would reduce the impact to less than significant. However, since this intersection is located in the City of Concord, the City of Pittsburg cannot guarantee the completion of the improvements and therefore is considered **Significant and Unavoidable**.

Impact 20: Intersection Long-Term (2035) Plus Project (Intersection #40)

The Clayton Road/Bailey Road intersection will operate at LOS F during the AM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase the v/c by 0.03 or more with the addition of the proposed project. This is a significant impact.

Mitigation 20

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the southbound approach should be restriped to be a southbound left turn lane, a shared southbound through-right turn lane, and a southbound right turn lane. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Clayton Road/Bailey Road intersection to an acceptable LOS E in the AM peak hour and thereby would reduce the impact to less than significant.

Since the project did not trigger the unacceptable level of service (i.e. already operated at LOS F without the project) and the proposed mitigation improves the intersection operations to an acceptable level of service, the project shall be responsible for a proportionate share of the mitigation costs. Modifying the intersection would reduce the impact to less than significant. However, since this intersection is located in the City of Concord, the City of Pittsburg cannot guarantee the completion of the improvements and therefore is considered **Significant and Unavoidable**.

Impact 21: Intersection Long-Term (2035) Plus Project (Intersection #43)

The Bailey Road/Project Entrance intersection will operate at LOS B during the AM peak hour, which is acceptable under the Long-term without Project condition. The intersection would operate at an unacceptable LOS F. This is a significant impact.

Mitigation 21

To mitigate the project impacts expected to occur in the Long-term plus Project condition, Bailey Road should be widened from two lanes to four lanes. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Bailey Road/Project Entrance intersection to an acceptable LOS C in the AM peak hour. The intersection would meet the LOS requirement of LOS D or better for a signalized intersection in the City of Pittsburg in the AM peak hour, and thereby would reduce the impact to less than significant.

Since the mitigation is included in the Pittsburg CIP (Project ST-27) as Bailey Road Operational Safety Improvements, the project shall pay its fair-share fee. There are no identified funding sources for this project, but it is eligible for Measure J funding. In addition, there is no timeframe for the completion of this project. Modifying the intersection would reduce the impact to less than significant.

Impact 22: Intersection Long-Term (2035) Plus Project (Intersection #48)

The Concord Boulevard/Port Chicago Highway intersection will operate at LOS F during the AM peak hour, which is unacceptable under the Long-term without Project condition. The intersection would increase the v/c by 0.03 or more with the addition of the proposed project. This is a significant impact.

Mitigation 22

To mitigate the project impacts expected to occur in the Long-term plus Project condition, the intersection timing splits should be optimized. As shown in **Table 22**, the proposed mitigation is anticipated to improve the operations at the Concord Boulevard/Port Chicago Highway intersection to an acceptable LOS C in the AM peak hour. The intersection would meet the LOS requirement of LOS E or better for a signalized intersection in the City of Concord in the AM peak hour, and thereby would reduce the impact to less than significant.

Since the project did not trigger the unacceptable level of service (i.e. already operated at LOS F without the project) and the proposed mitigation improves the intersection operations to an acceptable level of service, the project shall be responsible for a proportionate share of the mitigation costs. Modifying the intersection would reduce the impact to less than significant. However, since this intersection is located in the City of Concord, the City of Pittsburg cannot guarantee the completion of the improvements and therefore is considered **Significant and Unavoidable**.

Table 22 – Long-term (2035) Plus Project (Mitigated) Intersection Level of Service Summary

#	Intersection	V/C or Delay Criteria[1]	Intersection Control[2]	Long-term (2035)						Long-term (2035) + Project										Long-term (2035) + Project (Mitigated)									
				AM Peak			PM Peak			AM Peak					PM Peak					AM Peak					PM Peak				
				LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	ΔDelay	v/c	Δv/c	LOS	Delay	ΔDelay	v/c	Δv/c	LOS	Delay	ΔDelay	v/c	Δv/c	LOS	Delay	ΔDelay	v/c	Δv/c
1	Avila Road / Willow Pass Road	D	Signal	C	25.5	0.83	**F**	**104.6**	**1.10**	C	30.0	4.5	0.85	0.02	**F**	**121.7**	**17.1**	**1.16**	**0.06**					**E**	**62.2**	**-42.4**	**1.05**	**-0.05**
2	EB SR-4 Ramps / Willow Pass Road	E	Signal	B	11.7		C	24.9		B	12.0	0.3			C	26.3	1.4												
3	WB SR-4 Ramps / Willow Pass Road	E	Signal	**F**	**343.6**		B	15.9		**F**	**358.2**	**14.6**			B	16.6	0.7			**F**	**102.6**	**-241.0**							
4	Rio Verde Circle / San Marco Boulevard	E	AWSC	D	32.3		A	9.2		**F**	**67.4**	**35.1**			B	13.8	4.6			E	38.8	6.5							
5	Santa Teresa Drive / San Marco Boulevard	D	Signal	C	34.5		B	18.5		D	46.6	12.1			B	18.3	-0.2												
6	Leland Road / San Marco Boulevard	D	Signal	**F**	**79.8**		**F**	**143.1**		**F**	**89.8**	**10.0**			**F**	**147.0**	**3.9**			**F**	**89.8**	**10.0**							
7	EB SR-4 Ramps / San Marco Boulevard	D	Signal	D	47.6		**E**	**56.3**		**E**	**62.3**	**14.7**			**E**	**78.6**	**22.3**			B	13.6	-34.0			C	23.9	-32.4		
8	WB SR-4 Ramps / San Marco Boulevard	D	Signal	**F**	**338.8**		C	30.4		**F**	**341.6**	**2.8**			C	32.0	1.6												
9	Willow Pass Road / Port Chicago Highway	D	Signal	B	13.6		B	11.0		B	13.9	0.3			B	11.2	0.2												
10	Willow Pass Road / Bailey Road	D	Signal	**F**	**146.6**		**F**	**110.6**		**F**	**146.9**	**0.3**			**F**	**111.6**	**1.0**												
11	Willow Pass Road / Loftus Road	D	Signal	C	27.7		B	19.0		C	27.8	0.1			B	19.2	0.2												
12	EB Willow Pass Road / Range Road	E	SSSC	A	6.9		A	9.1		A	7.2	0.3			A	9.3	0.2												
	Worst Approach			B	12.4		B	14.0		B	12.7	0.3			B	14.3	0.3												
13	WB Willow Pass Road / Range Road	E	SSSC	A	0.2		A	0.4		A	0.2	0.0			A	0.4	0.0												
	Worst Approach			A	0.6		A	0.6		A	0.6	0.0			A	0.7	0.1												
14	Willow Pass Road / Railroad Avenue	D	Signal	**E**	**58.0**		C	31.4		**E**	**58.2**	**0.2**			C	31.9	0.5												
15	Leland Road / Alves Ranch Drive	D	Signal	C	32.5		C	22.0		C	32.7	0.2			C	22.1	0.1												
16	Leland Road / Woodhill Drive	D	Signal	B	13.5		B	12.1		B	13.6	0.1			B	12.2	0.1												
17	Leland Road / Southwood Drive	D	Signal	**F**	**92.9**		D	47.0		**F**	**96.2**	**3.3**			D	47.9	0.9												
18	Leland Road / Bailey Road	E	Signal	**F**	**165.8**		E	66.8		**F**	**174.8**	**9.0**			**F**	**104.0**	**37.2**			**F**	**145.1**	**-20.7**			E	75.4	8.6		
19	Maylard Street / Bailey Road	E	Signal	C	21.8		C	26.2		C	21.4	-0.4			C	26.5	0.3												
20	EB SR-4 Ramps / Bailey Road	E	Signal	C	24.9		D	41.6		C	24.6	-0.3			E	55.2	13.6												
21	WB SR-4 Ramps / Bailey Road	E	Signal	D	48.2		C	23.0		D	53.9	5.7			C	24.3	1.3												
22	Canal Road / Bailey Road	D	Signal	C	32.2		B	12.8		C	32.3	0.1			B	13.1	0.3												
23	Leland Road / Chestnut Drive	D	Signal	**F**	**230.4**		C	25.9		**F**	**232.3**	**1.9**			C	28.1	2.2												
24	Leland Road / Jacqueline Drive	D	Signal	**F**	**179.7**		C	27.6		**F**	**182.1**	**2.4**			C	27.3	-0.3												
25	Leland Road / Montevideo Drive	D	Signal	B	11.3		A	5.3		B	11.9	0.6			A	5.4	0.1												
26	Leland Road / Range Road	D	Signal	**E**	**70.0**		C	33.8		**E**	**72.4**	**2.4**			C	33.5	-0.3												
27	Leland Road / Dover Way	D	Signal	**F**	**83.8**		C	25.8		**F**	**87.3**	**3.5**			C	25.0	-0.8												
28	Leland Road / Burton Avenue	D	Signal	**F**	**95.7**		C	30.0		**F**	**115.5**	**19.8**			C	31.9	1.9			B	12.2	-83.5							
29	Leland Road / Crestview Drive	D	Signal	**F**	**202.7**		**E**	**60.2**		**F**	**208.3**	**5.6**			**E**	**64.0**	**3.8**			**E**	**58.1**	**-144.6**							
30	Leland Road / Railroad Avenue	D	Signal	**F**	**183.8**		**F**	**172.8**		**F**	**165.7**	**-18.1**			**F**	**171.2**	**-1.6**												
31	EB SR-4 Ramps / Railroad Avenue	D	Signal	C	27.6		**F**	**94.8**		C	27.9	0.3			**F**	**94.7**	**-0.1**												
32	WB SR-4 Ramps / Railroad Avenue	D	Signal	D	41.9		D	35.5		D	41.9	0.0			D	35.4	-0.1												
33	Willow Pass Road / Olivera Road	E	Signal	D	51.0	0.97	E	67.7	1.00	D	53.5	2.5	0.99	0.02	E	71.2	3.5	1.01	0.01										
34	Concord Boulevard / Farm Bureau Road	D	Signal	D	47.4	0.96	D	36.1	0.90	D	49.6	2.2	0.99	0.03	D	37.3	1.2	0.93	0.03										
35	Concord Boulevard / Bailey Road	D	Signal	**F**	**204.7**	**1.34**	**F**	**120.8**	**1.21**	**F**	**251.4**	**46.7**	**1.44**	**0.10**	**F**	**157.5**	**36.7**	**1.35**	**0.14**	**F**	**177.8**	**-26.9**	**1.43**	**0.09**	**F**	**93.2**	**-27.6**	**1.14**	**-0.07**
36	Bailey Road / Myrtle Drive	D	SSSC	A	4.3	N/A	**F**	**281.4**	**1.59**	**F**	**231.8**	**227.5**	**N/A**	**N/A**	**F**	**379.8**	**98.4**	**1.93**	**0.34**	**F**	**92.4**	**88.1**	**1.25**	**N/A**	**F**	**159.7**	**-121.7**	**1.34**	**-0.25**
	Worst Approach			B	10.4	N/A	**F**	**OVRFL**	**3.33**	**F**	**OVRFL**	**N/A**	**N/A**	**N/A**	**F**	**OVRFL**	**N/A**	**N/A**	**N/A**										
37	Clayton Road / Babel Lane	E	Signal	C	31.1	0.79	C	31.3	0.85	C	31.2	0.1	0.80	0.01	C	31.6	0.3	0.86	0.01										
38	Clayton Road / Farm Bureau Road	E	Signal	**F**	**90.1**	**1.03**	**F**	**87.3**	**0.92**	**F**	**92.1**	**2.0**	**1.04**	**0.01**	**F**	**86.8**	**-0.5**	**0.92**	**0.00**										
39	Clayton Road / Treat Boulevard	E	Signal	**F**	**83.5**	**0.98**	**F**	**102.2**	**1.04**	**F**	**89.0**	**5.5**	**0.99**	**0.01**	**F**	**122.7**	**20.5**	**1.08**	**0.04**						**F**	**99.7**	**-2.5**	**1.07**	**0.03**
40	Clayton Road / Bailey Road	E	Signal	**F**	**198.6**	**1.28**	C	33.5	0.74	**F**	**229.4**	**30.8**	**1.37**	**0.09**	C	34.5	1.0	0.76	0.02	E	76.7	-121.9	1.02	-0.26					
41	Cowell Road / Treat Boulevard	D	Signal	**F**	**89.8**	**1.02**	**F**	**124.5**	**1.20**	**F**	**96.0**	**6.2**	**1.04**	**0.02**	**F**	**129.0**	**4.5**	**1.22**	**0.02**										
42	Leland Road / Santa Teresa Drive	D	Signal	A	9.2		A	7.1		B	12.2	3.0			A	8.1	1.0												
43	Bailey Road / Project Entrance	D	Signal	B	16.3		A	5.9		**F**	**129.4**	**113.1**			B	16.6	10.7			C	21.9	5.6							
44	Treat Boulevard / Oak Grove Road	E	Signal	**F**	**237.7**	**1.48**	**F**	**272.5**	**1.48**	**F**	**237.9**	**0.2**	**1.49**	**0.01**	**F**	**276.6**	**4.1**	**1.50**	**0.02**										
45	Willow Pass Road / Diamond Boulevard	E	Signal	B	18.0	0.52	D	41.1	0.74	B	17.9	-0.1	0.52	0.00	D	41.2	0.1	0.75	0.01										
46	Willow Pass Road / Market Street	E	Signal	D	40.6	0.89	D	49.5	1.01	D	40.7	0.1	0.90	0.01	D	49.8	0.3	1.02	0.01										
47	Willow Pass Road / Galindo Street	E	Signal	D	54.7	0.84	**F**	**111.7**	**1.11**	D	54.4	-0.3	0.85	0.01	**F**	**111.8**	**0.1**	**1.13**	**0.02**										
48	Concord Boulevard / Port Chicago Highway	E	Signal	**F**	**130.0**	**0.89**	C	23.1	0.60	**F**	**147.8**	**17.8**	**0.92**	**0.03**	C	24.2	1.1	0.62	0.02	C	34.4	-95.6	0.92	0.03					
49	Kirker Pass Road / Oakhurst Drive/Concord Boulevard	D	Signal	**F**	**699.3**	**1.24**	**F**	**336.6**	**1.05**	**F**	**693.9**	**-5.4**	**1.25**	**0.01**	**F**	**334.5**	**-2.1**	**1.06**	**0.01**										
50	Ygnacio Valley Road / Clayton Road	E	Signal	**F**	**289.0**	**1.19**	**F**	**108.7**	**1.01**	**F**	**288.1**	**-0.9**	**1.20**	**0.01**	**F**	**110.2**	**1.5**	**1.01**	**0.00**										

[1] For all intersections, the LOS criteria is based on seconds of delay.

[2] Each study intersection is controlled by a traffic signal, a side-street stop-controlled (SSSC), or a all-way stop-controlled (AWSC).

OVRFL - Intersection delay exceeds 500 seconds and is considered overflow.

Note: Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.

Impact 23: Freeway Long-term Plus Project Impacts

The following freeway segments are significantly impacted by the proposed project in the Long-term plus Project scenario:

- NB SR-242 between Clayton Road off-ramp and Olivera Road – PM peak hour
- EB SR-4 between the I-680 on-ramp and the SR-242 off-ramp – PM peak hour

Each of these freeway segments operate at LOS F in the PM peak hour. The project adds vehicle trips to each segment and increases the density of the freeway segment. This is a significant impact.

Mitigation 23

Similar to Mitigation #15, there are no feasible mitigations to improve the LOS and densities for the freeway segments on NB SR-242 and EB SR-4 in the PM peak hour. The congestion on NB SR-242 is due to the downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve this congestion. To improve the operations of the EB SR-4 interchange at Port Chicago Highway would entail adding additional lanes to this segment and for the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp. As mitigation, this project should pay its East Contra Costa Regional Fee. Any improvements would require cooperation and coordination with Caltrans and CCTA. Therefore, since the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway, the impact is **Significant and Unavoidable**.

Impact 24: MTSO Long-term Plus Project Impacts

The following MTSO segments are significantly impacted by the proposed project in the Long-term plus Project scenario:

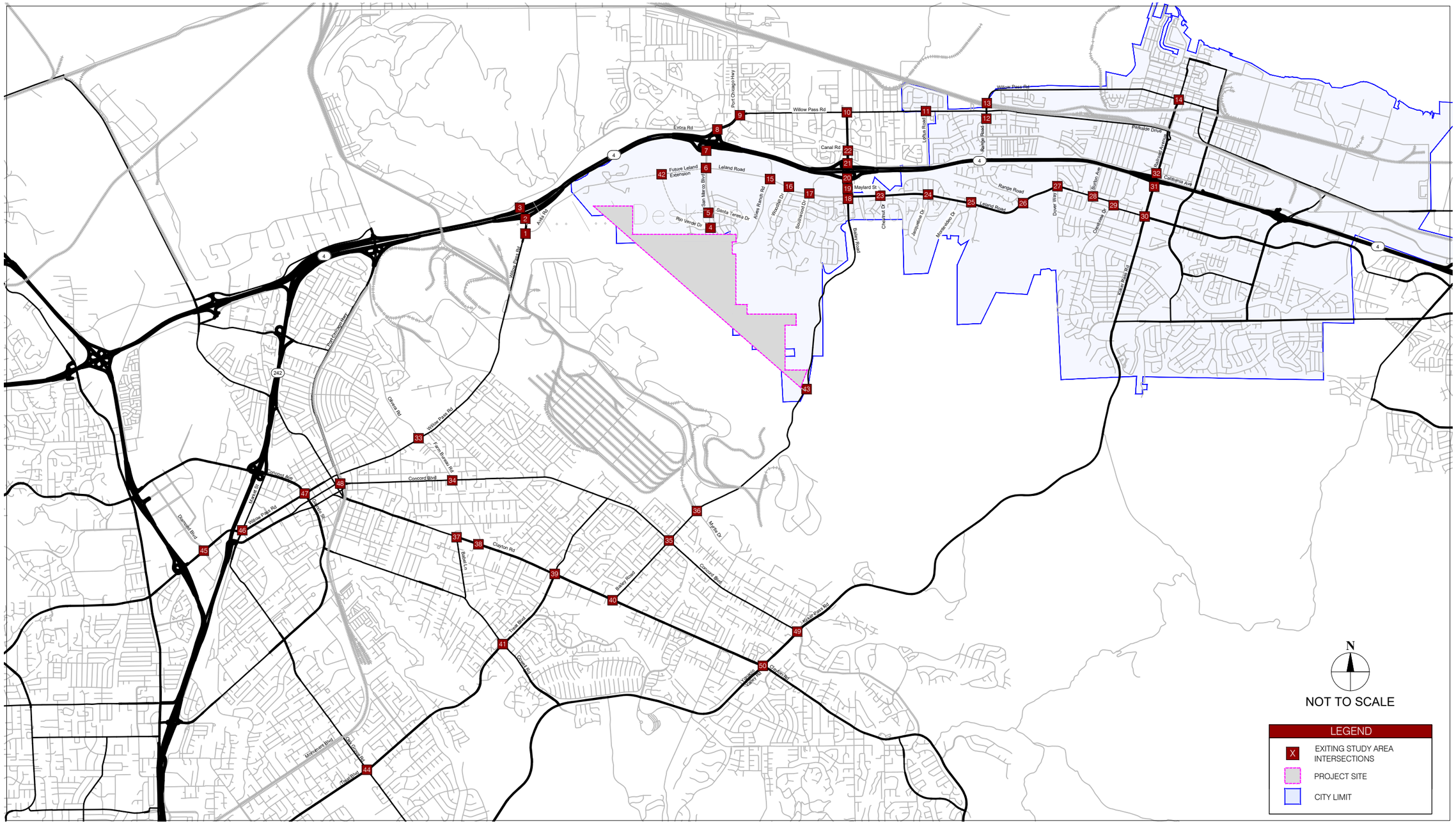
- EB SR-4 in the East County – PM peak hour
- WB SR-4 in the East County – AM peak hour
- EB SR-4 in the Central County – PM peak hour
- NB SR-242 in the Central County – PM peak hour

Each of these freeway segments exceed the allowable delay index and the project adds vehicle trips that worsen the delay index. The project increases the delay index for EB SR-4 in the East County in the PM peak hour from an unacceptable 7.9 to 8.7, and in the Central County from 6.2 to 6.7. The project increases the delay index for WB SR-4 in the East County in the AM peak hour from an unacceptable 3.3 to 3.4. The project increases the delay index for NB SR-242 in the PM peak hour from an unacceptable 3.4 to 3.5. This is a significant impact.

Mitigation 24

Similar to the freeway impacts in Impact #39, there are no feasible mitigations to improve the delay index for the freeway segments on NB SR-242 and EB SR-4 in the PM peak hour. The congestion on NB SR-242 is due to the downstream bottleneck on EB SR-4 at the Port Chicago Highway interchange. Any improvements to widen NB SR-242 would not relieve this congestion. To improve the operations of the EB SR-4 interchange at Port Chicago Highway would entail adding

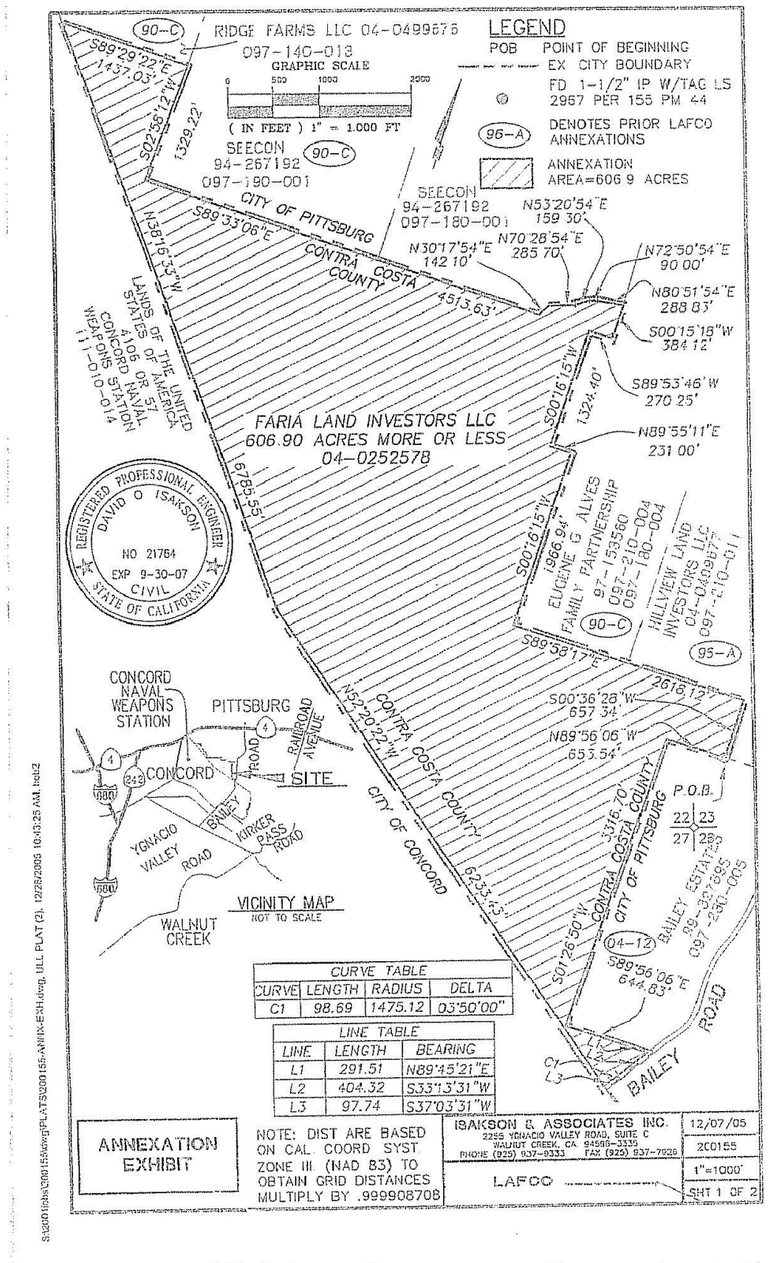
additional lanes to this segment and for the rest of the corridor. Multiple studies have evaluated potential freeway improvements, including adding an auxiliary lane from the Port Chicago Highway on-ramp to the Willow Pass Road off-ramp. As mitigation, this project should pay its East Contra Costa Regional Fee. Any improvements would require cooperation and coordination with Caltrans and CCTA. Therefore, since the City of Pittsburg would not be able to guarantee the construction of any improvements on the freeway, the impact is **Significant and Unavoidable**.



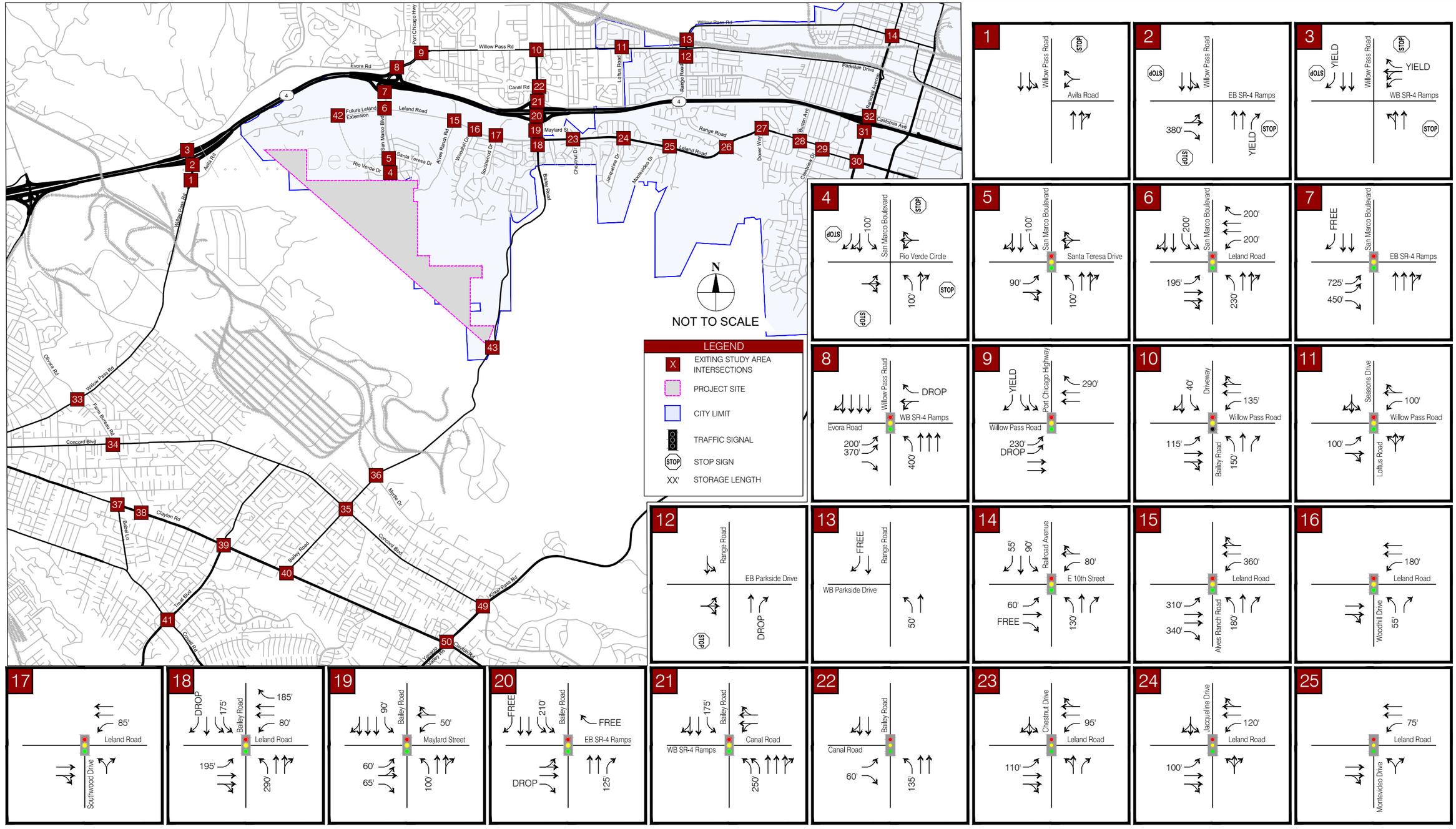
Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 1
PROJECT LOCATION AND STUDY INTERSECTIONS
PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



Source: Isakson & Associates, Inc.

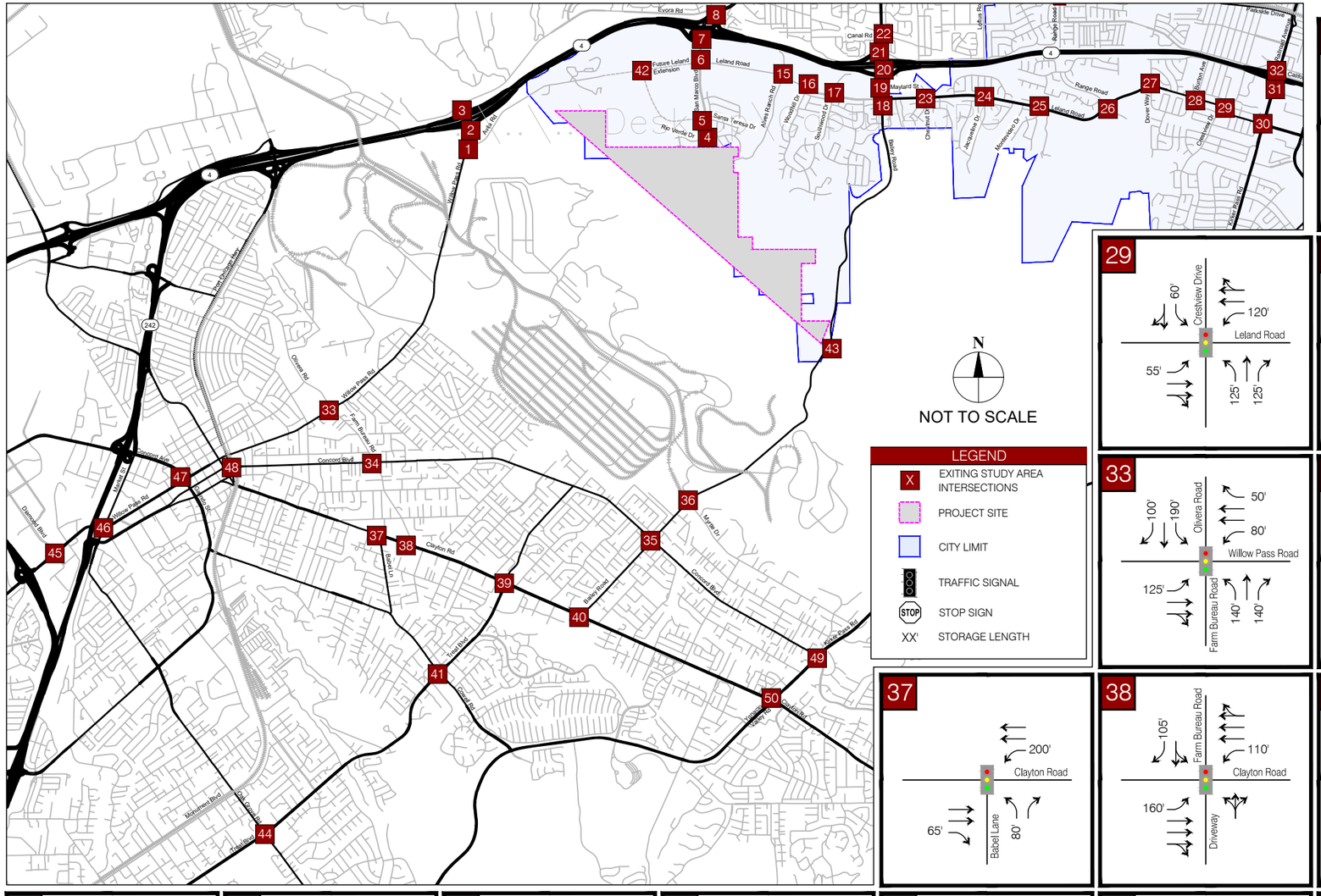


Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 3
EXISTING (2017) LANE GEOMETRY AND TRAFFIC CONTROL

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

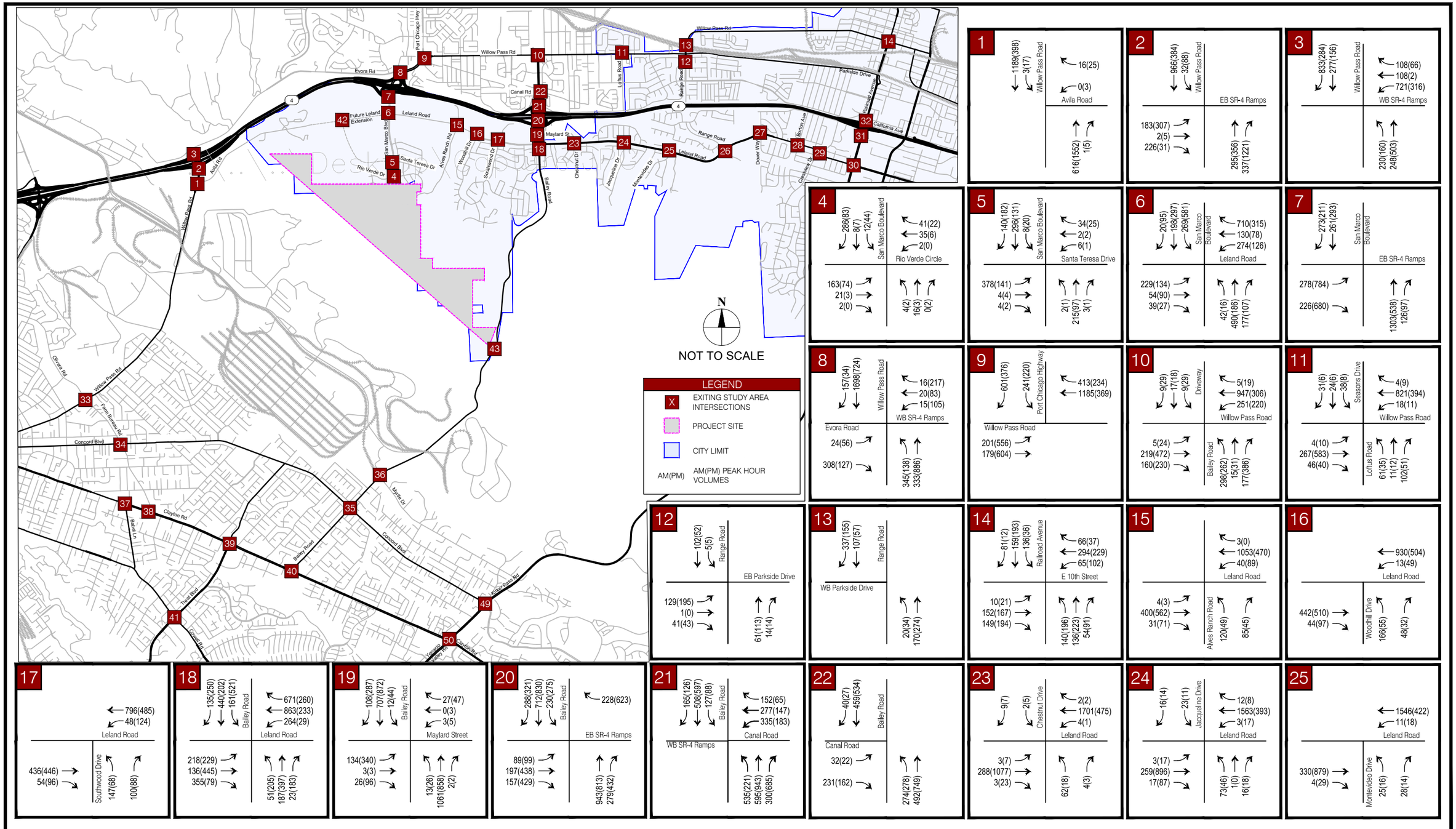


Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 3
EXISTING (2017) LANE GEOMETRY AND TRAFFIC CONTROL (CONTINUED)

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

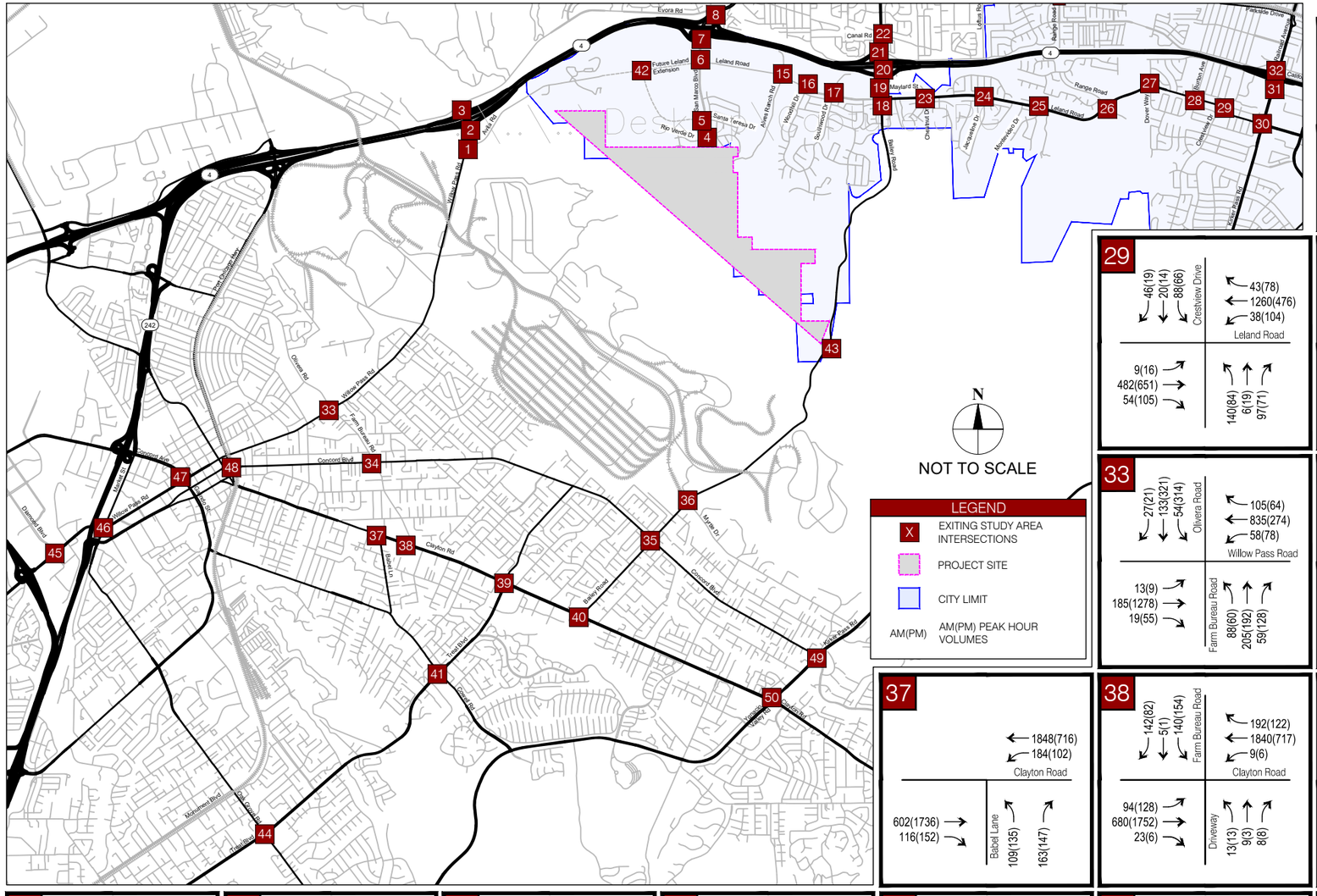


Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 4
EXISTING (2017) PEAK HOUR TURNING MOVEMENT VOLUMES

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



26

	201(62) 3(3) 281(69) Range Road	74(106) 1178(385) 10(6) Leland Road
127(134) 256(749) 11(10)	Golf Club Road 4(13) 1(4) 9(12)	

27

	31(14) 1(0) 12(11) Dover Way	10(10) 1292(447) 2(7) Leland Road
7(10) 497(734) 40(75)		116(41) 0(1) 9(3)

28

	51(19) 23(2) 84(22) Burton Avenue	131(23) 1177(489) 1(2) Leland Road
45(50) 438(697) 56(40)		45(12) 60(5) 1(11)

29

	46(19) 20(14) 88(66) Crestview Drive	43(78) 1260(476) 38(104) Leland Road
9(16) 482(651) 54(105)		140(84) 6(19) 97(71)

30

	417(276) 652(717) 132(189) Railroad Avenue	126(188) 731(334) 83(98) Leland Road
240(223) 386(461) 94(141)		170(133) 585(804) 88(118)

31

	813(731) 247(298) Railroad Avenue	EB SR-4 Ramps
260(523) 1(2) 422(500)		701(862) 324(432)

32

	158(334) 787(822) 98(84) Railroad Avenue	371(286) 127(212) 273(207) California Avenue
WB SR-4 Ramps		192(406) 648(843) 121(136)

33

	27(21) 133(321) 54(314) Olivera Road	105(64) 835(274) 58(78) Willow Pass Road
13(9) 185(1278) 19(55)	Farm Bureau Road 88(60) 205(192) 59(128)	

34

	55(27) 186(184) 159(235) Farm Bureau Road	165(98) 932(461) 29(44) Concord Boulevard
21(77) 369(951) 45(74)		98(33) 251(154) 50(69)

35

	585(93) 296(148) 88(68) Bailey Road	36(88) 1111(400) 118(27) Concord Boulevard
115(319) 209(867) 25(67)		33(54) 113(340) 12(42)

36

	902(255) 115(27) Bailey Road	43(73) 52(23) Myrtle Drive
		201(663) 64(74)

37

		1848(716) 184(102) Clayton Road
602(1736) 116(152)	Babel Lane 109(135)	163(147)

38

	142(82) 5(1) 140(154) Farm Bureau Road	192(122) 1840(717) 9(6) Clayton Road
94(128) 680(1752) 23(6)	Driveway 13(13) 9(3) 8(8)	

39

	58(55) 490(262) 69(138) Treat Boulevard	30(77) 1385(639) 554(329) Clayton Road
85(127) 578(1377) 215(171)		249(248) 170(486) 197(494)

40

	373(146) 1(7) 125(215) Bailey Road	47(119) 1795(793) 13(67) Clayton Road
126(337) 514(1662) 0(4)	Driveway 3(35) 0(17) 0(24)	

41

	118(153) 1368(483) 43(89) Treat Boulevard	59(95) 483(295) 603(222) Cowell Road
110(306) 242(667) 336(126)		80(257) 350(1363) 148(744)

42

FUTURE INTERSECTION

43

FUTURE INTERSECTION WITH PROJECT

44

	136(149) 1648(522) 422(191) Treat Boulevard	140(446) 611(539) 308(265) Oak Grove Road
109(395) 684(492) 92(131)		115(185) 302(1655) 322(179)

45

	210(532) 19(48) 144(412) Diamond Blvd	261(374) 1094(1225) 69(77) Willow Pass Rd
299(449) 1171(1628) 118(118)		43(214) 12(78) 15(103)

46

	244(162) 277(428) 111(131) Market Street	8(25) 998(763) Willow Pass Road
86(297) 783(1815) 129(300)		524(478) 492(658) 118(174)

47

	24(34) 635(998) 61(234) Galindo St	255(219) 608(327) 126(103) Willow Pass Road
47(103) 221(699) 42(99)		92(137) 1080(871) 96(241)

48

	Port Chicago Highway	177(108) 1070(441) Concord Boulevard
3(8) 79(143)		679(397) 838(975) 61(15)

49

	581(91) 1564(487) 73(95) Kirker Pass Road	107(80) 399(106) 233(179) Concord Boulevard
62(314) 68(218) 134(131)		101(106) 375(1624) 92(363)

50

	543(190) 1181(311) 112(159) Ygnacio Valley Road	54(106) 646(325) 276(184) Clayton Road
127(505) 163(644) 19(70)		75(183) 221(1360) 75(392)

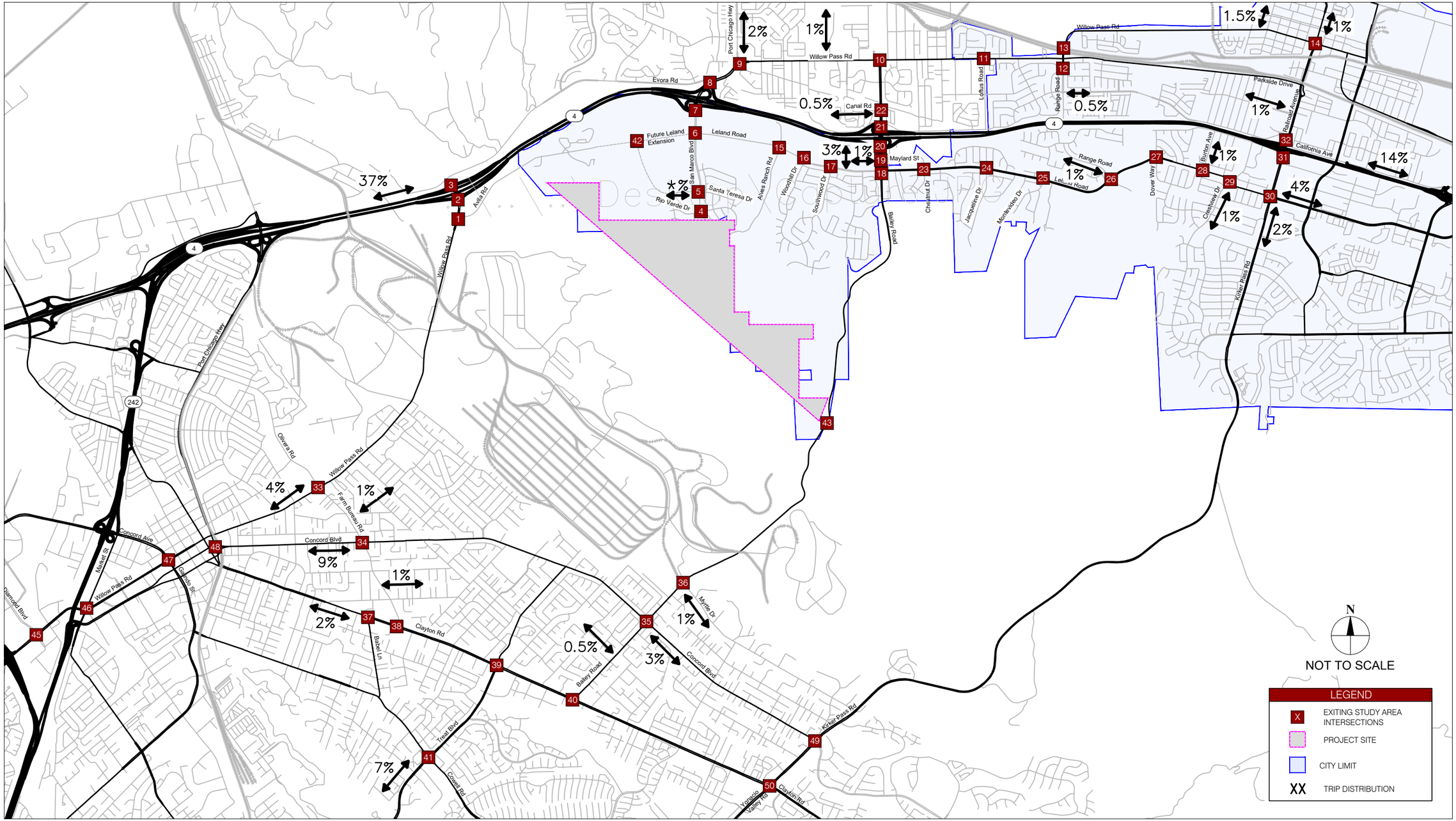
Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 4

EXISTING (2017) PEAK HOUR TURNING MOVEMENT VOLUMES (CONTINUED)

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

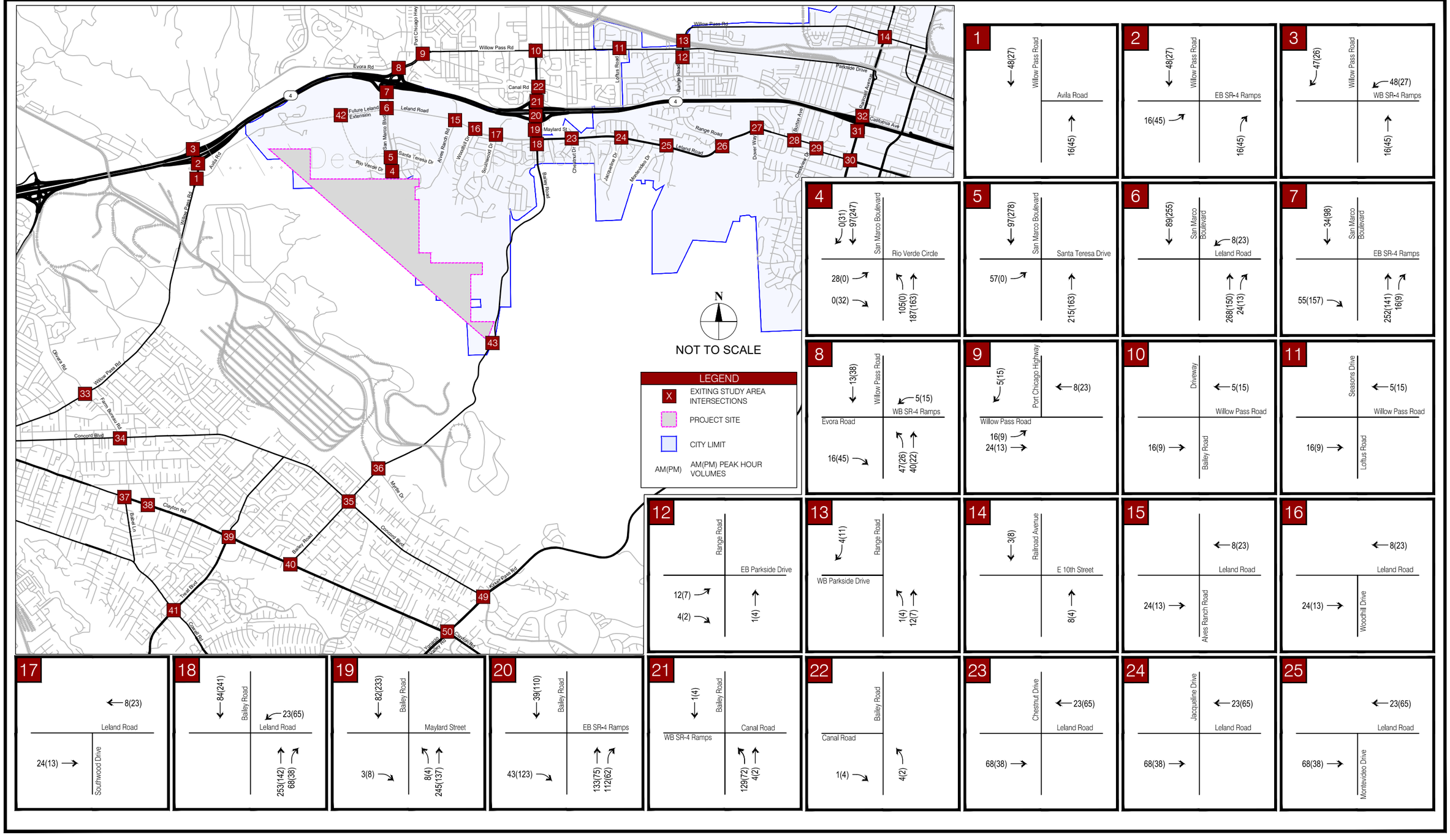


* ASSUMED 190 AM PEAK AND 63 PM PEAK PROJECT TRIPS DIVERTED TO DELTA VIEW ELEMENTARY SCHOOL.

Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 5
PROJECT TRIP DISTRIBUTION
PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

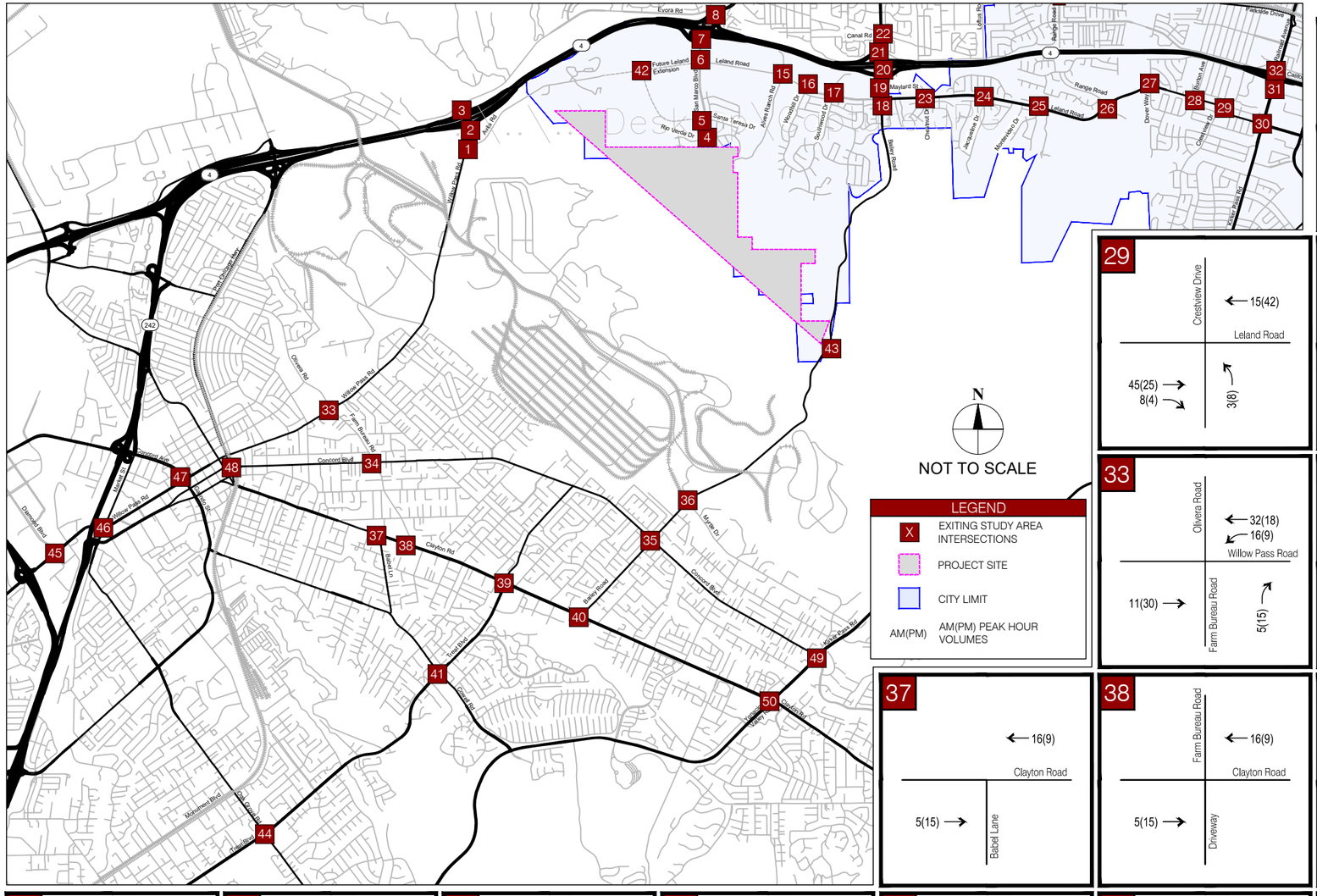


Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 6
EXISTING CONDITION NEW PROJECT GENERATED TRAFFIC VOLUMES

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

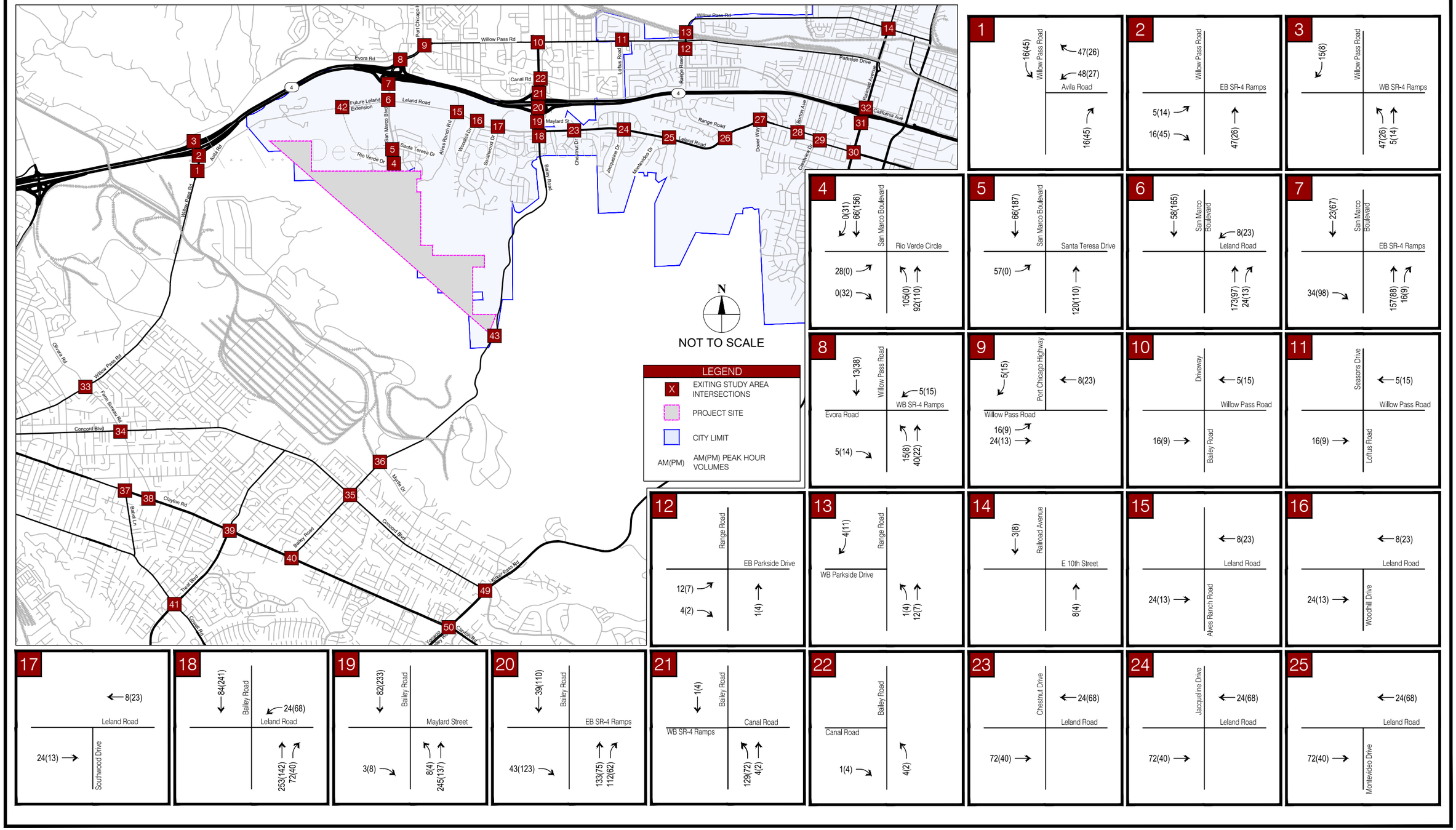


Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 6
EXISTING CONDITION NEW PROJECT GENERATED TRAFFIC VOLUMES (CONTINUED)

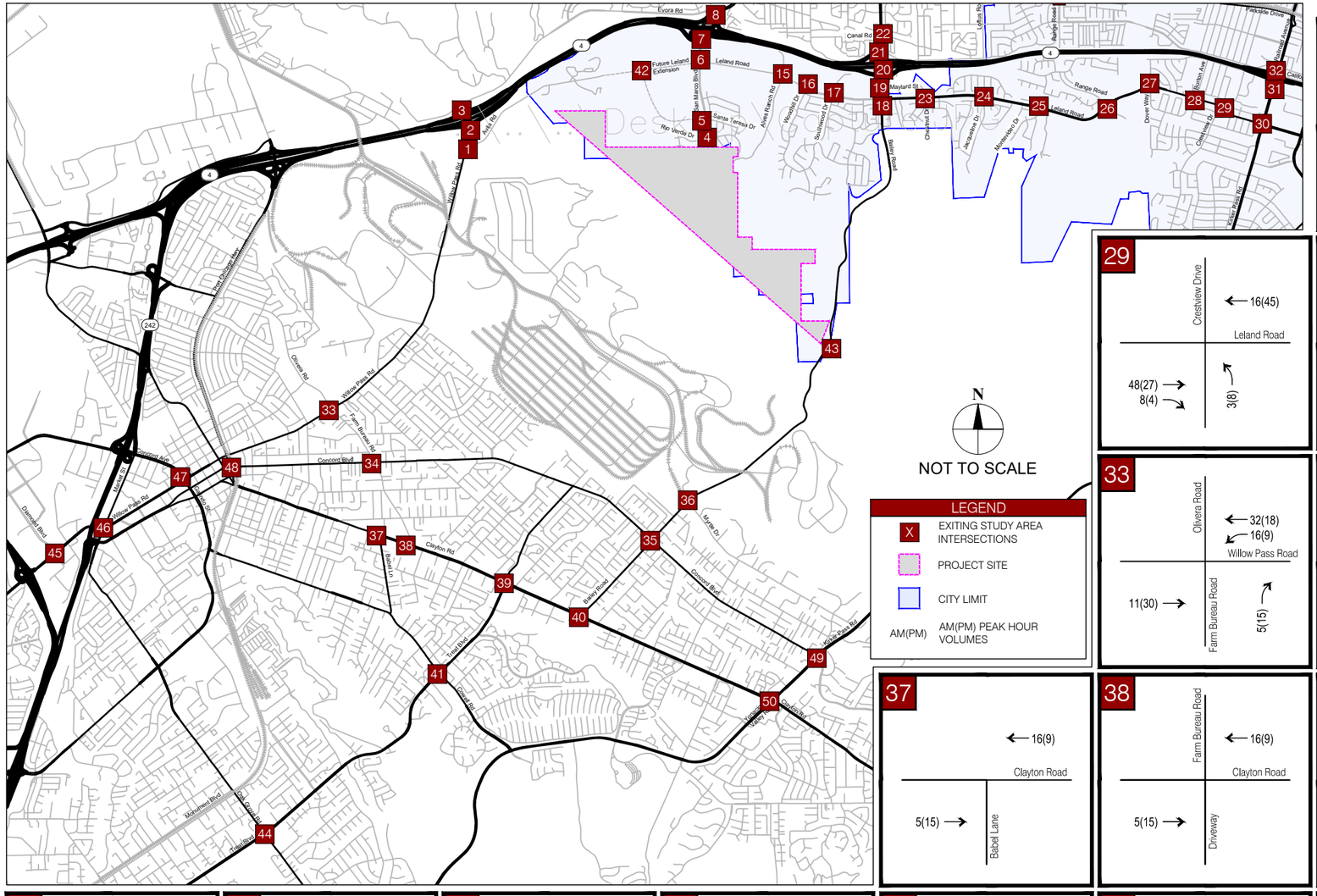
PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 7
CUMULATIVE CONDITION NEW PROJECT GENERATED TRAFFIC VOLUMES
PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



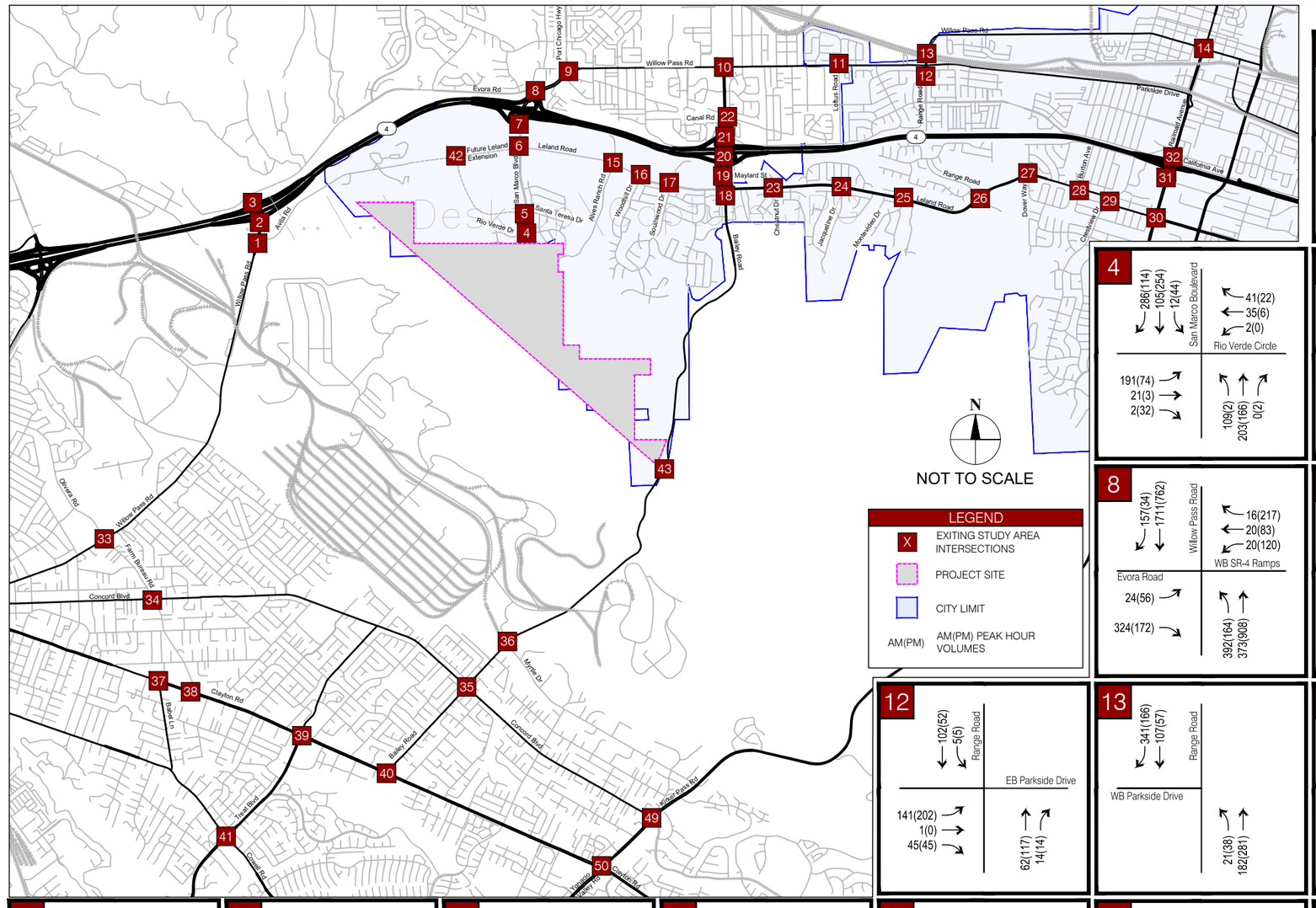
Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 7

CUMULATIVE CONDITION NEW PROJECT GENERATED TRAFFIC VOLUMES (CONTINUED)

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

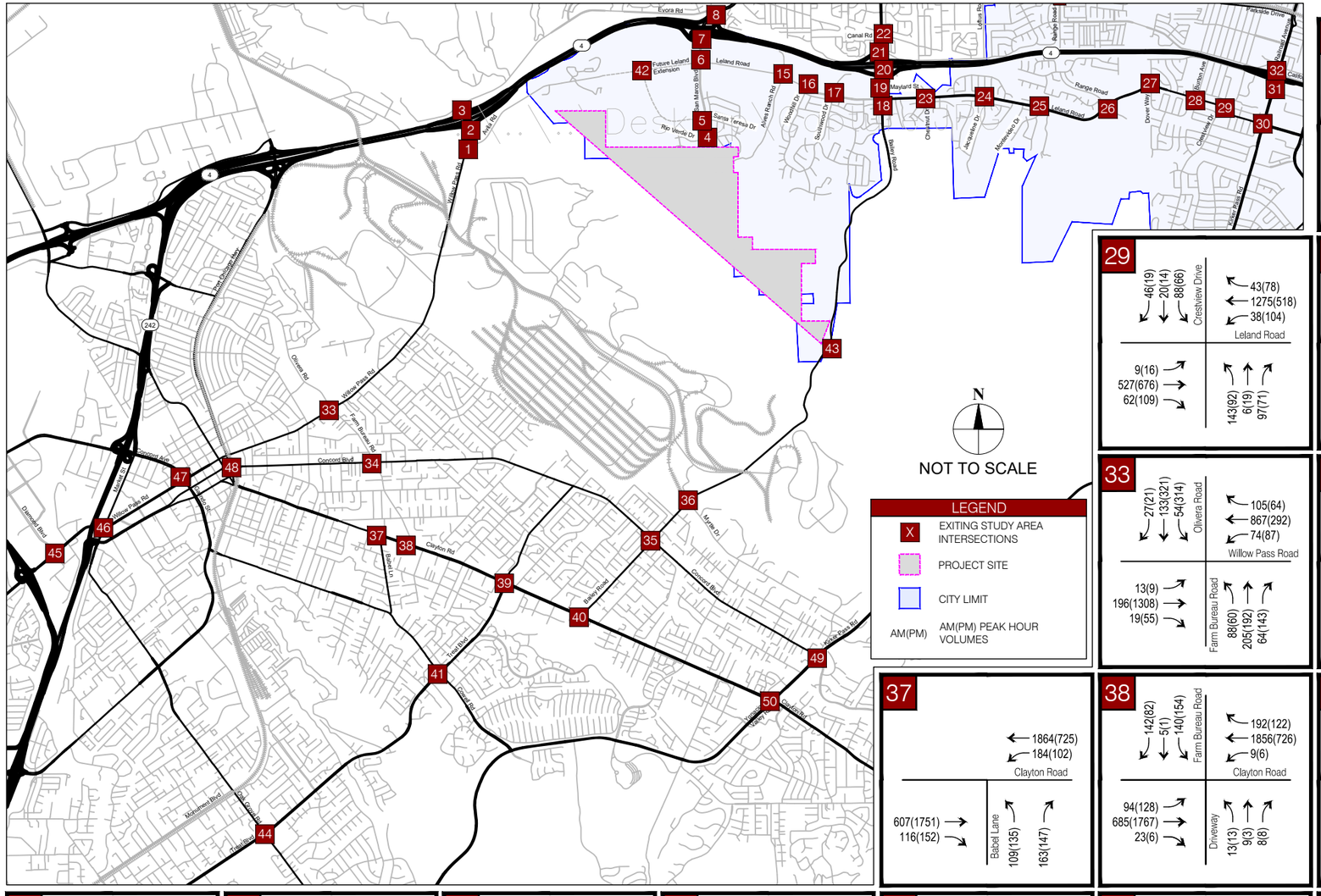


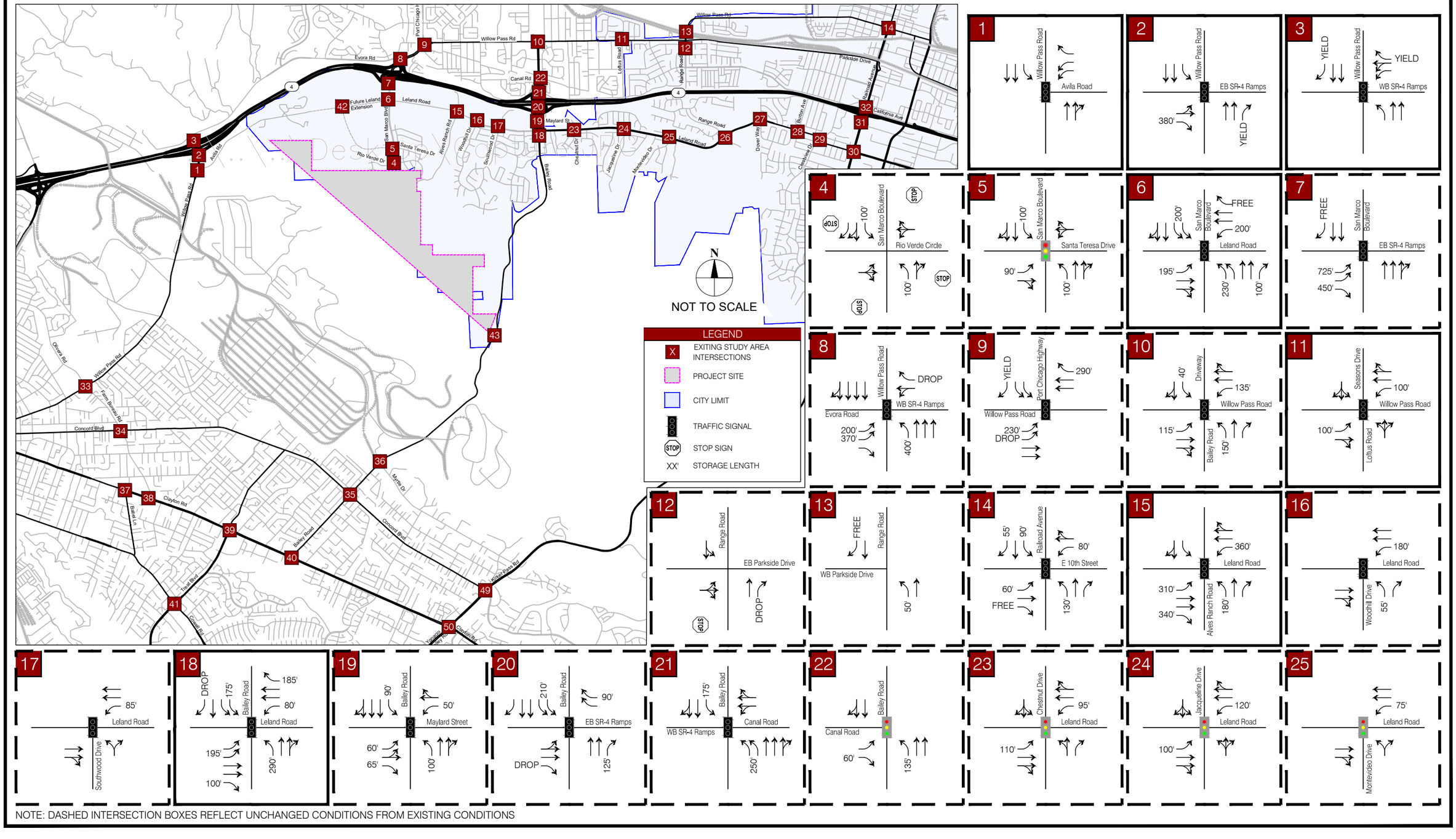
Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 8
EXISTING (2017) PLUS PROJECT PEAK HOUR TURNING MOVEMENT VOLUMES

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY


Evora Rd
Canal Rd
Leland Road
Future Leland Extension
Range Road
Lakeside Drive
Railroad Avenue
Cascade
Mayland St
Rio Verde Dr
Santa Teresa Dr
Alves Ranch Rd
Woodhill Dr
Southwood Dr
Ubora Rd
Chestnut Dr
Jacqueline Dr
Montevideo Dr
Dover Way
Clearlake Dr
Kirker Pass Rd
Bonan Ave
Burton Ave
Beaver Road
Willow Pass Rd
Farm Bureau Rd
Concord Blvd
Olivera Rd
Myrtle Dr
Bailey Road
Clayton Rd
Treat Blvd
Diamond Blvd
Gateway Blvd
Port Chicago Highway
Ygnacio Valley Road
Cowell Road
Kirker Pass Road
Concord Ave
Alhambra Ave
Marsh Dr
Diablo Rd
Mohr Ave
Pacheco Blvd
Arnold Industrial Way
Solano Way
Contra Costa Canal
Pittsburg Antioch Hwy
Willow Pass Rd
Railroad Ave
Crestview Drive
Babel Ln
Driveway
Project Entrance
Oak Grove Road
Clayton Road
Golf Club Road
Dover Way
Burton Avenue
Railroad Avenue
Crestview Drive
Bailey Rd
Treat Boulevard
Farm Bureau Road
Olivera Road
Market Street
Gaildo St
Port Chicago Highway
Concord Boulevard
Kirker Pass Road
Ygnacio Valley Road
Clayton Road
Cowell Road
EB SR-4 Ramps
WB SR-4 Ramps
California Avenue
Diamond Blvd
Willow Pass Road
Railroad Avenue
Crestview Drive
Leland Road
Bailey Road
Myrtle Drive
Concord Boulevard
Babel Lane



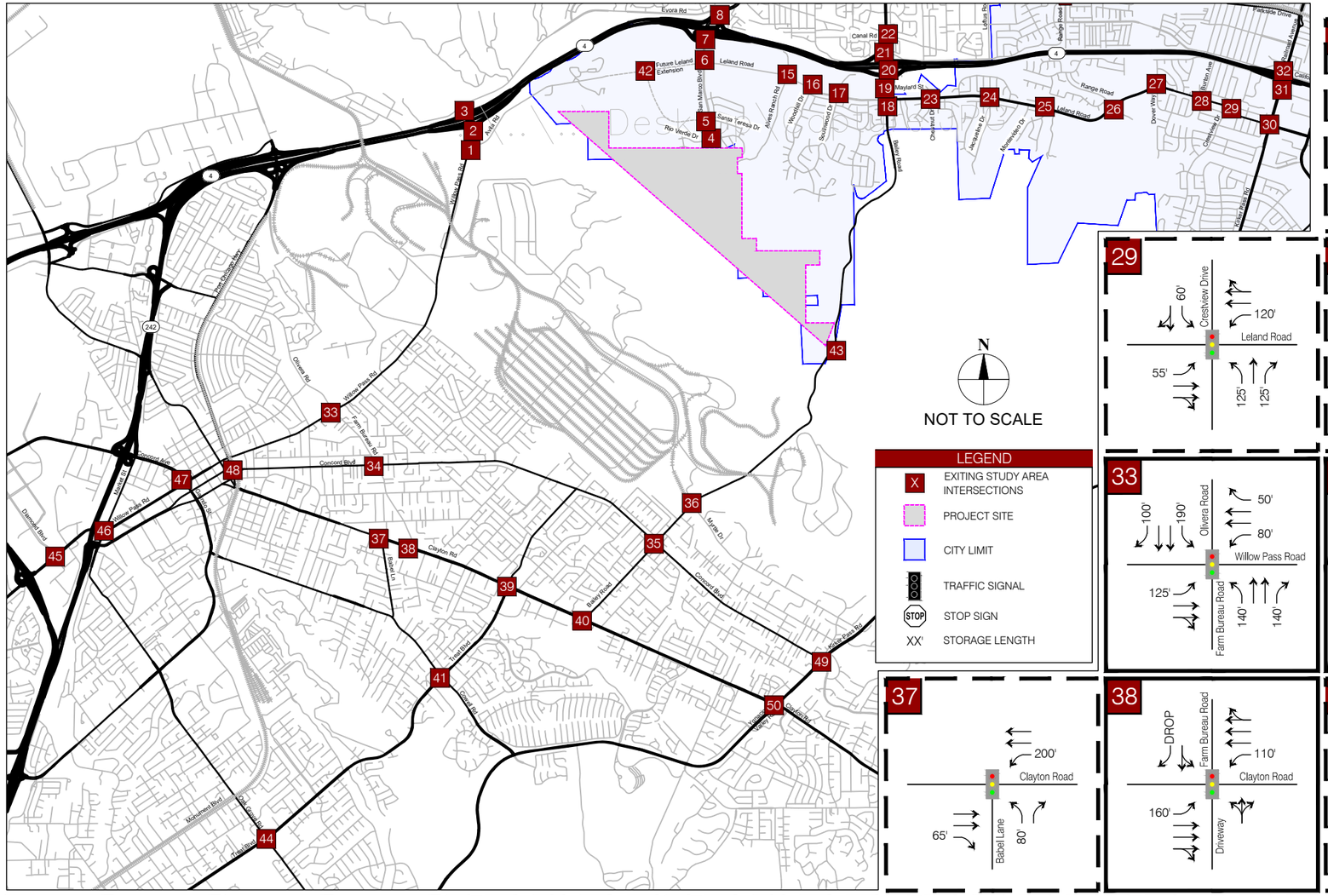
NOTE: DASHED INTERSECTION BOXES REFLECT UNCHANGED CONDITIONS FROM EXISTING CONDITIONS

Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 9
CUMULATIVE (2035) LANE GEOMETRY AND TRAFFIC CONTROL

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



NOTE: DASHED INTERSECTION BOXES REFLECT UNCHANGED CONDITIONS FROM EXISTING CONDITIONS

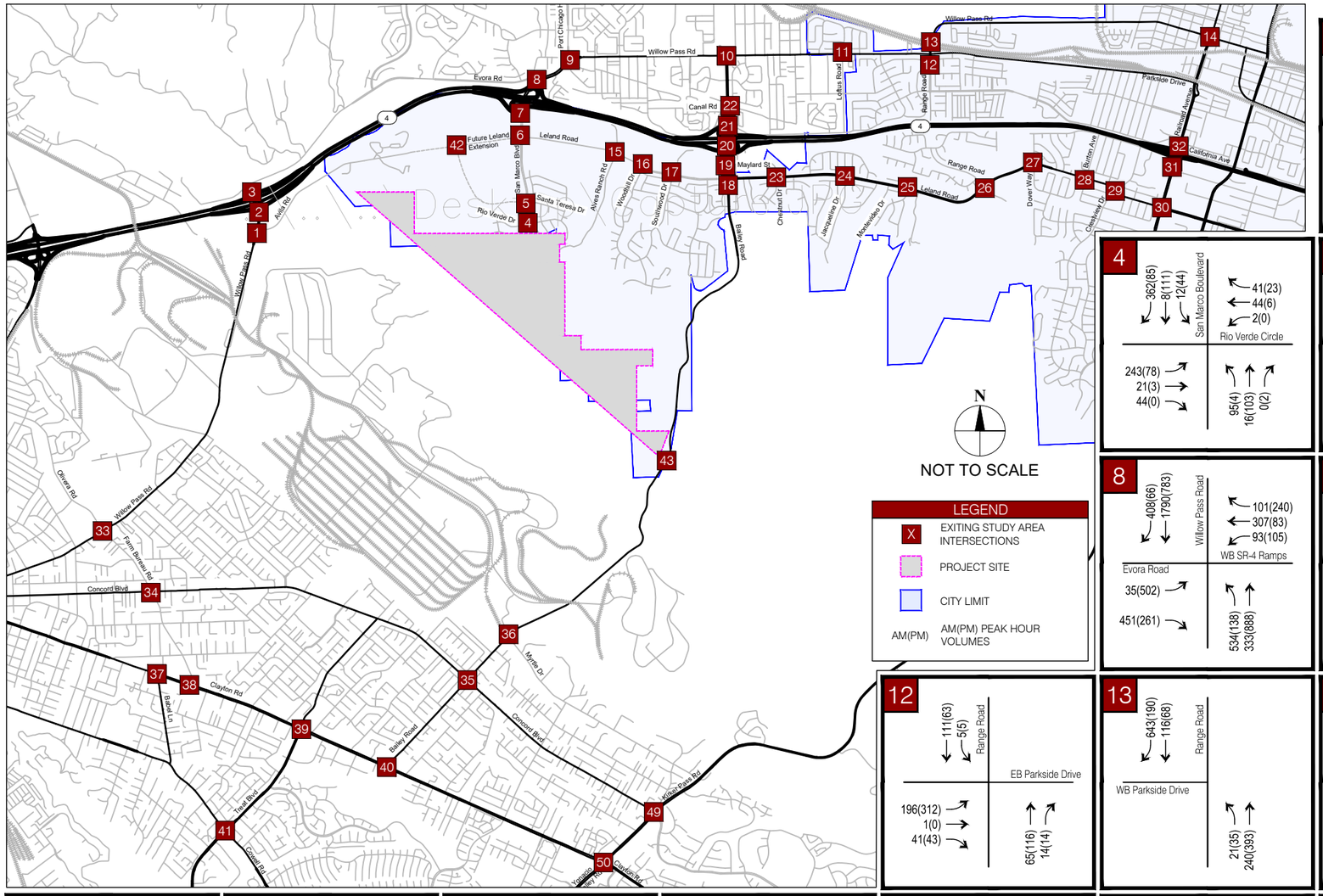
* WITH THE ADDITION OF THE PROJECT

Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 9
CUMULATIVE (2035) LANE GEOMETRY AND TRAFFIC CONTROL (CONTINUED)

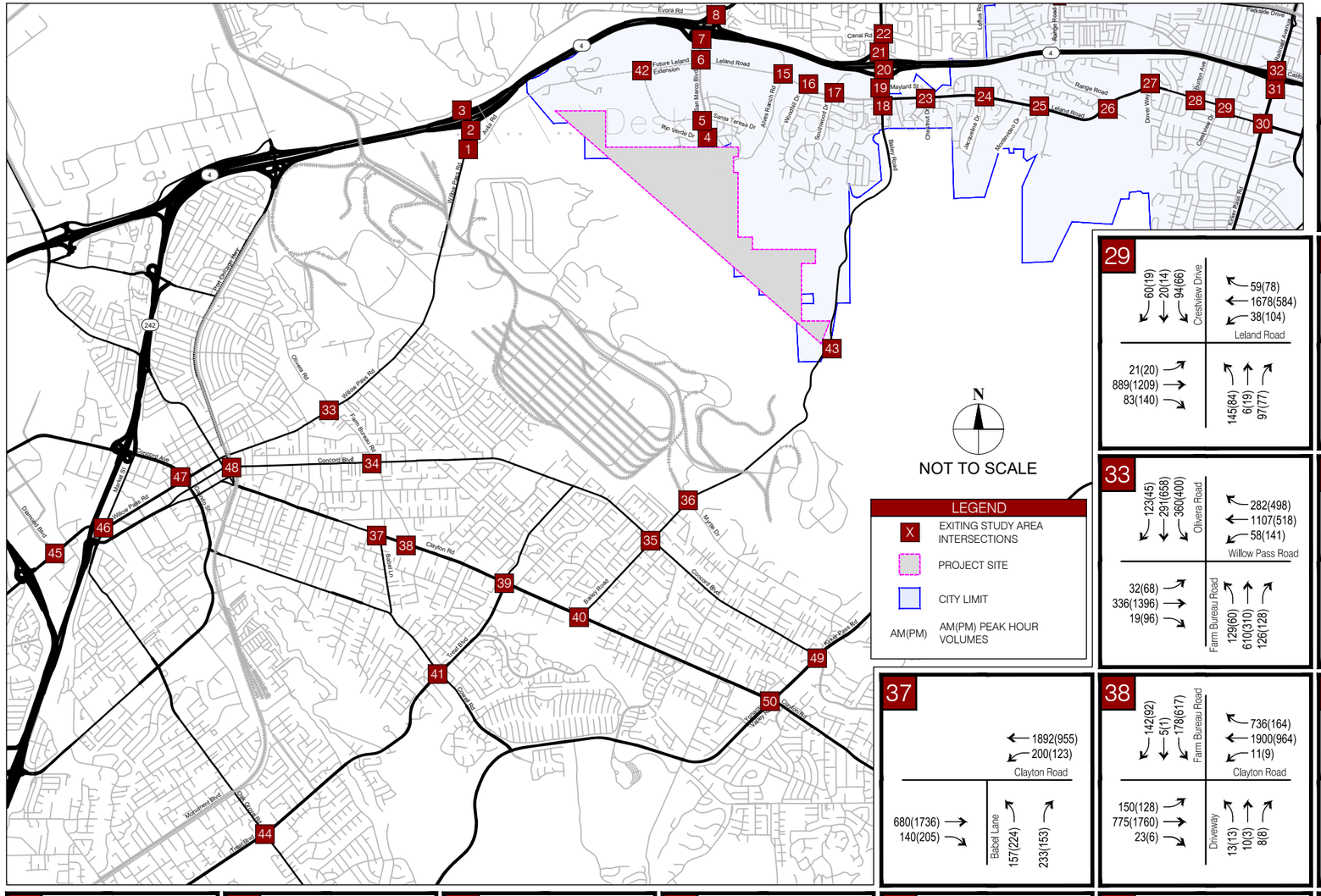
PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 10
CUMULATIVE (2035) PEAK HOUR TURNING MOVEMENT VOLUMES
PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



26

	201(62) 3(3) 281(70) Range Road		74(106) 1632(503) 10(6) Leland Road
137(140) 746(1355) 12(11)		Golf Club Road 11(13) 1(4) 9(12)	

27

	31(14) 1(5) 12(11) Dover Way		10(10) 1730(562) 2(7) Leland Road
7(10) 977(1332) 40(75)		116(41) 5(1) 9(3)	

28

	51(19) 23(2) 87(22) Burton Avenue		133(23) 1619(601) 1(2) Leland Road
45(51) 941(1290) 56(40)		45(12) 60(5) 1(12)	

29

	60(19) 20(14) 94(66) Crestview Drive		59(78) 1678(584) 38(104) Leland Road
21(20) 889(1209) 83(140)		145(84) 6(19) 97(77)	

30

	789(586) 275(612) 162(189) Railroad Avenue		126(108) 797(208) 20(24) Leland Road
463(607) 615(616) 51(167)		164(54) 445(302) 55(21)	

31

	933(968) 283(379) Railroad Avenue		EB SR-4 Ramps
504(456) 1(1) 422(499)		872(707) 324(389)	

32

	158(430) 916(1114) 98(115) Railroad Avenue		439(384) 127(227) 300(233) California Avenue
WB SR-4 Ramps		199(294) 1039(765) 138(104)	

33

	123(45) 291(658) 380(400) Olivera Road		282(498) 1107(518) 58(141) Willow Pass Road
32(68) 336(1396) 19(96)		Farm Bureau Road 129(60) 610(310) 126(128)	

34

	108(40) 224(565) 218(284) Farm Bureau Road		221(159) 954(461) 29(88) Concord Boulevard
23(114) 369(951) 45(135)		216(33) 729(172) 77(69)	

35

	913(363) 575(185) 86(78) Bailey Road		36(88) 1275(405) 168(27) Concord Boulevard
141(724) 238(867) 89(71)		59(79) 113(342) 12(42)	

36

	1504(542) 758(27) Bailey Road		43(549) 52(48) Myrtle Drive
		201(1087) 65(74)	

37

			1892(955) 200(123) Clayton Road
680(1736) 140(205)		Babel Lane 157(224)	233(153)

38

	142(92) 5(1) 178(617) Farm Bureau Road		736(164) 1900(964) 11(9) Clayton Road
150(128) 775(1760) 23(6)		Driveway 13(13) 10(3) 8(8)	

39

	90(97) 607(364) 90(177) Treat Boulevard		37(83) 1809(853) 577(344) Clayton Road
110(171) 660(1665) 232(224)		291(353) 190(559) 197(508)	

40

	866(172) 1(7) 125(223) Bailey Road		47(121) 1858(1092) 13(67) Clayton Road
126(353) 671(2072) 0(4)		Driveway 3(35) 0(17) 0(24)	

41

	1491(170) 1492(627) 59(104) Treat Boulevard		77(99) 618(295) 663(246) Cowell Road
110(333) 245(693) 336(145)		80(269) 360(1574) 163(820)	

42

			1335(962) 56(94) Leland Road
652(1606) 21(142)		Santa Teresa Drive 169(55)	63(83)

43

	61(41) 1453(629) Bailey Rd		
Project Entrance 11(71) 25(44)		28(67) 657(1012)	

44

	264(414) 1786(951) 465(449) Treat Boulevard		202(713) 611(1280) 308(412) Oak Grove Road
688(395) 1584(502) 209(131)		119(289) 408(1741) 322(236)	

45

	266(532) 26(59) 155(436) Diamond Blvd		261(374) 1128(1225) 78(85) Willow Pass Rd
299(457) 1347(1651) 175(140)		76(257) 14(103) 22(136)	

46

	244(162) 328(468) 120(131) Market Street		120(257) 1077(765) Willow Pass Road
86(297) 962(1815) 172(705)		524(478) 492(658) 239(320)	

47

	36(35) 793(1143) 63(234) Galindo St		383(353) 767(336) 131(116) Willow Pass Road
144(262) 392(701) 89(176)		99(138) 1390(1353) 96(241)	

48

	Port Chicago Highway		295(118) 1238(441) Concord Boulevard
3(10) 140(143)		679(396) 383(1257) 378(15)	

49

	776(185) 1879(790) 97(137) Kirker Pass Road		156(85) 420(146) 233(197) Concord Boulevard
160(314) 127(218) 225(132)		119(169) 616(2013) 109(411)	

50

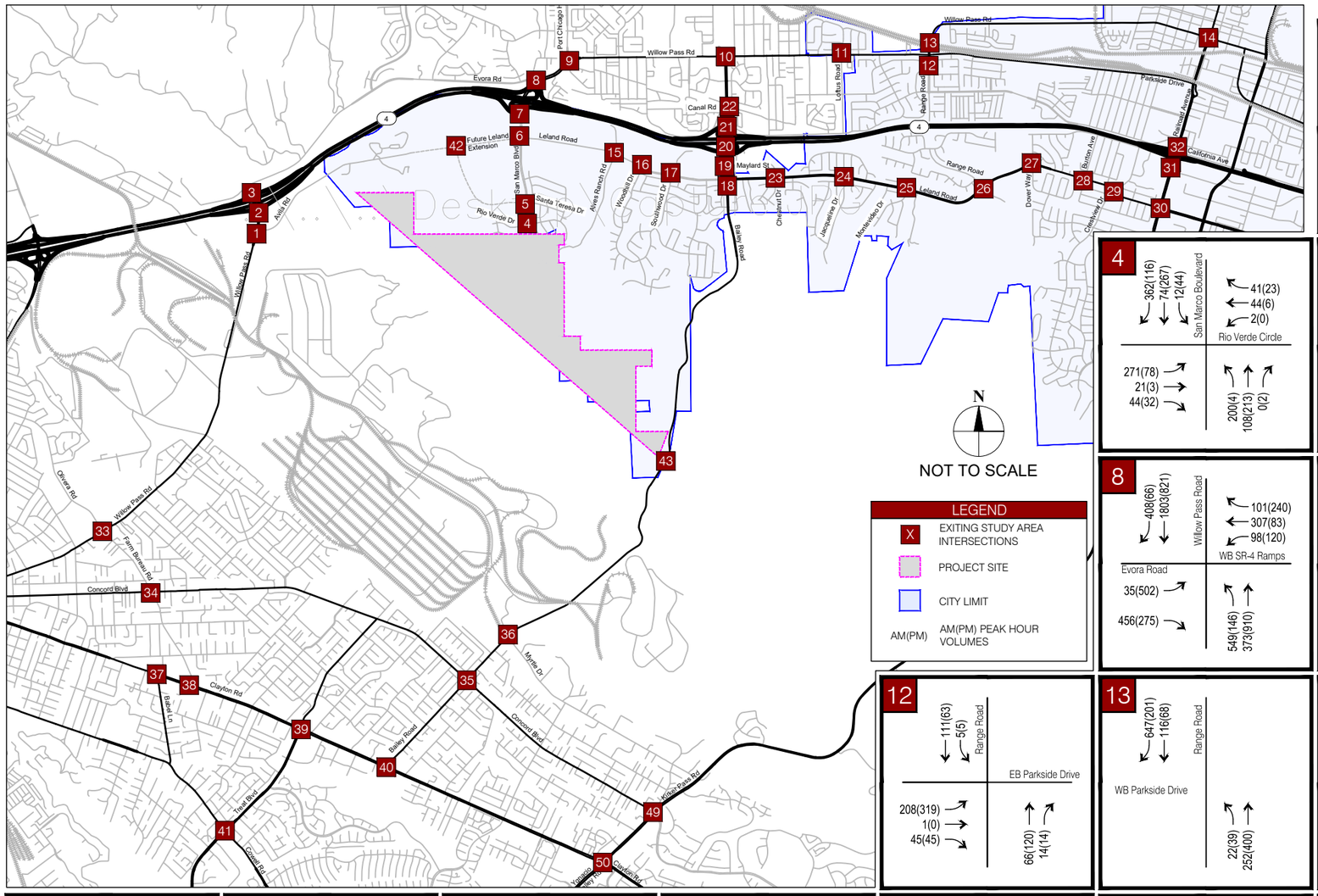
	543(209) 1551(453) 204(369) Ygnacio Valley Road		162(220) 647(562) 1357(421) Clayton Road
155(505) 454(776) 38(70)		75(192) 376(1718) 291(867)	

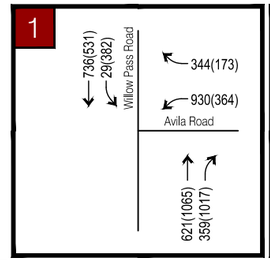
Kimley»Horn

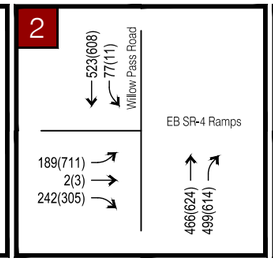
BH-097464007 JUNE 2019

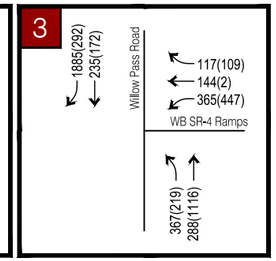
FIGURE 10
CUMULATIVE (2035) PEAK HOUR TURNING MOVEMENT VOLUMES (CONTINUED)

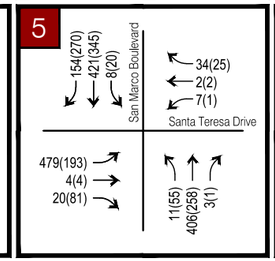
PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

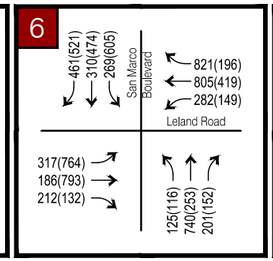


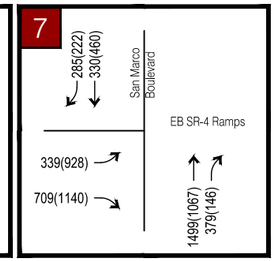


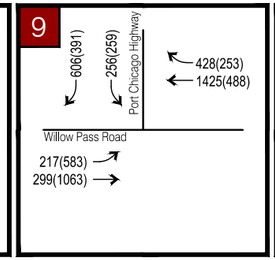


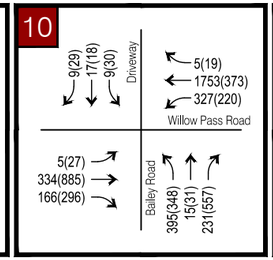


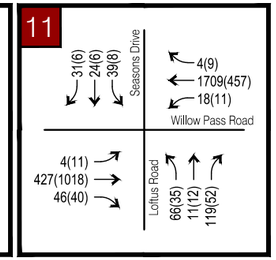


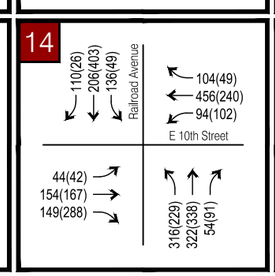


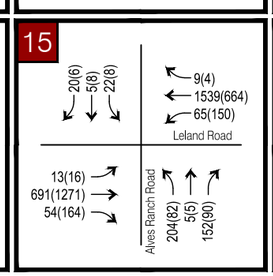


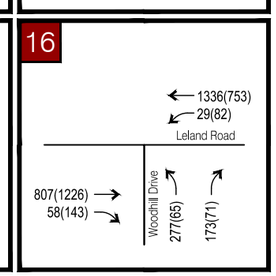


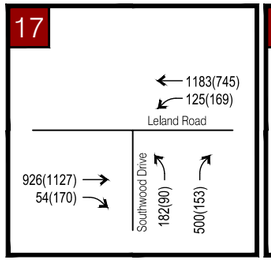


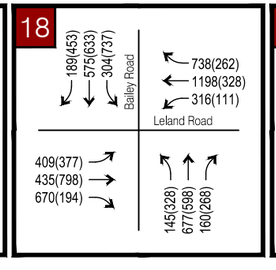


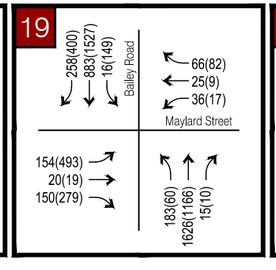


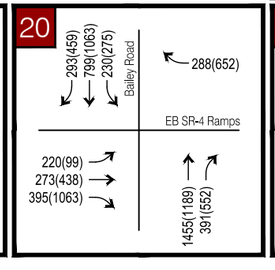


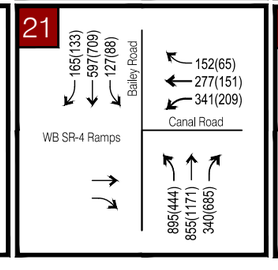


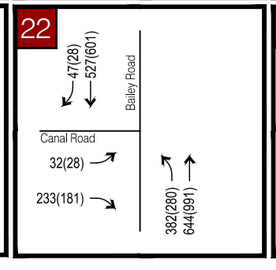


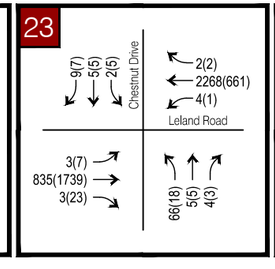


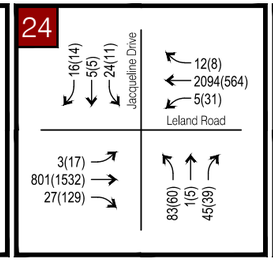


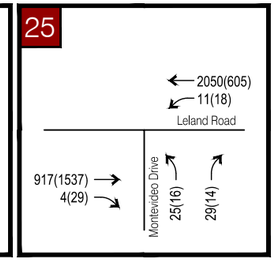










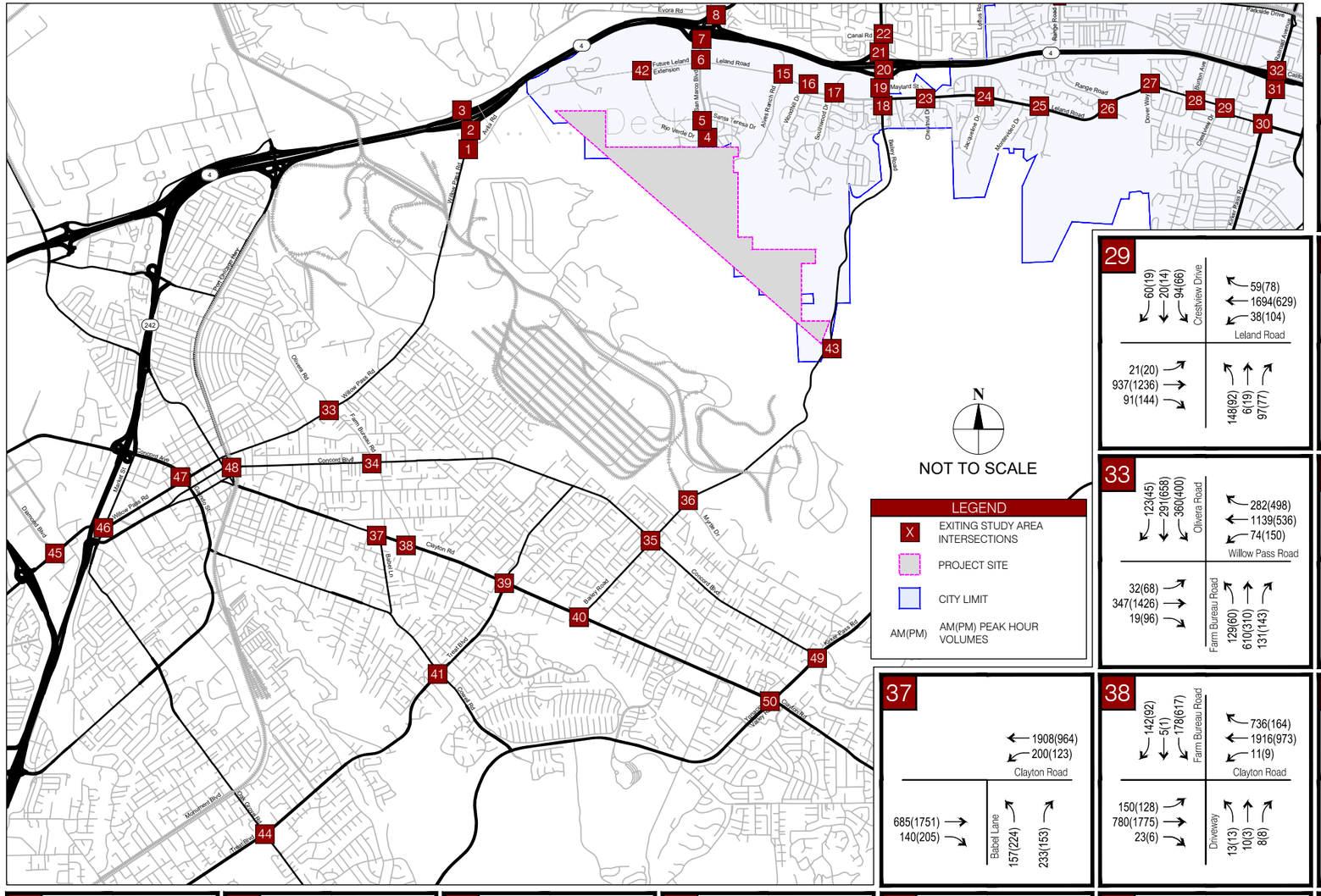


Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 11
CUMULATIVE (2035) PLUS PROJECT PEAK HOUR TURNING MOVEMENT VOLUMES

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY



26

Range Road: 204(70) ↓ 3(3) ↓ 281(70) ; 74(106) ← 1653(564) ← 10(6)
Golf Club Road: 145(144) → 810(1391) → 12(11) ; 11(13) ↑ 1(4) ↑ 9(12)
Leland Road

27

Dover Way: 31(14) ↓ 1(5) ↓ 12(11) ; 10(10) ← 1751(623) ← 2(7)
7(10) → 1041(1368) → 40(75) ; 116(41) ↑ 5(1) ↑ 9(3)
Leland Road

28

Burton Avenue: 54(27) ↓ 23(2) ↓ 87(22) ; 133(23) ← 1638(654) ← 1(2)
53(55) → 997(1321) → 56(40) ; 45(12) ↑ 60(5) ↑ 1(12)
Leland Road

29

Crestview Drive: 60(19) ↓ 20(14) ↓ 94(66) ; 59(78) ← 1694(629) ← 38(104)
21(20) → 937(1236) → 91(144) ; 148(92) ↑ 6(19) ↑ 97(77)
Leland Road

30

Railroad Avenue: 789(586) ↓ 275(612) ↓ 162(189) ; 126(108) ← 808(238) ← 20(24)
463(607) → 647(634) → 67(176) ; 169(69) ↑ 445(302) ↑ 55(21)
Leland Road

31

Railroad Avenue: 933(968) ↓ 283(379) ↓
520(465) → 1(1) → 422(499) ;
EB SR-4 Ramps: 872(707) ↑ 324(389) ↑

32

Railroad Avenue: 163(445) ↓ 916(1114) ↓ 98(115) ↓
WB SR-4 Ramps ;
California Avenue: 439(384) ← 127(227) ← 300(233)
199(294) ↑ 1055(774) ↑ 138(104) ↑

33

Olivera Road: 123(45) ↓ 291(658) ↓ 360(400) ↓ ; 282(498) ← 1139(536) ← 74(150)
32(68) → 347(1426) → 19(96) → ; Farm Bureau Road: 129(60) ↑ 610(310) ↑ 131(143) ↑
Willow Pass Road

34

Farm Bureau Road: 108(40) ↓ 232(569) ↓ 218(284) ↓ ; 221(159) ← 1026(501) ← 29(88)
23(114) → 393(1019) → 45(135) → ; 216(33) ↑ 732(180) ↑ 77(69) ↑
Concord Boulevard

35

Bailey Road: 985(403) ↓ 651(227) ↓ 110(91) ↓ ; 44(111) ← 1275(405) ← 168(27)
165(792) → 238(867) → 89(71) → ; 59(79) ↑ 138(414) ↑ 12(42) ↑
Concord Boulevard

36

Bailey Road: 1675(638) ↓ 766(31) ↓ ; 46(557) ← 52(48)
258(1250) ↑ 65(74) ↑
Myrtle Drive

37

1908(964) ← 200(123) ← Clayton Road
685(1751) → 140(205) → ; Babel Lane: 157(224) ↑ 233(153) ↑

38

Farm Bureau Road: 142(92) ↓ 5(1) ↓ 178(617) ↓ ; 736(164) ← 1916(973) ← 11(9) ← Clayton Road
150(128) → 780(1775) → 23(6) → ; Driveway: 13(13) ↑ 10(3) ↑ 8(8) ↑

39

Treat Boulevard: 90(97) ↓ 607(364) ↓ 90(177) ↓ ; 37(83) ← 1825(862) ← 633(375) ← Clayton Road
110(171) → 665(1680) → 232(224) → ; 291(353) ↑ 190(559) ↑ 216(561) ↑

40

Bailey Road: 938(212) ↓ 1(7) ↓ 125(223) ↓ ; 47(121) ← 1858(1092) ← 13(67) ← Clayton Road
150(421) → 671(2072) → 0(4) → ; Driveway: 3(35) ↑ 0(17) ↑ 0(24) ↑

41

Treat Boulevard: 149(170) ↓ 1548(658) ↓ 59(104) ↓ ; 77(99) ← 618(295) ← 663(246) ← Cowell Road
110(333) → 245(693) → 336(145) → ; 80(269) ↑ 379(1627) ↑ 163(820) ↑

42

1335(962) ← 56(94) ← Leland Road
652(1606) → 53(232) → ; Santa Teresa Drive: 264(108) ↑ 63(83) ↑

43

169(350) ↓ 1453(629) ↓ Bailey Rd
Project Entrance: 336(253) → 204(144) → ; 88(237) ↑ 657(1012) ↑

44

Treat Boulevard: 264(414) ↓ 1842(982) ↓ 465(449) ↓ ; 202(713) ← 611(1280) ← 308(412) ← Oak Grove Road
688(395) → 1584(502) → 209(131) → ; 119(289) ↑ 427(1794) ↑ 322(236) ↑

45

Diamond Blvd: 266(532) ↓ 26(59) ↓ 155(436) ↓ ; 261(374) ← 1160(1243) ← 78(85) ← Willow Pass Rd
299(457) → 1358(1681) → 175(140) → ; 76(257) ↑ 14(103) ↑ 22(136) ↑

46

Market Street: 244(162) ↓ 328(468) ↓ 120(131) ↓ ; 120(257) ← 1109(783) ← Willow Pass Road
86(297) → 973(1845) → 172(705) → ; 524(478) ↑ 492(658) ↑ 239(320) ↑

47

Galindo St: 36(35) ↓ 793(1143) ↓ 63(234) ↓ ; 383(353) ← 799(354) ← 131(116) ← Willow Pass Road
144(262) → 403(731) → 89(176) → ; 99(138) ↑ 1390(1353) ↑ 96(241) ↑

48

Port Chicago Highway: ; 295(118) ← 1310(481) ← Concord Boulevard
3(10) → 164(211) → ; 679(396) ↑ 383(1257) ↑ 378(15) ↑

49

Kirker Pass Road: 776(185) ↓ 1895(799) ↓ 97(137) ↓ ; 156(85) ← 428(169) ← 233(197) ← Concord Boulevard
160(314) → 151(231) → 225(132) → ; 119(169) ↑ 621(2028) ↑ 109(411) ↑

50

Ygnacio Valley Road: 543(209) ↓ 1567(462) ↓ 204(369) ↓ ; 162(220) ← 647(562) ← 1357(421) ← Clayton Road
155(505) → 454(776) → 38(70) → ; 75(192) ↑ 381(1733) ↑ 291(867) ↑

Kimley»Horn

BH-097464007 JUNE 2019

FIGURE 11
CUMULATIVE (2035) PLUS PROJECT PEAK HOUR TURNING MOVEMENT VOLUMES (CONTINUED)

PITTSBURG FARIA ANNEXATION TRAFFIC IMPACT STUDY

APPENDIX

TURNING MOVEMENT VOLUMES

EXISTING TRAFFIC CONDITIONS

TRIP GENERATION

EXISTING PLUS PROJECT TRAFFIC CONDITIONS

LONG-TERM (2035) TRAFFIC CONDITIONS

LONG-TERM (2035) PLUS PROJECT TRAFFIC CONDITIONS

ARTERIAL LEVEL OF SERVICE ANALYSIS

MITIGATED CONDITIONS

Turning Movement Volumes

National Data and Surveying Services

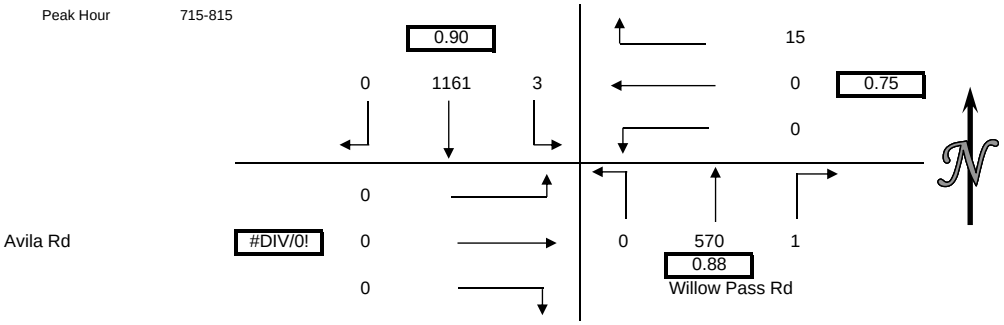
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-001
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Willow Pass Rd
	E/W	Avila Rd
CITY:		Concord

VEHICLE COUNTS

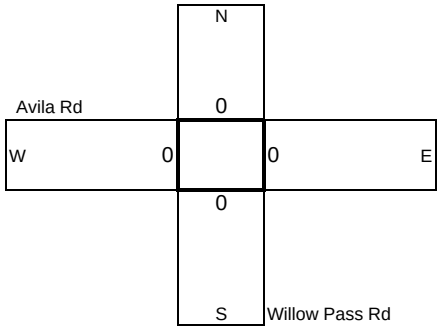
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	242	1	10	0	0	1	69	0	0	0	0	323
715-730	0	302	0	4	0	0	1	114	0	0	0	0	421
730-745	0	319	3	2	0	0	0	143	0	0	0	0	467
745-800	0	276	0	4	0	0	0	163	0	0	0	0	443
800-815	0	264	0	5	0	0	0	150	0	0	0	0	419
815-830	0	244	0	6	0	0	0	140	0	0	0	0	390
830-845	0	247	1	1	0	0	0	145	0	0	0	0	394
845-900	0	223	4	2	0	0	0	117	0	0	0	0	346
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	1139	4	20	0	0	2	489	0	0	0	0	1654
715-815	0	1161	3	15	0	0	1	570	0	0	0	0	1750
730-830	0	1103	3	17	0	0	0	596	0	0	0	0	1719
745-845	0	1031	1	16	0	0	0	598	0	0	0	0	1646
800-900	0	978	5	14	0	0	0	552	0	0	0	0	1549

Peak Hour 715-815



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	0	0	0	0	0
730-830	0	0	0	0	0
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	1	1	0	0	0	0	0	2
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	1	1	0	0	0	0	0	2
800-900	0	0	0	0	0	1	1	0	0	0	0	0	2

National Data and Surveying Services

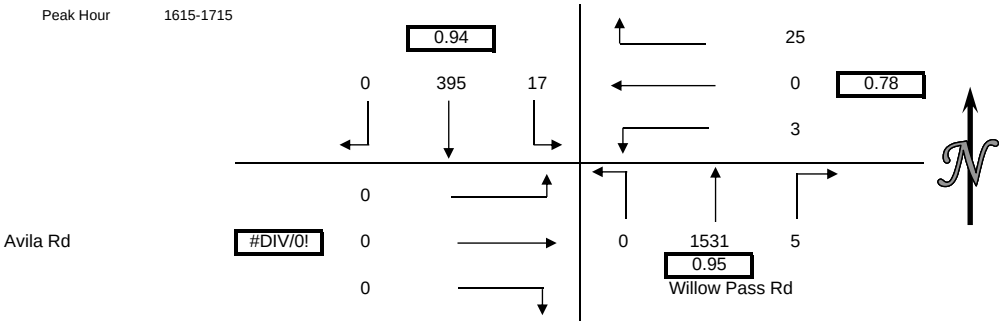
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-001
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Willow Pass Rd
	E/W	Avila Rd
CITY:		Concord

VEHICLE COUNTS

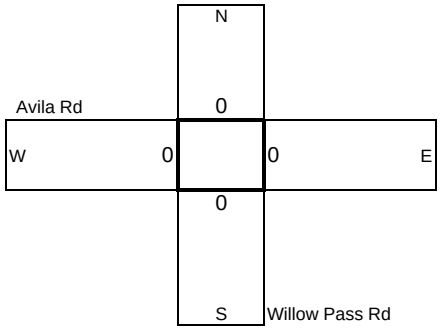
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	89	4	4	0	1	0	338	0	0	0	0	436
1615-1630	0	95	9	9	0	0	1	402	0	0	0	0	516
1630-1645	0	105	5	6	0	1	0	370	0	0	0	0	487
1645-1700	0	97	2	8	0	0	2	378	0	0	0	0	487
1700-1715	0	98	1	2	0	2	2	381	0	0	0	0	486
1715-1730	0	104	4	0	0	0	0	389	0	0	0	0	497
1730-1745	0	107	0	2	0	0	0	384	0	0	0	0	493
1745-1800	0	90	0	1	0	0	0	398	0	0	0	0	489
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	386	20	27	0	2	3	1488	0	0	0	0	1926
1615-1715	0	395	17	25	0	3	5	1531	0	0	0	0	1976
1630-1730	0	404	12	16	0	3	4	1518	0	0	0	0	1957
1645-1745	0	406	7	12	0	2	4	1532	0	0	0	0	1963
1700-1800	0	399	5	5	0	2	2	1552	0	0	0	0	1965

Peak Hour 1615-1715



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1645-1745	0	0	0	0	0	0	0	1	0	0	0	0	1
1700-1800	0	0	0	0	0	0	0	1	0	0	0	0	1

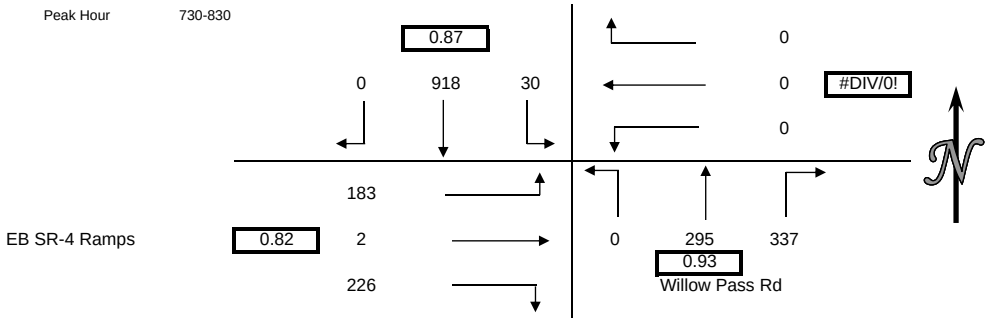
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-002
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Willow Pass Rd
	E/W	EB SR-4 Ramps
CITY:		Concord

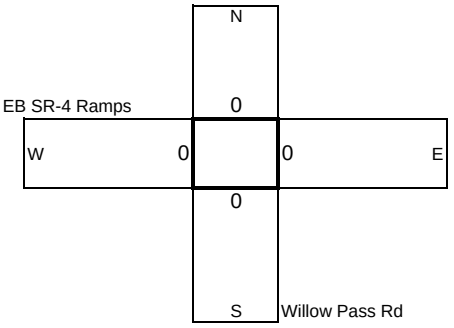
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	206	2	0	0	0	34	41	0	41	2	33	359
715-730	0	248	2	0	0	0	48	71	0	49	0	33	451
730-745	0	264	7	0	0	0	76	75	0	71	1	53	547
745-800	0	235	5	0	0	0	93	77	0	51	1	46	508
800-815	0	224	12	0	0	0	91	68	0	46	0	38	479
815-830	0	195	6	0	0	0	77	75	0	58	0	46	457
830-845	0	196	10	0	0	0	78	73	0	41	1	38	437
845-900	0	168	13	0	0	0	48	65	0	51	2	38	385
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	953	16	0	0	0	251	264	0	212	4	165	1865
715-815	0	971	26	0	0	0	308	291	0	217	2	170	1985
730-830	0	918	30	0	0	0	337	295	0	226	2	183	1991
745-845	0	850	33	0	0	0	339	293	0	196	2	168	1881
800-900	0	783	41	0	0	0	294	281	0	196	3	160	1758



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	0	0	0	0	0
730-830	0	0	0	0	0
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

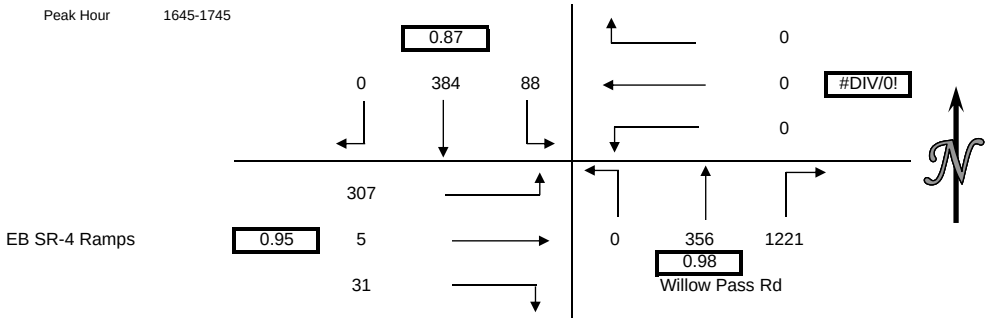
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-002
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Willow Pass Rd
	E/W	EB SR-4 Ramps
CITY:		Concord

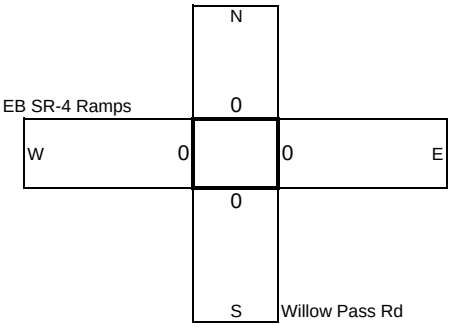
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	74	19	0	0	0	274	72	0	17	4	69	529
1615-1630	0	85	21	0	0	0	318	89	0	14	3	69	599
1630-1645	0	94	19	0	0	0	283	90	0	12	1	79	578
1645-1700	0	91	18	0	0	0	310	83	0	11	0	78	591
1700-1715	0	91	25	0	0	0	301	88	0	6	2	82	595
1715-1730	0	94	17	0	0	0	308	94	0	11	3	73	600
1730-1745	0	108	28	0	0	0	302	91	0	3	0	74	606
1745-1800	0	84	22	0	0	0	299	88	0	9	0	82	584
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	344	77	0	0	0	1185	334	0	54	8	295	2297
1615-1715	0	361	83	0	0	0	1212	350	0	43	6	308	2363
1630-1730	0	370	79	0	0	0	1202	355	0	40	6	312	2364
1645-1745	0	384	88	0	0	0	1221	356	0	31	5	307	2392
1700-1800	0	377	92	0	0	0	1210	361	0	29	5	311	2385



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	1	0	0	1
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	1	0	0	1
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	1	1
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1645-1745	0	0	0	0	0	0	0	1	0	0	0	1	2
1700-1800	0	0	0	0	0	0	0	1	0	0	0	1	2

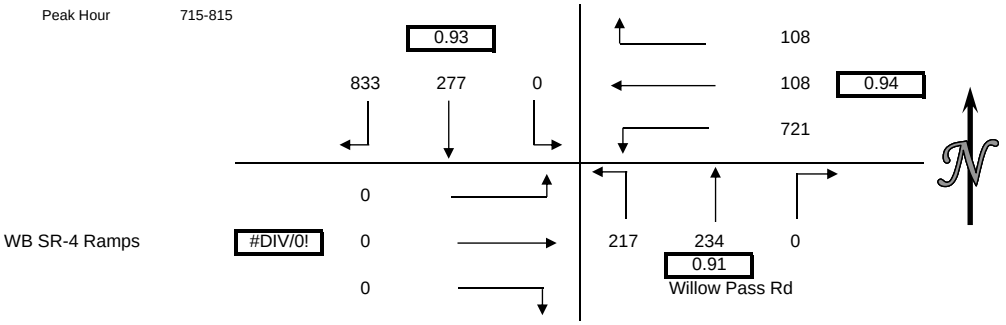
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-003
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Willow Pass Rd
	E/W	WB SR-4 Ramps
CITY:		Concord

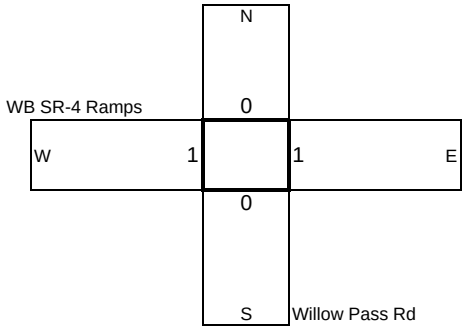
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	220	53	0	35	25	152	0	46	33	0	0	0	564
715-730	218	80	0	21	32	173	0	48	51	0	0	0	623
730-745	202	78	0	30	17	189	0	66	58	0	0	0	640
745-800	202	59	0	28	36	186	0	59	60	0	0	0	630
800-815	211	60	0	29	23	173	0	61	48	0	0	0	605
815-830	137	55	0	24	35	143	0	66	51	0	0	0	511
830-845	130	45	0	19	27	164	0	61	55	0	0	0	501
845-900	114	39	0	23	10	149	0	44	56	0	0	0	435
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	842	270	0	114	110	700	0	219	202	0	0	0	2457
715-815	833	277	0	108	108	721	0	234	217	0	0	0	2498
730-830	752	252	0	111	111	691	0	252	217	0	0	0	2386
745-845	680	219	0	100	121	666	0	247	214	0	0	0	2247
800-900	592	199	0	95	95	629	0	232	210	0	0	0	2052



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	1	0	1	2
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	0	1	2
715-815	0	1	0	1	2
730-830	0	1	0	1	2
745-845	0	1	0	1	2
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	1	0	0	0	0	0	0	0	0	0	0	0	1
730-745	0	0	0	0	1	0	0	0	0	0	0	0	1
745-800	1	0	0	0	0	0	0	0	0	0	0	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	2	0	0	0	1	0	0	0	0	0	0	0	3
715-815	2	0	0	0	1	0	0	0	0	0	0	0	3
730-830	1	0	0	0	1	0	0	0	0	0	0	0	2
745-845	1	0	0	0	0	0	0	0	0	0	0	0	1
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

National Data and Surveying Services

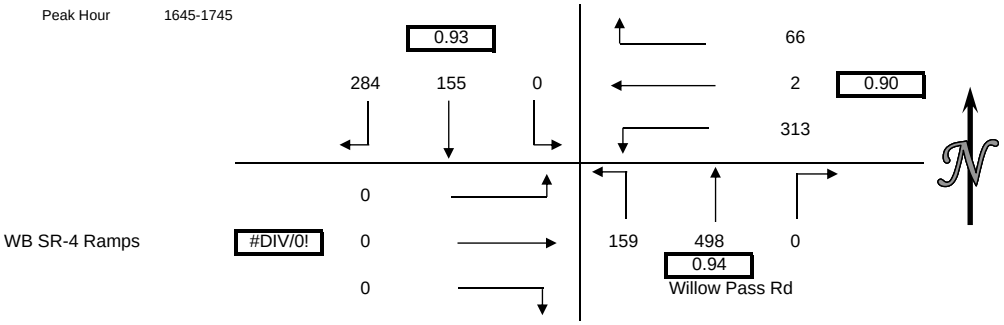
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-003
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Willow Pass Rd
	E/W	WB SR-4 Ramps
CITY:		Concord

VEHICLE COUNTS

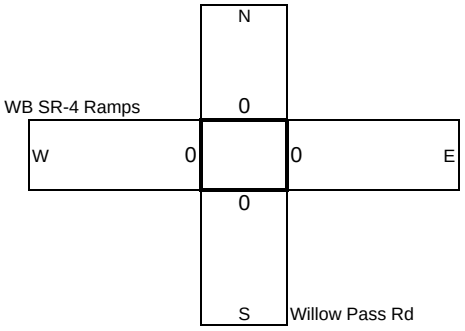
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	54	34	0	17	0	61	0	100	43	0	0	0	309
1615-1630	53	41	0	17	2	63	0	108	49	0	0	0	333
1630-1645	59	34	0	15	1	78	0	117	55	0	0	0	359
1645-1700	66	35	0	19	0	70	0	114	42	0	0	0	346
1700-1715	74	40	0	10	1	78	0	134	40	0	0	0	377
1715-1730	69	37	0	21	0	76	0	129	38	0	0	0	370
1730-1745	75	43	0	16	1	89	0	121	39	0	0	0	384
1745-1800	50	37	0	11	1	65	0	134	44	0	0	0	342
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	232	144	0	68	3	272	0	439	189	0	0	0	1347
1615-1715	252	150	0	61	4	289	0	473	186	0	0	0	1415
1630-1730	268	146	0	65	2	302	0	494	175	0	0	0	1452
1645-1745	284	155	0	66	2	313	0	498	159	0	0	0	1477
1700-1800	268	157	0	58	3	308	0	518	161	0	0	0	1473

Peak Hour 1645-1745



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	1	0	0	0	0	0	1
1730-1745	0	0	0	0	0	0	1	0	0	0	0	0	1
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	1	0	0	0	0	0	1
1645-1745	0	0	0	0	0	0	2	0	0	0	0	0	2
1700-1800	0	0	0	0	0	0	2	0	0	0	0	0	2

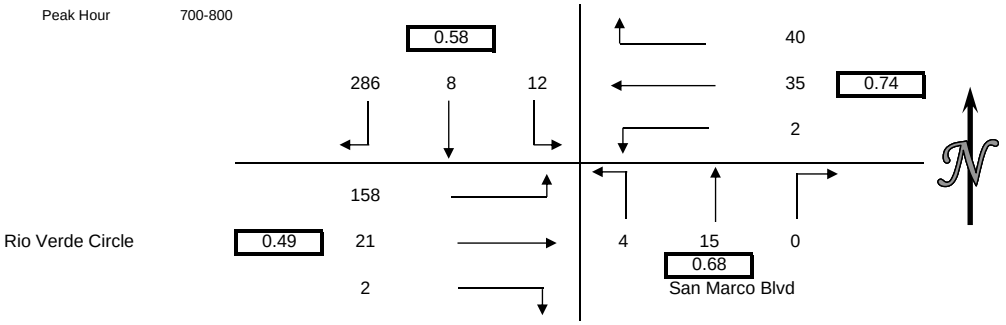
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-004
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	Rio Verde Circle
CITY:		Pittsburg

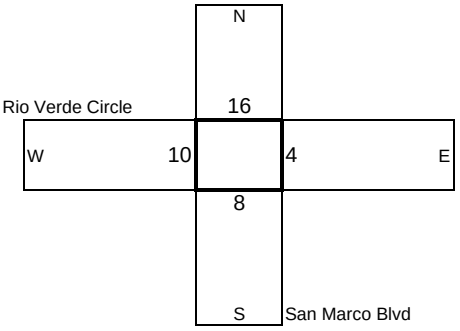
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	26	1	1	12	2	0	0	3	0	0	0	19	64
715-730	45	1	2	13	4	0	0	4	0	1	3	26	99
730-745	127	5	1	8	10	2	0	3	2	0	3	36	197
745-800	88	1	8	7	19	0	0	5	2	1	15	77	223
800-815	21	3	5	5	3	0	0	3	0	0	5	18	63
815-830	14	2	2	5	1	0	0	3	0	0	0	10	37
830-845	7	7	4	3	1	0	0	2	0	0	0	6	30
845-900	5	0	2	5	0	0	0	4	0	0	1	7	24
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	286	8	12	40	35	2	0	15	4	2	21	158	583
715-815	281	10	16	33	36	2	0	15	4	2	26	157	582
730-830	250	11	16	25	33	2	0	14	4	1	23	141	520
745-845	130	13	19	20	24	0	0	13	2	1	20	111	353
800-900	47	12	13	18	5	0	0	12	0	0	6	41	154



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	4	2	2	1	9
715-730	1	0	0	2	3
730-745	5	0	5	0	10
745-800	6	2	1	7	16
800-815	1	1	0	1	3
815-830	2	0	0	2	4
830-845	0	0	0	1	1
845-900	2	0	0	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	16	4	8	10	38
715-815	13	3	6	10	32
730-830	14	3	6	10	33
745-845	9	3	1	11	24
800-900	5	1	0	4	10



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	1	0	0	0	0	0	0	0	1
745-800	0	0	0	0	1	0	0	0	0	0	1	0	2
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	2	0	0	0	0	0	1	0	3
715-815	0	0	0	0	2	0	0	0	0	0	1	0	3
730-830	0	0	0	0	2	0	0	0	0	0	1	0	3
745-845	0	0	0	0	1	0	0	0	0	0	1	0	2
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

National Data and Surveying Services

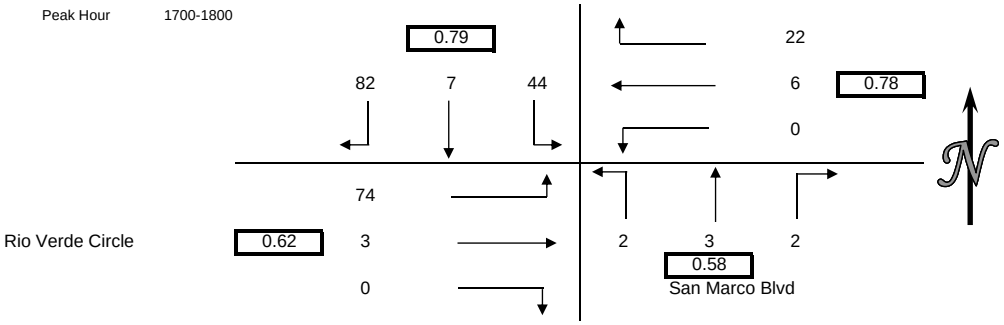
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-004
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	Rio Verde Circle
CITY:		Pittsburg

VEHICLE COUNTS

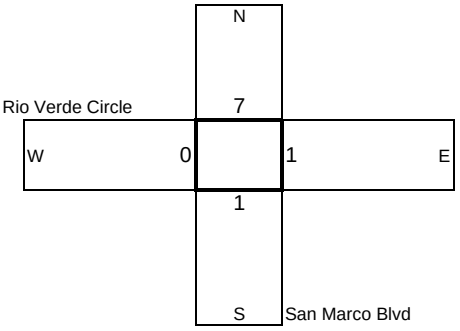
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	2	6	8	2	0	0	0	2	0	0	0	4	24
1615-1630	3	1	9	1	0	1	0	1	0	0	0	6	22
1630-1645	8	4	3	0	0	0	0	1	0	0	0	3	19
1645-1700	6	1	3	2	1	0	1	4	1	1	1	4	25
1700-1715	7	1	9	6	3	0	1	1	0	0	1	4	33
1715-1730	21	1	13	4	0	0	1	0	1	0	0	10	51
1730-1745	30	2	10	7	1	0	0	0	0	0	1	30	81
1745-1800	24	3	12	5	2	0	0	2	1	0	1	30	80
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	19	12	23	5	1	1	1	8	1	1	1	17	90
1615-1715	24	7	24	9	4	1	2	7	1	1	2	17	99
1630-1730	42	7	28	12	4	0	3	6	2	1	2	21	128
1645-1745	64	5	35	19	5	0	3	5	2	1	3	48	190
1700-1800	82	7	44	22	6	0	2	3	2	0	3	74	245

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	1	0	0	1	2
1700-1715	3	1	0	0	4
1715-1730	3	0	0	0	3
1730-1745	0	0	1	0	1
1745-1800	1	0	0	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	1	0	0	1	2
1615-1715	4	1	0	1	6
1630-1730	7	1	0	1	9
1645-1745	7	1	1	1	10
1700-1800	7	1	1	0	9



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0

National Data and Surveying Services

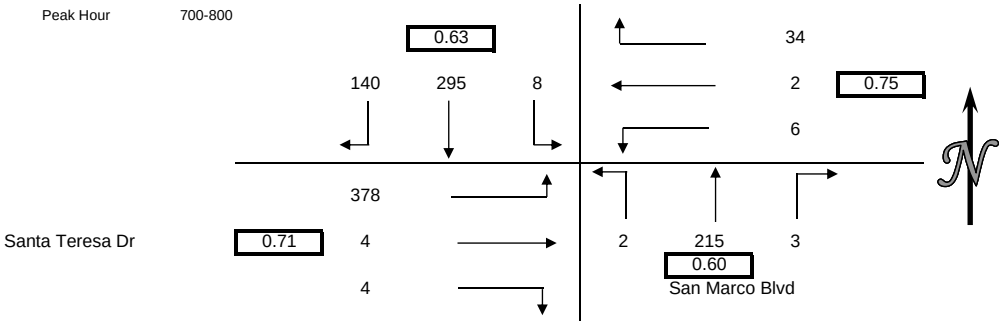
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-005
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	Santa Teresa Dr
CITY:		Pittsburg

VEHICLE COUNTS

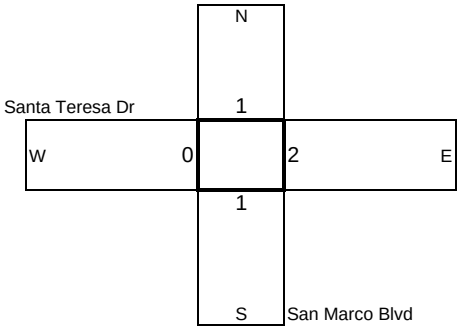
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	24	32	2	7	0	0	1	34	0	0	1	65	166
715-730	29	46	2	8	0	1	1	43	0	0	0	75	205
730-745	52	123	0	9	2	3	1	47	1	1	0	109	348
745-800	35	94	4	10	0	2	0	91	1	3	3	129	372
800-815	30	26	5	5	0	1	0	28	0	1	0	45	141
815-830	38	19	3	6	0	0	0	19	0	0	0	39	124
830-845	36	17	0	5	0	0	0	11	1	0	0	53	123
845-900	28	14	4	7	0	0	0	18	0	0	1	41	113
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	140	295	8	34	2	6	3	215	2	4	4	378	1091
715-815	146	289	11	32	2	7	2	209	2	5	3	358	1066
730-830	155	262	12	30	2	6	1	185	2	5	3	322	985
745-845	139	156	12	26	0	3	0	149	2	4	3	266	760
800-900	132	76	12	23	0	1	0	76	1	1	1	178	501

Peak Hour 700-800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	1	1	0	2
715-730	1	0	0	0	1
730-745	0	0	0	0	0
745-800	0	1	0	0	1
800-815	0	1	1	1	3
815-830	1	3	2	0	6
830-845	0	1	0	1	2
845-900	1	1	1	0	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	1	2	1	0	4
715-815	1	2	1	1	5
730-830	1	5	3	1	10
745-845	1	6	3	2	12
800-900	2	6	4	2	14



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	1	1
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	1	1
715-815	0	0	0	0	0	0	0	0	0	0	0	1	1
730-830	0	0	0	0	0	0	0	0	0	0	0	1	1
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

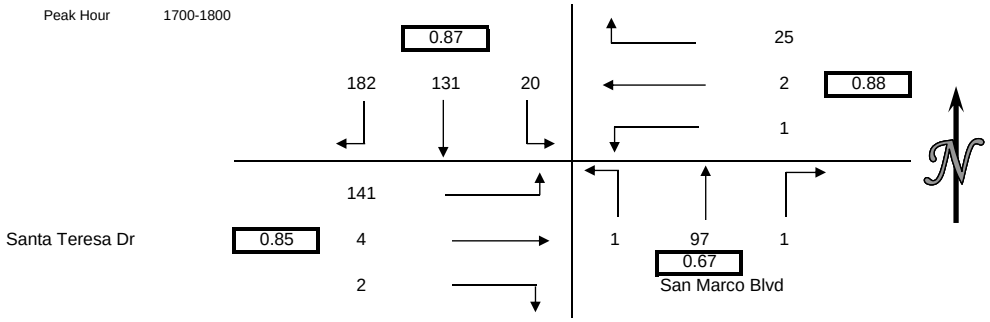
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-005
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	Santa Teresa Dr
CITY:		Pittsburg

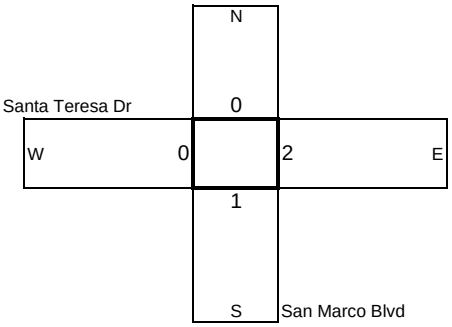
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	40	16	5	1	0	0	0	8	0	0	1	39	110
1615-1630	41	13	10	3	0	0	0	8	0	0	0	26	101
1630-1645	40	15	6	8	1	0	0	5	0	1	0	34	110
1645-1700	33	9	11	6	0	0	0	9	0	1	1	22	92
1700-1715	36	17	2	8	0	0	0	11	1	0	0	33	108
1715-1730	47	34	8	7	1	0	0	14	0	1	2	30	144
1730-1745	47	41	5	7	0	1	1	35	0	0	0	38	175
1745-1800	52	39	5	3	1	0	0	37	0	1	2	40	180
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	154	53	32	18	1	0	0	30	0	2	2	121	413
1615-1715	150	54	29	25	1	0	0	33	1	2	1	115	411
1630-1730	156	75	27	29	2	0	0	39	1	3	3	119	454
1645-1745	163	101	26	28	1	1	1	69	1	2	3	123	519
1700-1800	182	131	20	25	2	1	1	97	1	2	4	141	607



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	1	0	0	1	2
1615-1630	0	0	0	0	0
1630-1645	1	0	0	0	1
1645-1700	0	1	2	0	3
1700-1715	0	1	1	0	2
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	1	0	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	2	1	2	1	6
1615-1715	1	2	3	0	6
1630-1730	1	2	3	0	6
1645-1745	0	2	3	0	5
1700-1800	0	2	1	0	3



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0

National Data and Surveying Services

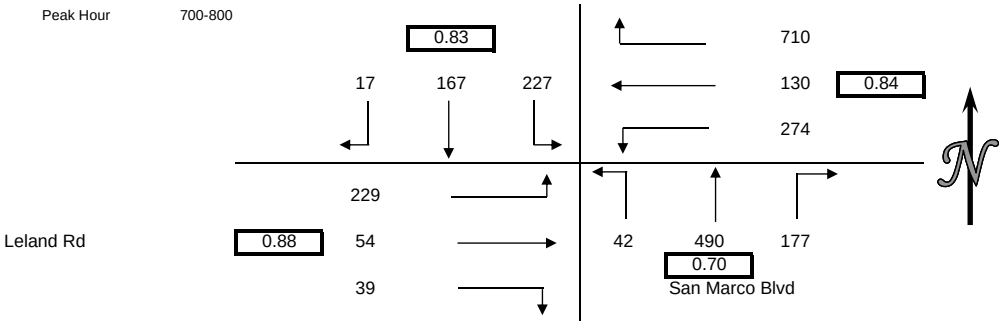
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-006
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

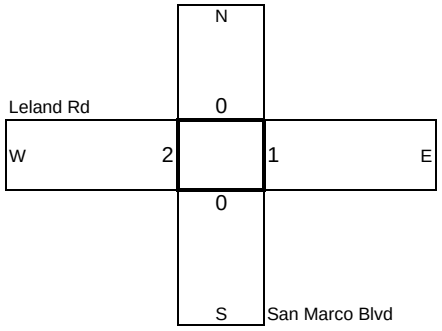
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	3	33	39	192	28	34	29	99	2	3	16	52	530
715-730	4	36	52	173	36	53	25	118	5	6	13	72	593
730-745	6	56	62	173	36	124	38	133	7	14	8	58	715
745-800	4	42	74	172	30	63	85	140	28	16	17	47	718
800-815	3	33	60	151	16	27	43	48	4	2	9	51	447
815-830	9	37	40	136	28	27	17	51	2	3	13	41	404
830-845	7	36	54	171	18	23	10	74	4	3	10	61	471
845-900	5	26	47	88	12	21	19	60	3	2	8	32	323
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	17	167	227	710	130	274	177	490	42	39	54	229	2556
715-815	17	167	248	669	118	267	191	439	44	38	47	228	2473
730-830	22	168	236	632	110	241	183	372	41	35	47	197	2284
745-845	23	148	228	630	92	140	155	313	38	24	49	200	2040
800-900	24	132	201	546	74	98	89	233	13	10	40	185	1645

Peak Hour 700-800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	2	2
715-730	0	0	0	0	0
730-745	0	1	0	0	1
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	3	0	0	3
830-845	0	1	0	0	1
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	0	2	3
715-815	0	1	0	0	1
730-830	0	4	0	0	4
745-845	0	4	0	0	4
800-900	0	4	0	0	4



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	1	0	0	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	1	0	0	0	0	0	1
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	1	0	0	0	1	0	0	0	0	0	2
715-815	0	0	0	0	0	0	1	0	0	0	0	0	1
730-830	0	0	0	0	0	0	1	0	0	0	0	0	1
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

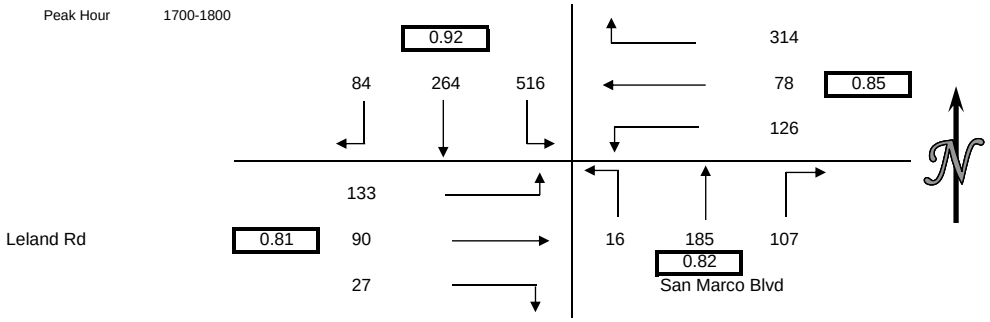
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-006
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	Leland Rd
CITY:		Pittsburg

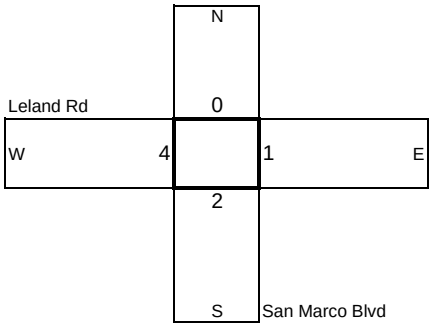
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	22	56	100	74	18	17	16	35	6	8	18	32	402
1615-1630	18	61	108	78	18	21	5	33	4	0	15	35	396
1630-1645	22	55	106	75	18	15	15	39	4	2	21	50	422
1645-1700	13	44	108	49	15	22	12	28	4	6	20	36	357
1700-1715	17	59	127	65	12	15	16	40	3	0	21	29	404
1715-1730	23	71	121	81	20	36	21	36	6	10	19	24	468
1730-1745	21	64	125	86	28	39	36	52	4	11	22	44	532
1745-1800	23	70	143	82	18	36	34	57	3	6	28	36	536
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	75	216	422	276	69	75	48	135	18	16	74	153	1577
1615-1715	70	219	449	267	63	73	48	140	15	8	77	150	1579
1630-1730	75	229	462	270	65	88	64	143	17	18	81	139	1651
1645-1745	74	238	481	281	75	112	85	156	17	27	82	133	1761
1700-1800	84	264	516	314	78	126	107	185	16	27	90	133	1940



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	1	1	2
1645-1700	1	0	2	0	3
1700-1715	0	1	0	1	2
1715-1730	0	0	1	2	3
1730-1745	0	0	1	1	2
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	1	0	3	1	5
1615-1715	1	1	3	2	7
1630-1730	1	1	4	4	10
1645-1745	1	1	4	4	10
1700-1800	0	1	2	4	7



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	1	0	0	0	0	0	0	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	1	0	0	0	0	0	0	0	0	0	0	1
1630-1730	0	1	0	0	0	0	0	0	0	0	0	0	1
1645-1745	0	1	0	0	0	0	0	0	0	0	0	0	1
1700-1800	0	1	0	0	0	0	0	0	0	0	0	0	1

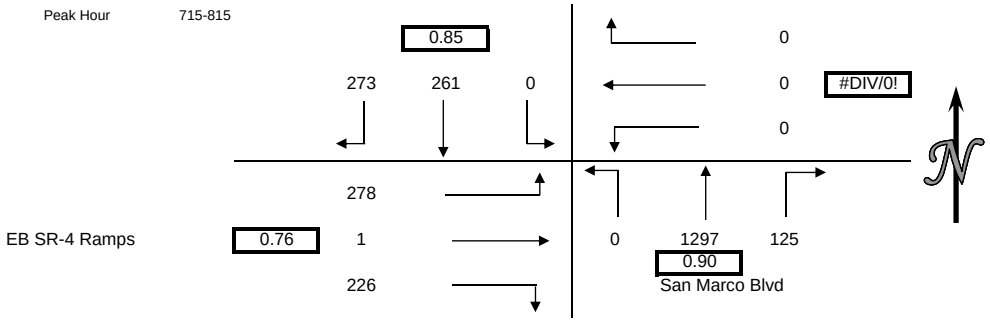
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-007
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	EB SR-4 Ramps
CITY:		Pittsburg

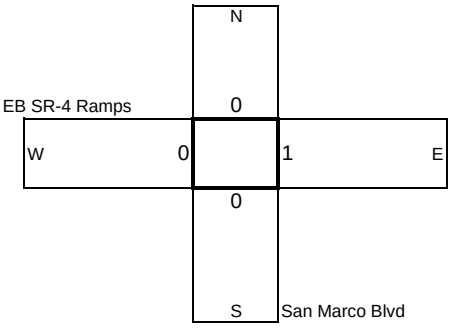
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	46	41	0	0	0	0	15	346	0	39	0	39	526
715-730	55	59	0	0	0	0	31	365	0	43	1	60	614
730-745	70	87	0	0	0	0	24	359	0	48	0	51	639
745-800	82	73	0	0	0	0	47	340	0	67	0	69	678
800-815	66	42	0	0	0	0	23	233	0	68	0	98	530
815-830	37	38	0	0	0	0	19	214	0	65	1	80	454
830-845	58	49	0	0	0	0	28	289	0	52	0	61	537
845-900	52	51	0	0	0	0	20	156	0	36	1	59	375
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	253	260	0	0	0	0	117	1410	0	197	1	219	2457
715-815	273	261	0	0	0	0	125	1297	0	226	1	278	2461
730-830	255	240	0	0	0	0	113	1146	0	248	1	298	2301
745-845	243	202	0	0	0	0	117	1076	0	252	1	308	2199
800-900	213	180	0	0	0	0	90	892	0	221	2	298	1896



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	1	0	0	1
715-730	0	0	0	0	0
730-745	0	1	0	0	1
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	2	0	0	2
715-815	0	1	0	0	1
730-830	0	1	0	0	1
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	1	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	1	0	0	0	0	1
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

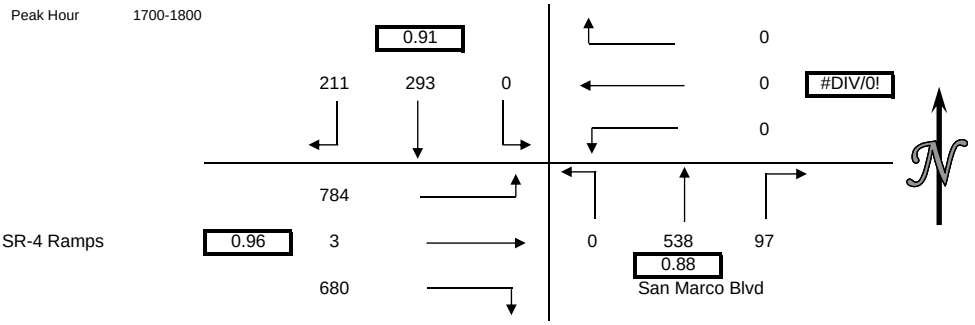
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-007
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	EB SR-4 Ramps
CITY:		Pittsburg

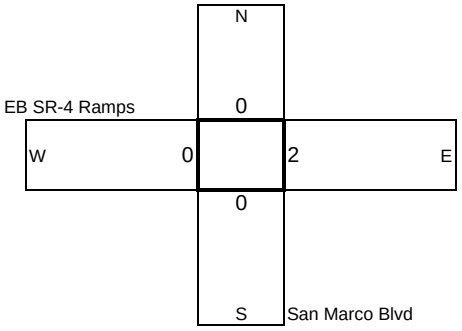
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	51	74	0	0	0	0	23	114	0	131	1	210	604
1615-1630	51	73	0	0	0	0	32	121	0	136	1	194	608
1630-1645	67	80	0	0	0	0	34	133	0	127	0	219	660
1645-1700	49	47	0	0	0	0	20	91	0	145	2	225	579
1700-1715	56	63	0	0	0	0	19	118	0	164	1	208	629
1715-1730	61	75	0	0	0	0	22	121	0	173	0	188	640
1730-1745	50	88	0	0	0	0	24	156	0	172	1	178	669
1745-1800	44	67	0	0	0	0	32	143	0	171	1	210	668
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	218	274	0	0	0	0	109	459	0	539	4	848	2451
1615-1715	223	263	0	0	0	0	105	463	0	572	4	846	2476
1630-1730	233	265	0	0	0	0	95	463	0	609	3	840	2508
1645-1745	216	273	0	0	0	0	85	486	0	654	4	799	2517
1700-1800	211	293	0	0	0	0	97	538	0	680	3	784	2606



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	2	0	0	2
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	2	0	0	2
1630-1730	0	2	0	0	2
1645-1745	0	2	0	0	2
1700-1800	0	2	0	0	2



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	1	0	0	0	0	0	0	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	1	0	0	0	0	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	1	0	0	0	0	0	0	0	0	0	0	1
1630-1730	0	1	0	0	0	0	0	0	0	0	0	0	1
1645-1745	0	1	0	0	0	0	0	0	0	0	0	0	1
1700-1800	0	2	0	0	0	0	0	0	0	0	0	0	2

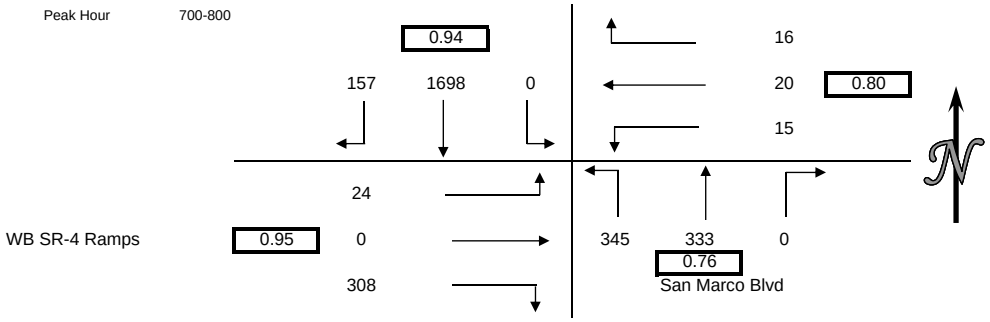
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-008
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	WB SR-4 Ramps
CITY:		Bay Point

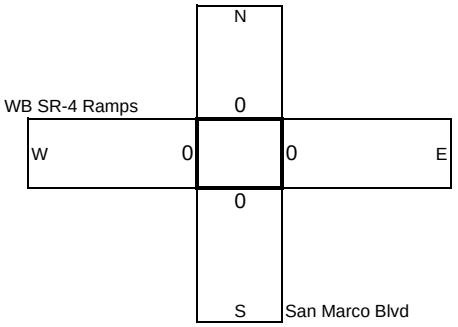
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	37	430	0	0	5	4	0	47	75	72	0	5	675
715-730	37	415	0	6	4	3	0	91	87	75	0	12	730
730-745	35	456	0	5	7	4	0	85	69	81	0	4	746
745-800	48	397	0	5	4	4	0	110	114	80	0	3	765
800-815	30	317	0	7	17	7	0	116	53	48	0	7	602
815-830	58	282	0	9	12	7	0	98	49	40	0	3	558
830-845	29	241	0	16	13	17	0	81	65	39	0	4	505
845-900	13	193	0	20	19	12	0	74	29	54	0	15	429
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	157	1698	0	16	20	15	0	333	345	308	0	24	2916
715-815	150	1585	0	23	32	18	0	402	323	284	0	26	2843
730-830	171	1452	0	26	40	22	0	409	285	249	0	17	2671
745-845	165	1237	0	37	46	35	0	405	281	207	0	17	2430
800-900	130	1033	0	52	61	43	0	369	196	181	0	29	2094



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	1	0	0	1	2
815-830	0	0	0	0	0
830-845	1	0	0	1	2
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	1	0	0	1	2
730-830	1	0	0	1	2
745-845	2	0	0	2	4
800-900	2	0	0	2	4



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	1	0	0	1
715-730	0	1	0	0	0	0	0	0	0	0	0	0	1
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	1	0	0	0	0	0	0	0	1	0	0	2
715-815	0	1	0	0	0	0	0	0	0	0	0	0	1
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

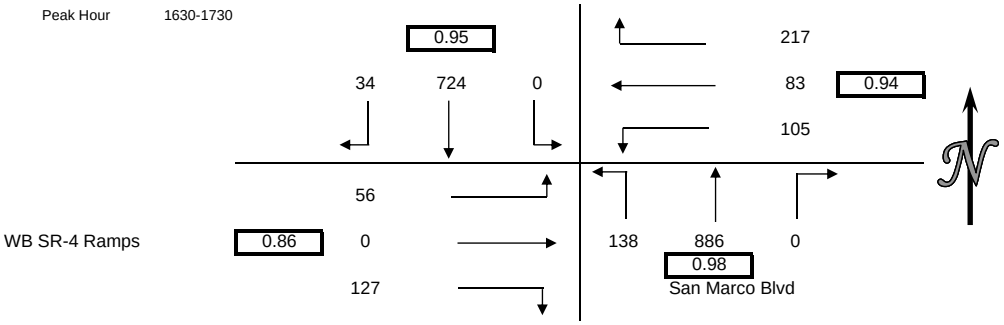
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-008
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	WB SR-4 Ramps
CITY:		Bay Point

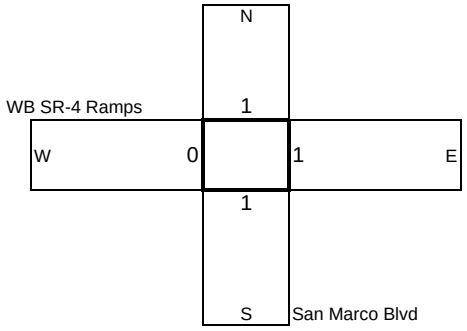
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	7	155	0	45	20	32	0	230	24	29	0	8	550
1615-1630	6	151	0	46	15	35	0	218	37	38	0	8	554
1630-1645	11	188	0	47	19	27	0	223	39	36	0	17	607
1645-1700	11	181	0	60	24	23	0	215	34	29	0	14	591
1700-1715	8	169	0	50	17	30	0	228	29	31	0	13	575
1715-1730	4	186	0	60	23	25	0	220	36	31	0	12	597
1730-1745	12	168	0	54	25	28	0	211	23	43	0	17	581
1745-1800	7	164	0	57	21	22	0	235	42	32	0	16	596
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	35	675	0	198	78	117	0	886	134	132	0	47	2302
1615-1715	36	689	0	203	75	115	0	884	139	134	0	52	2327
1630-1730	34	724	0	217	83	105	0	886	138	127	0	56	2370
1645-1745	35	704	0	224	89	106	0	874	122	134	0	56	2344
1700-1800	31	687	0	221	86	105	0	894	130	137	0	58	2349



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	1	1
1630-1645	0	0	1	0	1
1645-1700	0	0	0	0	0
1700-1715	1	1	0	0	2
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	2	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	1	1	2
1615-1715	1	1	1	1	4
1630-1730	1	1	1	0	3
1645-1745	1	1	0	0	2
1700-1800	1	1	0	2	4



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1645-1745	0	0	0	0	0	0	0	1	0	0	0	0	1
1700-1800	0	0	0	0	0	0	0	1	0	0	0	0	1

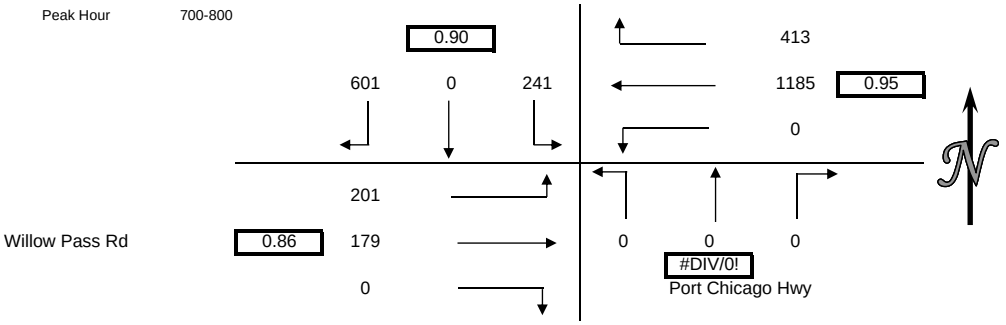
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-009
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Port Chicago Hwy
	E/W	Willow Pass Rd
CITY:		Bay Point

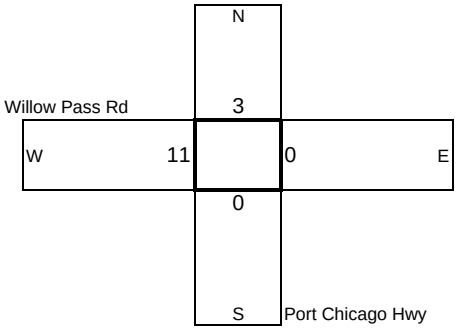
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	140	0	27	61	337	0	0	0	0	0	34	27	626
715-730	160	0	55	100	313	0	0	0	0	0	52	54	734
730-745	159	0	67	142	280	0	0	0	0	0	42	68	758
745-800	142	0	92	110	255	0	0	0	0	0	51	52	702
800-815	99	0	66	57	257	0	0	0	0	0	69	58	606
815-830	86	1	40	54	235	0	0	0	0	0	55	56	527
830-845	87	0	39	22	165	0	0	0	0	0	51	50	414
845-900	74	0	22	35	129	0	0	0	0	0	64	45	369
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	601	0	241	413	1185	0	0	0	0	0	179	201	2820
715-815	560	0	280	409	1105	0	0	0	0	0	214	232	2800
730-830	486	1	265	363	1027	0	0	0	0	0	217	234	2593
745-845	414	1	237	243	912	0	0	0	0	0	226	216	2249
800-900	346	1	167	168	786	0	0	0	0	0	239	209	1916



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	2	2
715-730	0	0	0	6	6
730-745	3	0	0	0	3
745-800	0	0	0	3	3
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	3	0	0	11	14
715-815	3	0	0	9	12
730-830	3	0	0	3	6
745-845	0	0	0	3	3
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	3	0	0	0	0	0	0	0	3
715-730	0	0	0	0	2	0	0	0	0	0	0	0	2
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	1	0	0	0	0	0	0	0	0	0	1
845-900	0	0	0	0	0	0	0	0	0	0	1	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	5	0	0	0	0	0	0	0	5
715-815	0	0	0	0	2	0	0	0	0	0	0	0	2
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	1	0	0	0	0	0	0	0	0	0	1
800-900	0	0	1	0	0	0	0	0	0	0	1	0	2

National Data and Surveying Services

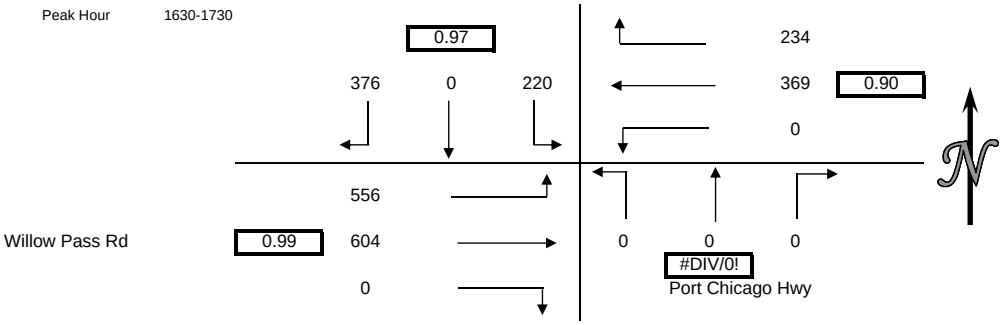
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-009
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Port Chicago Hwy
	E/W	Willow Pass Rd
CITY:		Bay Point

VEHICLE COUNTS

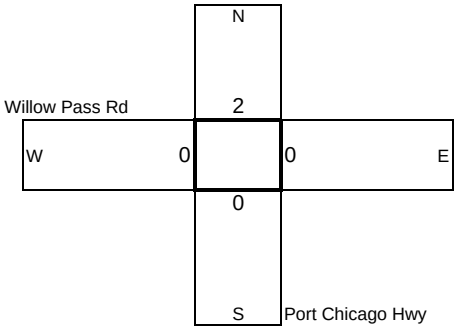
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	74	0	56	45	86	0	0	0	0	0	149	152	562
1615-1630	79	0	68	47	93	0	0	0	0	0	149	115	551
1630-1645	94	0	59	60	107	0	0	0	0	0	158	135	613
1645-1700	97	0	50	77	90	0	0	0	0	0	167	126	607
1700-1715	94	0	56	43	89	0	0	0	0	0	149	145	576
1715-1730	91	0	55	54	83	0	0	0	0	0	130	150	563
1730-1745	84	0	65	61	79	0	0	0	0	0	167	121	577
1745-1800	97	0	58	55	86	0	0	0	0	0	175	129	600
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	344	0	233	229	376	0	0	0	0	0	623	528	2333
1615-1715	364	0	233	227	379	0	0	0	0	0	623	521	2347
1630-1730	376	0	220	234	369	0	0	0	0	0	604	556	2359
1645-1745	366	0	226	235	341	0	0	0	0	0	613	542	2323
1700-1800	366	0	234	213	337	0	0	0	0	0	621	545	2316

Peak Hour 1630-1730



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	1	1
1615-1630	0	0	0	3	3
1630-1645	2	0	0	0	2
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	2	2
1745-1800	0	0	0	2	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	2	0	0	4	6
1615-1715	2	0	0	3	5
1630-1730	2	0	0	0	2
1645-1745	0	0	0	2	2
1700-1800	0	0	0	4	4



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	5	0	2	0	0	0	0	0	0	0	7
1700-1715	0	0	0	0	1	0	0	0	0	0	0	0	1
1715-1730	0	0	0	0	1	0	0	0	0	0	1	0	2
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	1	1	0	0	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	5	0	2	0	0	0	0	0	0	0	7
1615-1715	0	0	5	0	3	0	0	0	0	0	0	0	8
1630-1730	0	0	5	0	4	0	0	0	0	0	1	0	10
1645-1745	0	0	5	0	4	0	0	0	0	0	1	0	10
1700-1800	0	0	0	1	3	0	0	0	0	0	1	0	5

National Data and Surveying Services

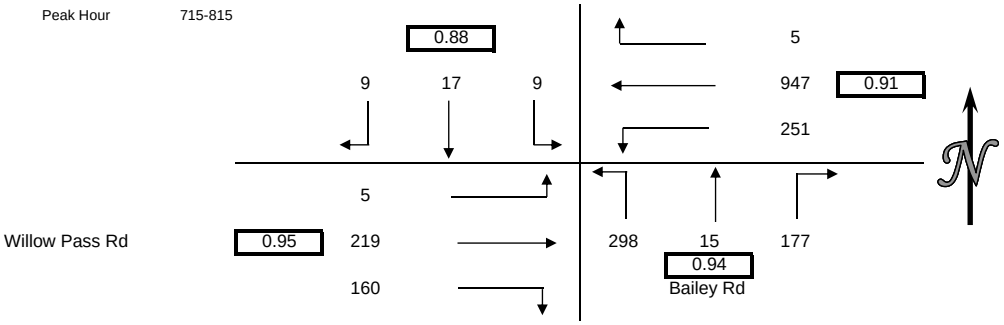
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-010
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Willow Pass Rd
CITY:		Bay Point

VEHICLE COUNTS

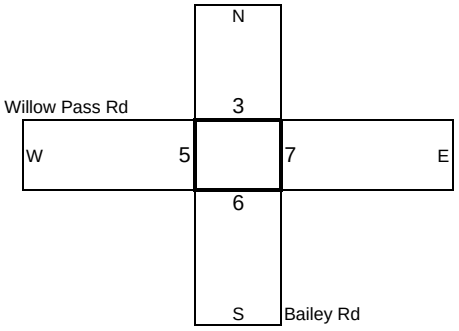
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	3	7	1	0	241	49	34	3	67	27	36	1	469
715-730	3	4	0	1	254	74	38	1	68	31	63	1	538
730-745	2	4	3	0	271	53	40	4	86	44	56	1	564
745-800	2	2	5	2	214	64	44	4	75	48	50	2	512
800-815	2	7	1	2	208	60	55	6	69	37	50	1	498
815-830	3	4	6	4	159	44	53	6	70	27	33	4	413
830-845	4	4	4	2	115	41	45	3	58	42	31	4	353
845-900	4	3	0	2	83	43	35	2	43	33	44	0	292
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	10	17	9	3	980	240	156	12	296	150	205	5	2083
715-815	9	17	9	5	947	251	177	15	298	160	219	5	2112
730-830	9	17	15	8	852	221	192	20	300	156	189	8	1987
745-845	11	17	16	10	696	209	197	19	272	154	164	11	1776
800-900	13	18	11	10	565	188	188	17	240	139	158	9	1556

Peak Hour 715-815



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	2	0	4	7
715-730	1	2	1	1	5
730-745	0	3	0	1	4
745-800	0	1	4	0	5
800-815	2	1	1	3	7
815-830	3	2	0	2	7
830-845	2	0	1	2	5
845-900	4	0	1	2	7
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	2	8	5	6	21
715-815	3	7	6	5	21
730-830	5	7	5	6	23
745-845	7	4	6	7	24
800-900	11	3	3	9	26



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	4	0	0	0	0	0	0	0	4
715-730	0	0	0	0	1	0	0	0	0	0	1	0	2
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	1	0	0	0	0	0	0	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	1	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	6	0	0	0	0	0	1	0	7
715-815	0	0	0	0	2	0	0	0	0	0	1	0	3
730-830	0	0	0	0	1	0	0	0	0	0	0	0	1
745-845	0	0	0	0	1	0	0	0	0	0	0	0	1
800-900	0	0	0	0	0	0	0	0	0	0	1	0	1

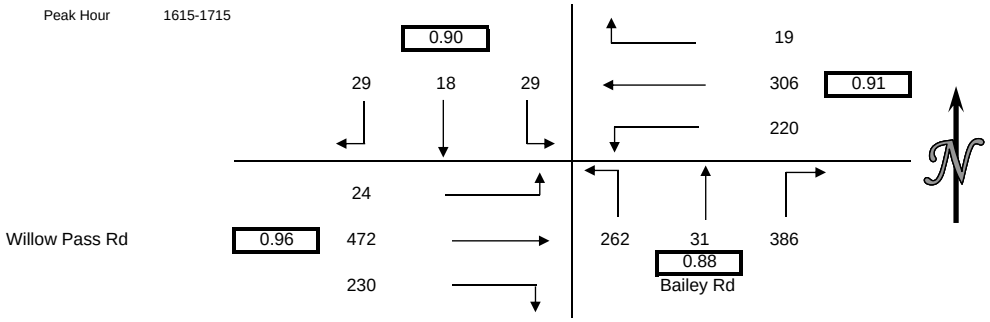
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-010
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Willow Pass Rd
CITY:		Bay Point

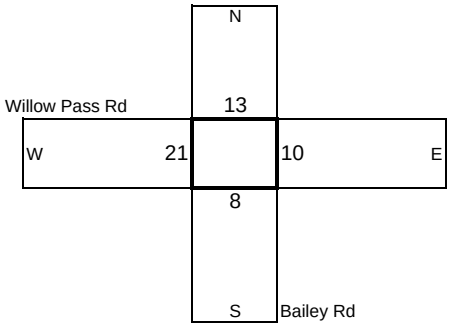
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	5	6	3	3	66	51	91	8	72	47	81	4	437
1615-1630	11	6	4	3	68	48	117	12	65	61	120	9	524
1630-1645	9	3	9	5	85	60	100	9	69	61	108	4	522
1645-1700	5	7	5	4	92	49	83	4	61	54	131	3	498
1700-1715	4	2	11	7	61	63	86	6	67	54	113	8	482
1715-1730	12	2	6	3	82	73	95	4	52	65	97	10	501
1730-1745	4	5	2	2	74	61	112	5	64	53	117	4	503
1745-1800	8	4	6	4	74	65	110	9	67	50	131	8	536
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	30	22	21	15	311	208	391	33	267	223	440	20	1981
1615-1715	29	18	29	19	306	220	386	31	262	230	472	24	2026
1630-1730	30	14	31	19	320	245	364	23	249	234	449	25	2003
1645-1745	25	16	24	16	309	246	376	19	244	226	458	25	1984
1700-1800	28	13	25	16	291	262	403	24	250	222	458	30	2022



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	4	3	1	6	14
1615-1630	5	2	3	9	19
1630-1645	5	0	2	6	13
1645-1700	2	3	2	2	9
1700-1715	1	5	1	4	11
1715-1730	5	3	0	6	14
1730-1745	2	1	5	4	12
1745-1800	4	3	0	3	10
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	16	8	8	23	55
1615-1715	13	10	8	21	52
1630-1730	13	11	5	18	47
1645-1745	10	12	8	16	46
1700-1800	12	12	6	17	47



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	1	0	0	0	0	0	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	1	0	0	0	0	0	0	1	1	3
1645-1700	0	0	0	0	1	0	0	0	0	0	1	0	2
1700-1715	0	0	0	0	0	0	0	0	0	0	1	0	1
1715-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1730-1745	1	0	0	0	0	0	0	1	0	0	1	0	3
1745-1800	1	0	0	0	1	0	0	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	1	1	1	0	0	0	0	2	1	6
1615-1715	0	0	0	1	1	0	0	0	0	0	3	1	6
1630-1730	0	0	0	1	1	0	0	1	0	0	3	1	7
1645-1745	1	0	0	0	1	0	0	2	0	0	3	0	7
1700-1800	2	0	0	0	1	0	0	2	0	0	2	0	7

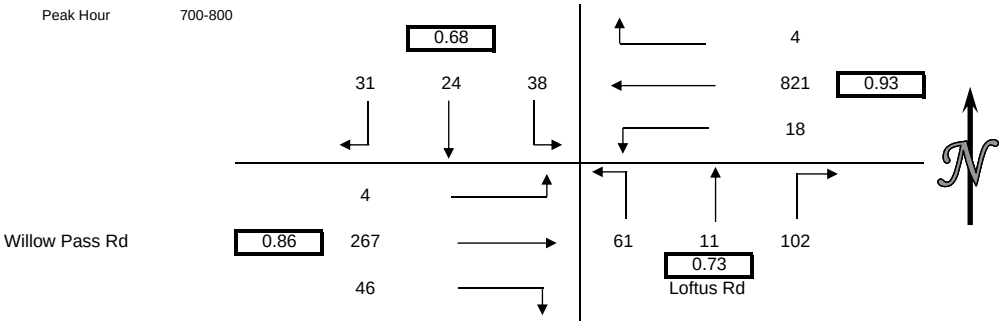
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-011
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Loftus Rd
	E/W	Willow Pass Rd
CITY:		Pittsburg

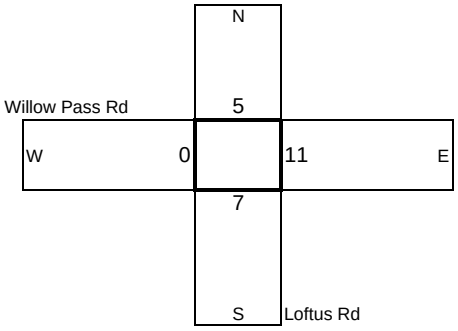
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	12	2	3	0	220	6	6	3	8	7	59	1	327
715-730	4	8	13	1	212	3	20	4	16	16	76	0	373
730-745	7	12	15	1	207	4	46	1	13	15	62	1	384
745-800	8	2	7	2	182	5	30	3	24	8	70	2	343
800-815	4	0	2	1	208	7	13	2	14	3	56	1	311
815-830	5	0	4	0	157	4	9	3	9	6	51	2	250
830-845	5	0	6	2	100	7	9	1	3	7	58	1	199
845-900	1	1	3	1	92	9	5	0	8	8	46	4	178
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	31	24	38	4	821	18	102	11	61	46	267	4	1427
715-815	23	22	37	5	809	19	109	10	67	42	264	4	1411
730-830	24	14	28	4	754	20	98	9	60	32	239	6	1288
745-845	22	2	19	5	647	23	61	9	50	24	235	6	1103
800-900	15	1	15	4	557	27	36	6	34	24	211	8	938



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	1	4	0	6
715-730	4	8	1	0	13
730-745	0	1	1	0	2
745-800	0	1	1	0	2
800-815	0	1	0	0	1
815-830	1	0	1	0	2
830-845	2	2	2	0	6
845-900	0	0	2	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	5	11	7	0	23
715-815	4	11	3	0	18
730-830	1	3	3	0	7
745-845	3	4	4	0	11
800-900	3	3	5	0	11



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	1	0	1
745-800	0	0	0	0	0	0	0	0	0	0	1	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	1	0	0	0	0	0	0	0	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	0	0	0	0	2	0	3
715-815	0	0	0	0	0	0	0	0	0	0	2	0	2
730-830	0	0	0	0	0	0	0	0	0	0	2	0	2
745-845	0	0	0	0	1	0	0	0	0	0	1	0	2
800-900	0	0	0	0	1	0	0	0	0	0	0	0	1

National Data and Surveying Services

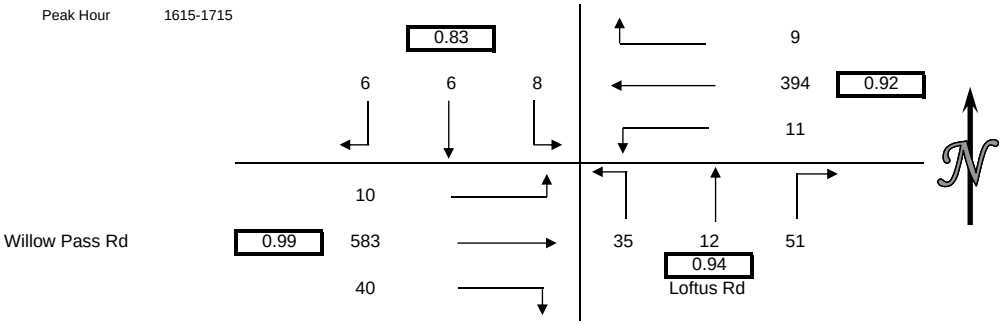
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-011
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Loftus Rd
	E/W	Willow Pass Rd
CITY:		Pittsburg

VEHICLE COUNTS

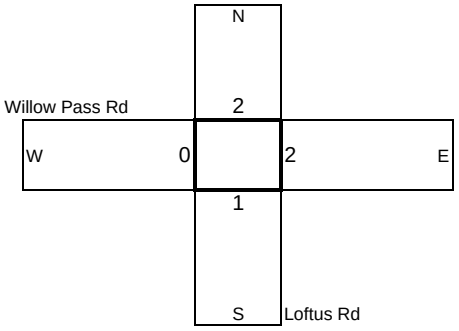
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	1	1	1	2	91	4	7	7	5	9	107	2	237
1615-1630	0	2	2	1	89	1	18	3	5	9	146	3	279
1630-1645	2	3	0	2	103	3	8	1	14	11	146	1	294
1645-1700	2	0	3	5	104	4	11	4	9	9	145	3	299
1700-1715	2	1	3	1	98	3	14	4	7	11	146	3	293
1715-1730	4	2	1	0	86	3	11	2	7	7	127	2	252
1730-1745	3	1	4	0	96	4	9	4	5	15	162	3	306
1745-1800	4	2	3	6	80	2	7	5	8	6	147	4	274
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	5	6	6	10	387	12	44	15	33	38	544	9	1109
1615-1715	6	6	8	9	394	11	51	12	35	40	583	10	1165
1630-1730	10	6	7	8	391	13	44	11	37	38	564	9	1138
1645-1745	11	4	11	6	384	14	45	14	28	42	580	11	1150
1700-1800	13	6	11	7	360	12	41	15	27	39	582	12	1125

Peak Hour 1615-1715



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	1	0	0	1
1615-1630	2	0	1	0	3
1630-1645	0	1	0	0	1
1645-1700	0	1	0	0	1
1700-1715	0	0	0	0	0
1715-1730	2	0	4	0	6
1730-1745	1	1	1	0	3
1745-1800	1	1	2	0	4
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	2	3	1	0	6
1615-1715	2	2	1	0	5
1630-1730	2	2	4	0	8
1645-1745	3	2	5	0	10
1700-1800	4	2	7	0	13



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	1	0	0	0	1
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	1	0	0	0	0	0	1	0	2
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	1	0	0	0	1
1615-1715	0	0	0	0	0	0	0	0	1	0	0	0	1
1630-1730	0	0	0	0	0	0	0	0	1	0	0	0	1
1645-1745	0	0	0	0	1	0	0	0	1	0	1	0	3
1700-1800	0	0	0	0	1	0	0	0	0	0	1	0	2

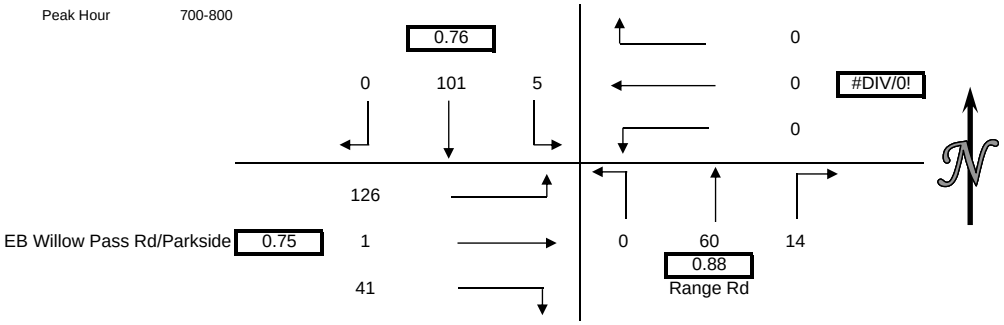
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-012
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Range Rd
	E/W	EB Willow Pass Rd/Parkside Dr
CITY:		Pittsburg

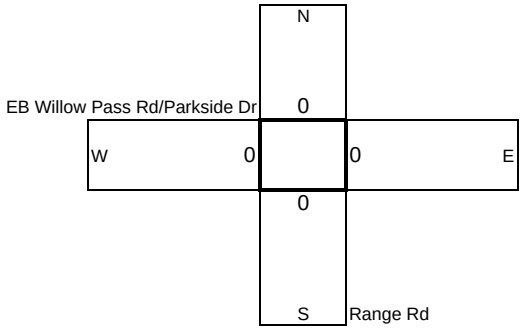
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	34	1	0	0	0	1	14	0	7	0	19	76
715-730	0	27	1	0	0	0	2	15	0	16	0	40	101
730-745	0	31	2	0	0	0	6	15	0	12	0	32	98
745-800	0	9	1	0	0	0	5	16	0	6	1	35	73
800-815	0	10	0	0	0	0	0	10	0	3	0	31	54
815-830	0	8	0	0	0	0	3	8	0	6	0	20	45
830-845	0	1	0	0	0	0	1	7	0	5	0	19	33
845-900	0	7	0	0	0	0	3	7	0	2	0	22	41
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	101	5	0	0	0	14	60	0	41	1	126	348
715-815	0	77	4	0	0	0	13	56	0	37	1	138	326
730-830	0	58	3	0	0	0	14	49	0	27	1	118	270
745-845	0	28	1	0	0	0	9	41	0	20	1	105	205
800-900	0	26	0	0	0	0	7	32	0	16	0	92	173



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	0	0	0	0	0
730-830	0	0	0	0	0
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

National Data and Surveying Services

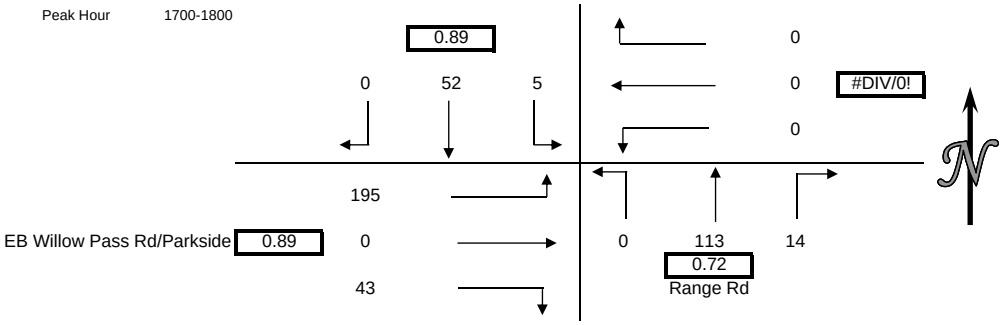
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-012
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Range Rd
	E/W	EB Willow Pass Rd/Parkside Dr
CITY:		Pittsburg

VEHICLE COUNTS

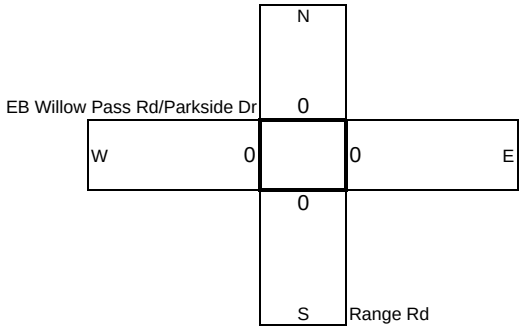
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	11	3	0	0	0	3	16	0	10	0	38	81
1615-1630	0	4	1	0	0	0	0	18	0	8	0	50	81
1630-1645	0	10	0	0	0	0	4	27	0	8	0	59	108
1645-1700	0	11	2	0	0	0	4	26	0	12	0	44	99
1700-1715	0	12	0	0	0	0	2	23	0	12	0	49	98
1715-1730	0	15	1	0	0	0	2	22	0	8	0	39	87
1730-1745	0	13	2	0	0	0	6	38	0	11	0	56	126
1745-1800	0	12	2	0	0	0	4	30	0	12	0	51	111
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	36	6	0	0	0	11	87	0	38	0	191	369
1615-1715	0	37	3	0	0	0	10	94	0	40	0	202	386
1630-1730	0	48	3	0	0	0	12	98	0	40	0	191	392
1645-1745	0	51	5	0	0	0	14	109	0	43	0	188	410
1700-1800	0	52	5	0	0	0	14	113	0	43	0	195	422

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	1	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	1	0	0	0	1	2
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	1	1
1630-1730	0	0	0	0	0	0	0	0	0	0	0	1	1
1645-1745	0	0	0	0	0	0	0	1	0	0	0	2	3
1700-1800	0	0	0	0	0	0	0	1	0	0	0	2	3

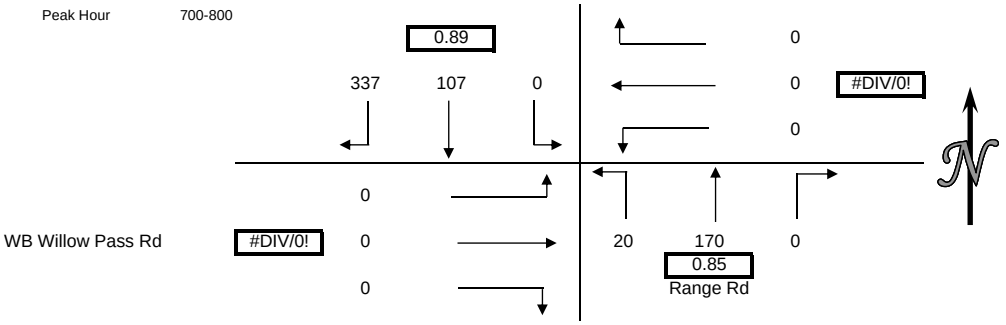
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-013
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Range Rd
	E/W	WB Willow Pass Rd
CITY:		Pittsburg

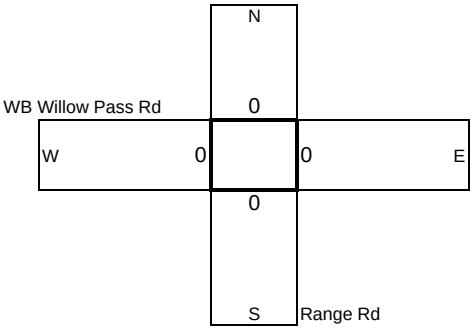
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	76	30	0	0	0	0	0	30	5	0	0	0	141
715-730	95	30	0	0	0	0	0	47	4	0	0	0	176
730-745	89	34	0	0	0	0	0	45	3	0	0	0	171
745-800	77	13	0	0	0	0	0	48	8	0	0	0	146
800-815	83	9	0	0	0	0	0	37	4	0	0	0	133
815-830	59	7	0	0	0	0	0	26	2	0	0	0	94
830-845	44	3	0	0	0	0	0	21	2	0	0	0	70
845-900	53	6	0	0	0	0	0	32	1	0	0	0	92
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	337	107	0	0	0	0	0	170	20	0	0	0	634
715-815	344	86	0	0	0	0	0	177	19	0	0	0	626
730-830	308	63	0	0	0	0	0	156	17	0	0	0	544
745-845	263	32	0	0	0	0	0	132	16	0	0	0	443
800-900	239	25	0	0	0	0	0	116	9	0	0	0	389



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	0	0	0	0	0
730-830	0	0	0	0	0
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	1	0	0	0	0	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	1	0	0	0	0	0	0	0	0	0	0	0	1
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	1	0	0	0	0	0	0	0	0	0	0	0	1
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	1	0	0	0	0	0	0	0	0	0	0	0	1
745-845	1	0	0	0	0	0	0	0	0	0	0	0	1
800-900	1	0	0	0	0	0	0	0	0	0	0	0	1

National Data and Surveying Services

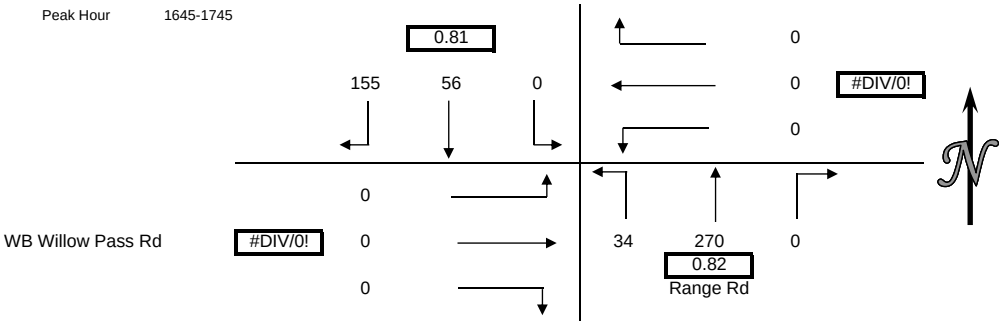
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-013
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Range Rd
	E/W	WB Willow Pass Rd
CITY:		Pittsburg

VEHICLE COUNTS

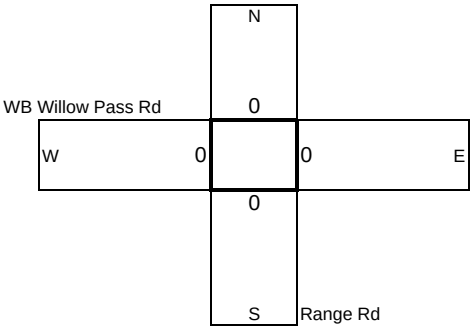
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	54	15	0	0	0	0	0	54	3	0	0	0	126
1615-1630	39	5	0	0	0	0	0	55	7	0	0	0	106
1630-1645	34	10	0	0	0	0	0	79	5	0	0	0	128
1645-1700	44	13	0	0	0	0	0	64	10	0	0	0	131
1700-1715	33	10	0	0	0	0	0	73	5	0	0	0	121
1715-1730	47	18	0	0	0	0	0	52	7	0	0	0	124
1730-1745	31	15	0	0	0	0	0	81	12	0	0	0	139
1745-1800	24	13	0	0	0	0	0	71	6	0	0	0	114
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	171	43	0	0	0	0	0	252	25	0	0	0	491
1615-1715	150	38	0	0	0	0	0	271	27	0	0	0	486
1630-1730	158	51	0	0	0	0	0	268	27	0	0	0	504
1645-1745	155	56	0	0	0	0	0	270	34	0	0	0	515
1700-1800	135	56	0	0	0	0	0	277	30	0	0	0	498

Peak Hour 1645-1745



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	1	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	2	0	0	0	0	2
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	1	0	0	0	0	1
1630-1730	0	0	0	0	0	0	0	1	0	0	0	0	1
1645-1745	0	0	0	0	0	0	0	3	0	0	0	0	3
1700-1800	0	0	0	0	0	0	0	3	0	0	0	0	3

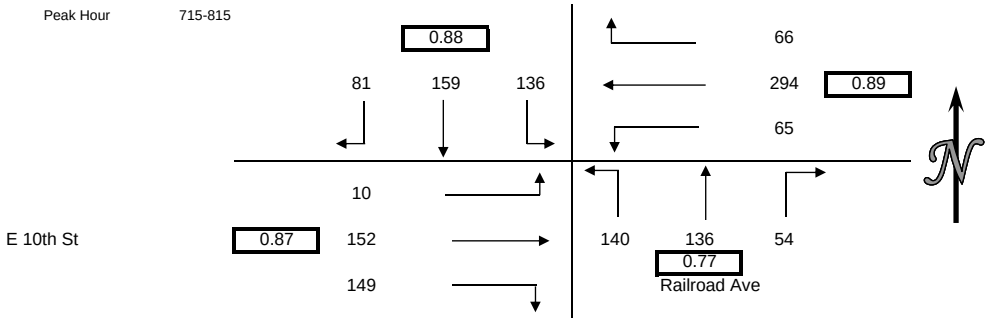
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-014
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	E 10th St
CITY:		Pittsburg

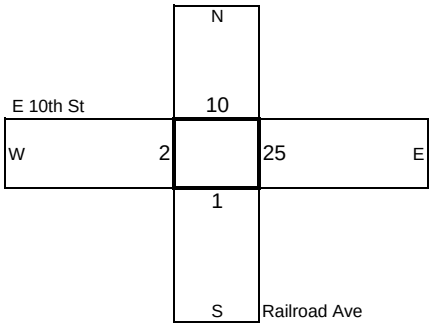
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	5	35	6	4	57	13	7	25	19	39	21	0	231
715-730	16	35	14	17	71	7	15	27	27	39	25	0	293
730-745	15	36	47	14	70	21	10	43	31	40	45	2	374
745-800	30	35	41	17	78	24	19	41	47	36	48	5	421
800-815	20	53	34	18	75	13	10	25	35	34	34	3	354
815-830	2	28	14	8	54	16	15	33	35	31	28	3	267
830-845	7	35	5	7	47	15	17	36	38	45	26	1	279
845-900	2	48	15	12	36	19	19	29	35	56	25	1	297
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	66	141	108	52	276	65	51	136	124	154	139	7	1319
715-815	81	159	136	66	294	65	54	136	140	149	152	10	1442
730-830	67	152	136	57	277	74	54	142	148	141	155	13	1416
745-845	59	151	94	50	254	68	61	135	155	146	136	12	1321
800-900	31	164	68	45	212	63	61	123	143	166	113	8	1197



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	3	0	0	4
715-730	5	6	0	0	11
730-745	2	7	0	1	10
745-800	1	7	1	1	10
800-815	2	5	0	0	7
815-830	0	1	0	0	1
830-845	2	1	0	0	3
845-900	3	1	0	0	4
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	9	23	1	2	35
715-815	10	25	1	2	38
730-830	5	20	1	2	28
745-845	5	14	1	1	21
800-900	7	8	0	0	15



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	1	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	1	0	2	0	0	0	0	0	0	0	3
745-800	0	0	0	0	0	0	0	0	0	0	0	1	1
800-815	0	0	0	0	1	0	0	0	0	0	0	0	1
815-830	0	0	0	0	1	0	0	0	0	0	0	0	1
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	1	0	2	0	1	0	0	0	0	1	5
715-815	0	0	1	0	3	0	0	0	0	0	0	1	5
730-830	0	0	1	0	4	0	0	0	0	0	0	1	6
745-845	0	0	0	0	2	0	0	0	0	0	0	1	3
800-900	0	0	0	0	2	0	0	0	0	0	0	0	2

National Data and Surveying Services

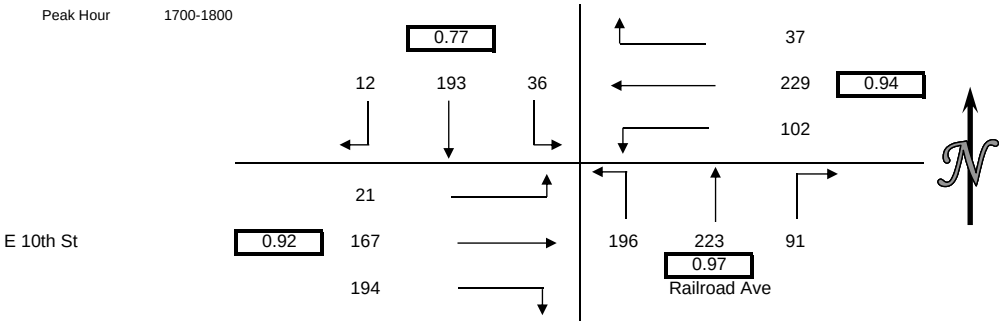
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-014
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	E 10th St
CITY:		Pittsburg

VEHICLE COUNTS

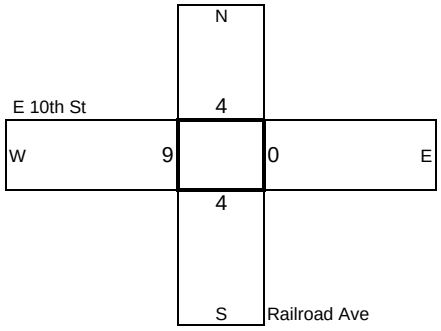
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	4	53	13	12	39	29	20	48	37	44	44	5	348
1615-1630	3	50	9	18	43	31	26	45	44	45	25	6	345
1630-1645	3	34	16	13	49	31	16	46	37	44	45	1	335
1645-1700	2	55	6	18	40	27	27	49	37	49	34	6	350
1700-1715	3	63	12	14	46	23	25	51	48	58	41	5	389
1715-1730	2	36	10	9	64	25	23	53	53	48	44	5	372
1730-1745	3	38	8	6	63	28	22	58	45	45	39	10	365
1745-1800	4	56	6	8	56	26	21	61	50	43	43	1	375
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	12	192	44	61	171	118	89	188	155	182	148	18	1378
1615-1715	11	202	43	63	178	112	94	191	166	196	145	18	1419
1630-1730	10	188	44	54	199	106	91	199	175	199	164	17	1446
1645-1745	10	192	36	47	213	103	97	211	183	200	158	26	1476
1700-1800	12	193	36	37	229	102	91	223	196	194	167	21	1501

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	3	1	1	1	6
1615-1630	1	0	1	1	3
1630-1645	3	3	0	0	6
1645-1700	3	2	1	0	6
1700-1715	2	0	3	0	5
1715-1730	1	0	0	8	9
1730-1745	1	0	1	1	3
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	10	6	3	2	21
1615-1715	9	5	5	1	20
1630-1730	9	5	4	8	26
1645-1745	7	2	5	9	23
1700-1800	4	0	4	9	17



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	1	0	0	0	1	1	2	0	0	5
1645-1700	0	0	0	0	0	0	0	0	1	0	0	0	1
1700-1715	1	0	0	0	1	0	0	0	0	0	2	0	4
1715-1730	0	0	0	1	1	0	0	0	0	0	0	1	3
1730-1745	0	0	0	0	0	0	0	0	0	0	1	0	1
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	1	0	0	0	1	2	2	0	0	6
1615-1715	1	0	0	1	1	0	0	1	2	2	2	0	10
1630-1730	1	0	0	2	2	0	0	1	2	2	2	1	13
1645-1745	1	0	0	1	2	0	0	0	1	0	3	1	9
1700-1800	1	0	0	1	2	0	0	0	0	0	3	1	8

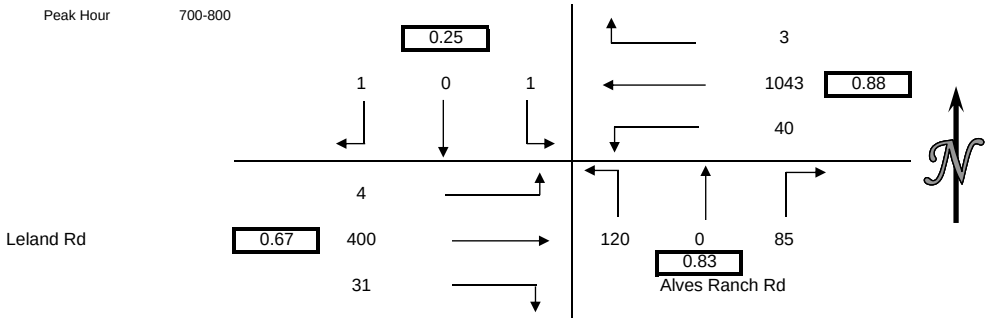
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-015
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Alves Ranch Rd
	E/W	Leland Rd
CITY:		Pittsburg

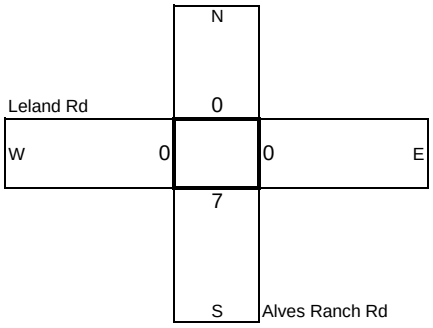
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	2	269	7	25	0	28	2	69	0	402
715-730	1	0	1	1	260	13	22	0	33	3	91	0	425
730-745	0	0	0	0	301	8	22	0	40	9	96	2	478
745-800	0	0	0	0	213	12	16	0	19	17	144	2	423
800-815	0	0	0	0	172	12	14	0	17	10	96	2	323
815-830	0	0	0	0	171	7	14	0	15	5	56	4	272
830-845	0	0	0	0	188	11	13	0	20	4	67	2	305
845-900	0	0	0	0	92	1	9	0	15	6	61	2	186
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	1	0	1	3	1043	40	85	0	120	31	400	4	1728
715-815	1	0	1	1	946	45	74	0	109	39	427	6	1649
730-830	0	0	0	0	857	39	66	0	91	41	392	10	1496
745-845	0	0	0	0	744	42	57	0	71	36	363	10	1323
800-900	0	0	0	0	623	31	50	0	67	25	280	10	1086



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	0	0	1	0	1
730-745	0	0	1	0	1
745-800	0	0	4	0	4
800-815	0	0	0	0	0
815-830	0	0	1	0	1
830-845	0	0	2	0	2
845-900	0	0	4	0	4
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	7	0	7
715-815	0	0	6	0	6
730-830	0	0	6	0	6
745-845	0	0	7	0	7
800-900	0	0	7	0	7



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	1	0	1
715-730	0	0	0	0	0	1	1	0	0	0	0	0	2
730-745	0	0	0	0	0	0	0	0	0	0	1	0	1
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	1	0	0	0	0	0	1
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	1	1	0	0	0	2	0	4
715-815	0	0	0	0	0	1	2	0	0	0	1	0	4
730-830	0	0	0	0	0	0	1	0	0	0	1	0	2
745-845	0	0	0	0	0	0	1	0	0	0	0	0	1
800-900	0	0	0	0	0	0	1	0	0	0	0	0	1

National Data and Surveying Services

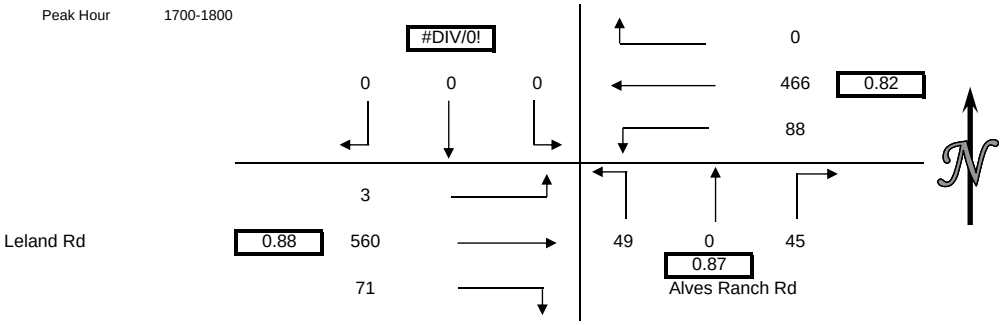
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-015
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Alves Ranch Rd
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

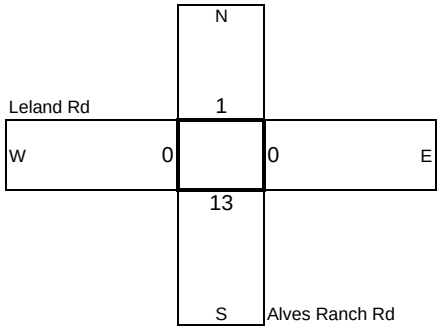
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	106	17	4	0	9	13	114	0	263
1615-1630	0	0	0	0	97	15	12	0	15	10	102	1	252
1630-1645	0	0	0	0	97	12	9	0	14	8	119	0	259
1645-1700	0	0	0	0	79	17	10	0	7	11	123	0	247
1700-1715	0	0	0	0	78	16	9	0	10	11	124	1	249
1715-1730	0	0	0	0	137	32	13	0	14	19	133	0	348
1730-1745	0	0	0	0	124	15	10	0	13	15	149	2	328
1745-1800	0	0	0	0	127	25	13	0	12	26	154	0	357
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	379	61	35	0	45	42	458	1	1021
1615-1715	0	0	0	0	351	60	40	0	46	40	468	2	1007
1630-1730	0	0	0	0	391	77	41	0	45	49	499	1	1103
1645-1745	0	0	0	0	418	80	42	0	44	56	529	3	1172
1700-1800	0	0	0	0	466	88	45	0	49	71	560	3	1282

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	3	0	3
1615-1630	0	0	3	0	3
1630-1645	0	0	3	0	3
1645-1700	0	0	1	0	1
1700-1715	0	0	4	0	4
1715-1730	0	0	1	0	1
1730-1745	1	0	2	0	3
1745-1800	0	0	6	0	6
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	10	0	10
1615-1715	0	0	11	0	11
1630-1730	0	0	9	0	9
1645-1745	1	0	8	0	9
1700-1800	1	0	13	0	14



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	1	0	0	0	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	1	0	0	0	0	0	0	0	1
1645-1745	0	0	0	0	1	0	0	0	0	0	0	0	1
1700-1800	0	0	0	0	1	0	0	0	0	0	0	0	1

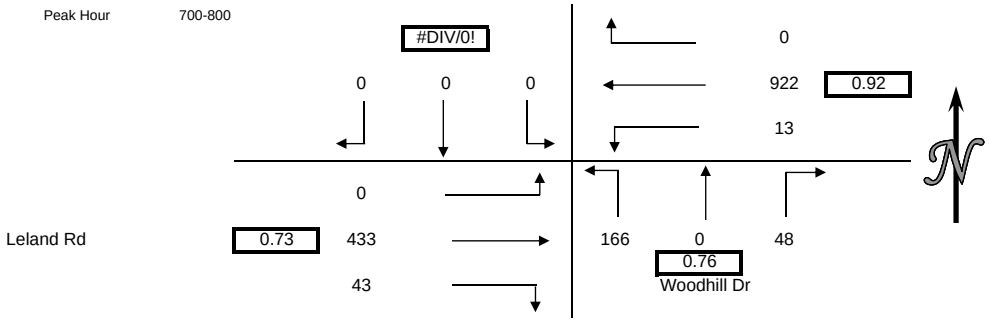
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-016
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Woodhill Dr
	E/W	Leland Rd
CITY:		Pittsburg

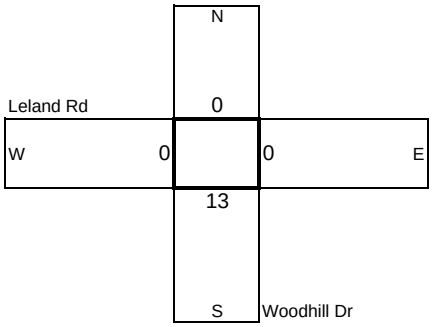
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	250	4	9	0	37	3	85	0	388
715-730	0	0	0	0	237	3	14	0	42	6	114	0	416
730-745	0	0	0	0	240	4	13	0	57	7	97	0	418
745-800	0	0	0	0	195	2	12	0	30	27	137	0	403
800-815	0	0	0	0	175	4	7	0	16	16	103	0	321
815-830	0	0	0	0	158	5	4	0	21	8	61	0	257
830-845	0	0	0	0	160	6	9	0	32	11	67	0	285
845-900	0	0	0	0	90	5	13	0	10	8	68	0	194
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	922	13	48	0	166	43	433	0	1625
715-815	0	0	0	0	847	13	46	0	145	56	451	0	1558
730-830	0	0	0	0	768	15	36	0	124	58	398	0	1399
745-845	0	0	0	0	688	17	32	0	99	62	368	0	1266
800-900	0	0	0	0	583	20	33	0	79	43	299	0	1057



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	0	0	7	0	7
730-745	0	0	2	0	2
745-800	0	0	3	0	3
800-815	0	0	4	0	4
815-830	0	0	1	0	1
830-845	0	0	3	0	3
845-900	0	0	9	0	9
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	13	0	13
715-815	0	0	16	0	16
730-830	0	0	10	0	10
745-845	0	0	11	0	11
800-900	0	0	17	0	17



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	1	0	1
715-730	0	0	0	0	1	0	0	0	0	0	1	0	2
730-745	0	0	0	0	0	0	0	0	0	0	1	0	1
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	1	0	1
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	0	0	0	0	3	0	4
715-815	0	0	0	0	1	0	0	0	0	0	3	0	4
730-830	0	0	0	0	0	0	0	0	0	0	2	0	2
745-845	0	0	0	0	0	0	0	0	0	0	1	0	1
800-900	0	0	0	0	0	0	0	0	0	0	1	0	1

National Data and Surveying Services

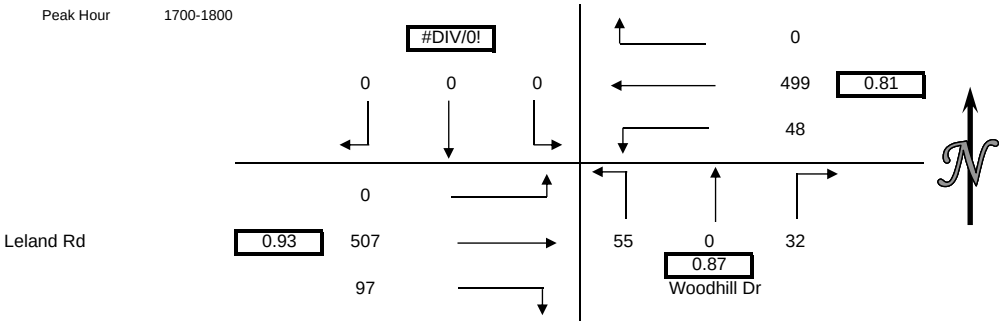
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-016
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Woodhill Dr
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

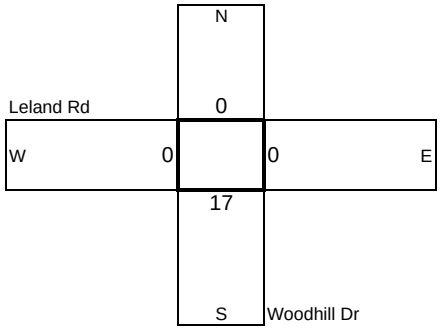
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	111	8	4	0	13	16	120	0	272
1615-1630	0	0	0	0	101	6	7	0	13	18	96	0	241
1630-1645	0	0	0	0	87	9	8	0	18	18	100	0	240
1645-1700	0	0	0	0	90	9	7	0	8	24	112	0	250
1700-1715	0	0	0	0	82	9	9	0	13	23	109	0	245
1715-1730	0	0	0	0	153	16	8	0	9	26	128	0	340
1730-1745	0	0	0	0	122	14	6	0	19	23	132	0	316
1745-1800	0	0	0	0	142	9	9	0	14	25	138	0	337
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	389	32	26	0	52	76	428	0	1003
1615-1715	0	0	0	0	360	33	31	0	52	83	417	0	976
1630-1730	0	0	0	0	412	43	32	0	48	91	449	0	1075
1645-1745	0	0	0	0	447	48	30	0	49	96	481	0	1151
1700-1800	0	0	0	0	499	48	32	0	55	97	507	0	1238

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	1	0	1
1615-1630	0	0	1	0	1
1630-1645	0	0	0	0	0
1645-1700	0	0	4	0	4
1700-1715	0	0	2	0	2
1715-1730	0	0	0	0	0
1730-1745	0	0	6	0	6
1745-1800	0	0	9	0	9
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	6	0	6
1615-1715	0	0	7	0	7
1630-1730	0	0	6	0	6
1645-1745	0	0	12	0	12
1700-1800	0	0	17	0	17



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	1	0	0	0	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	2	0	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	1	0	0	0	0	0	0	0	1
1645-1745	0	0	0	0	1	0	0	0	0	0	0	0	1
1700-1800	0	0	0	0	1	2	0	0	0	0	0	0	3

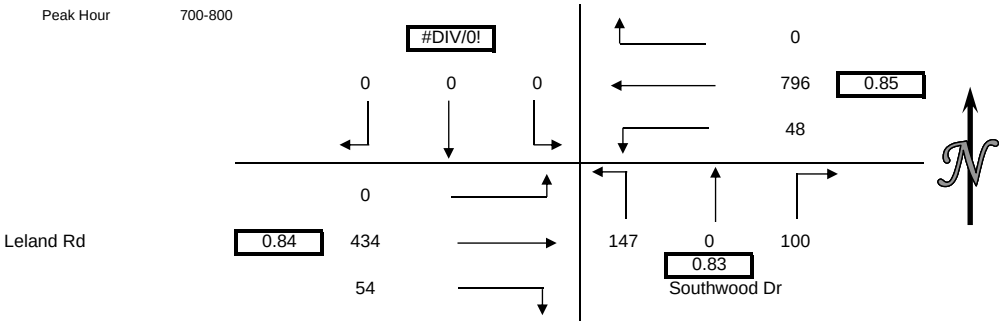
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-017
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Southwood Dr
	E/W	Leland Rd
CITY:		Pittsburg

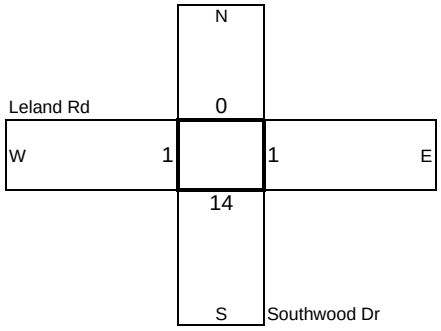
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	234	14	24	0	38	5	91	0	406
715-730	0	0	0	0	188	8	22	0	41	9	110	0	378
730-745	0	0	0	0	212	13	31	0	43	11	117	0	427
745-800	0	0	0	0	162	13	23	0	25	29	116	0	368
800-815	0	0	0	0	151	17	15	0	20	17	88	0	308
815-830	0	0	0	0	150	12	19	0	18	10	59	0	268
830-845	0	0	0	0	146	10	18	0	24	11	68	0	277
845-900	0	0	0	0	69	12	16	0	15	5	70	0	187
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	796	48	100	0	147	54	434	0	1579
715-815	0	0	0	0	713	51	91	0	129	66	431	0	1481
730-830	0	0	0	0	675	55	88	0	106	67	380	0	1371
745-845	0	0	0	0	609	52	75	0	87	67	331	0	1221
800-900	0	0	0	0	516	51	68	0	77	43	285	0	1040



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	0	1	5	0	6
730-745	0	0	5	0	5
745-800	0	0	3	1	4
800-815	0	0	6	0	6
815-830	0	1	2	0	3
830-845	0	0	3	1	4
845-900	0	0	5	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	14	1	16
715-815	0	1	19	1	21
730-830	0	1	16	1	18
745-845	0	1	14	2	17
800-900	0	1	16	1	18



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	1	0	1
715-730	0	0	0	0	1	0	1	0	0	1	0	0	3
730-745	0	0	0	0	0	0	0	0	0	0	1	0	1
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	1	0	1
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	1	0	0	1	2	0	5
715-815	0	0	0	0	1	0	1	0	0	1	2	0	5
730-830	0	0	0	0	0	0	0	0	0	0	2	0	2
745-845	0	0	0	0	0	0	0	0	0	0	1	0	1
800-900	0	0	0	0	0	0	0	0	0	0	1	0	1

National Data and Surveying Services

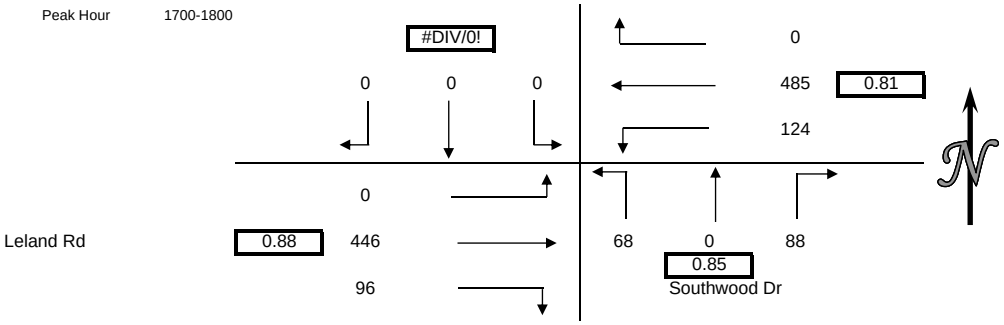
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-017
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Southwood Dr
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

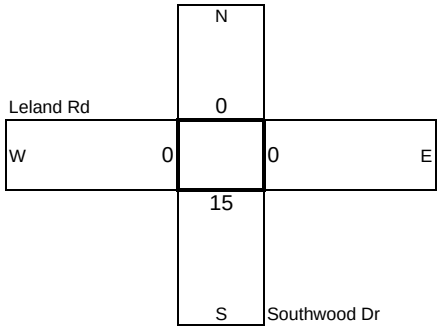
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	96	19	16	0	13	29	95	0	268
1615-1630	0	0	0	0	98	17	15	0	11	24	82	0	247
1630-1645	0	0	0	0	88	17	17	0	10	19	89	0	240
1645-1700	0	0	0	0	90	19	13	0	7	23	101	0	253
1700-1715	0	0	0	0	70	25	19	0	16	22	97	0	249
1715-1730	0	0	0	0	163	26	18	0	13	20	106	0	346
1730-1745	0	0	0	0	124	38	30	0	14	25	118	0	349
1745-1800	0	0	0	0	128	35	21	0	25	29	125	0	363
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	372	72	61	0	41	95	367	0	1008
1615-1715	0	0	0	0	346	78	64	0	44	88	369	0	989
1630-1730	0	0	0	0	411	87	67	0	46	84	393	0	1088
1645-1745	0	0	0	0	447	108	80	0	50	90	422	0	1197
1700-1800	0	0	0	0	485	124	88	0	68	96	446	0	1307

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	2	0	2
1615-1630	0	0	2	0	2
1630-1645	0	0	2	0	2
1645-1700	0	0	4	0	4
1700-1715	0	0	1	0	1
1715-1730	0	0	5	0	5
1730-1745	0	0	4	0	4
1745-1800	0	0	5	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	10	0	10
1615-1715	0	0	9	0	9
1630-1730	0	0	12	0	12
1645-1745	0	0	14	0	14
1700-1800	0	0	15	0	15



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	1	0	0	0	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	2	0	1	0	0	0	0	0	3
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	1	0	0	0	0	0	0	0	1
1645-1745	0	0	0	0	1	0	0	0	0	0	0	0	1
1700-1800	0	0	0	0	3	0	1	0	0	0	0	0	4

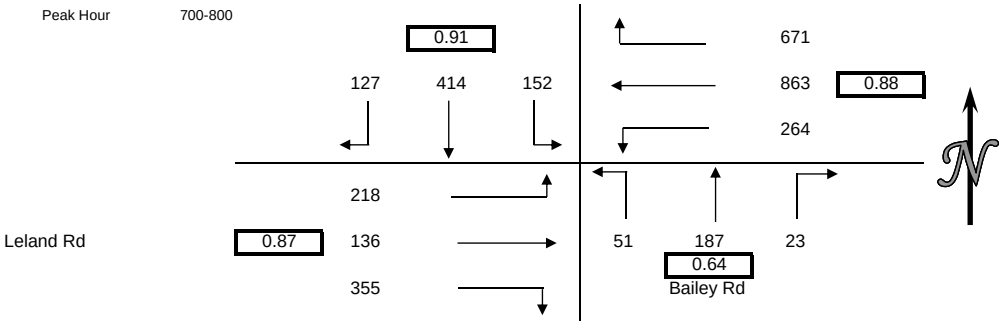
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-018
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Leland Rd
CITY:		Pittsburg

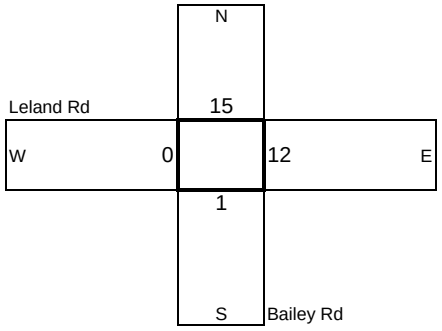
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	33	96	27	165	236	98	2	30	6	76	33	47	849
715-730	35	119	25	193	245	74	7	44	12	96	39	44	933
730-745	27	100	40	161	209	58	5	48	5	108	33	62	856
745-800	32	99	60	152	173	34	9	65	28	75	31	65	823
800-815	37	84	81	120	134	55	9	54	28	59	40	35	736
815-830	29	77	58	108	142	22	8	61	25	33	37	30	630
830-845	35	70	47	80	104	27	5	52	30	30	27	38	545
845-900	24	69	30	77	58	18	7	49	17	30	46	39	464
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	127	414	152	671	863	264	23	187	51	355	136	218	3461
715-815	131	402	206	626	761	221	30	211	73	338	143	206	3348
730-830	125	360	239	541	658	169	31	228	86	275	141	192	3045
745-845	133	330	246	460	553	138	31	232	111	197	135	168	2734
800-900	125	300	216	385	438	122	29	216	100	152	150	142	2375



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	3	5	0	0	8
715-730	3	2	0	0	5
730-745	4	4	0	0	8
745-800	5	1	1	0	7
800-815	6	3	1	0	10
815-830	7	4	0	0	11
830-845	4	1	0	0	5
845-900	4	3	0	0	7
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	15	12	1	0	28
715-815	18	10	2	0	30
730-830	22	12	2	0	36
745-845	22	9	2	0	33
800-900	21	11	1	0	33



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	2	0	0	0	0	0	0	0	2
715-730	0	0	0	0	1	0	0	0	0	0	0	0	1
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	1	0	0	0	0	0	0	0	0	0	1
815-830	0	0	0	0	0	0	0	0	0	0	1	0	1
830-845	0	0	0	0	1	0	0	0	0	0	0	0	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	3	0	0	0	0	0	0	0	3
715-815	0	0	1	0	1	0	0	0	0	0	0	0	2
730-830	0	0	1	0	0	0	0	0	0	0	1	0	2
745-845	0	0	1	0	1	0	0	0	0	0	1	0	3
800-900	0	0	1	0	1	0	0	0	0	0	1	0	3

National Data and Surveying Services

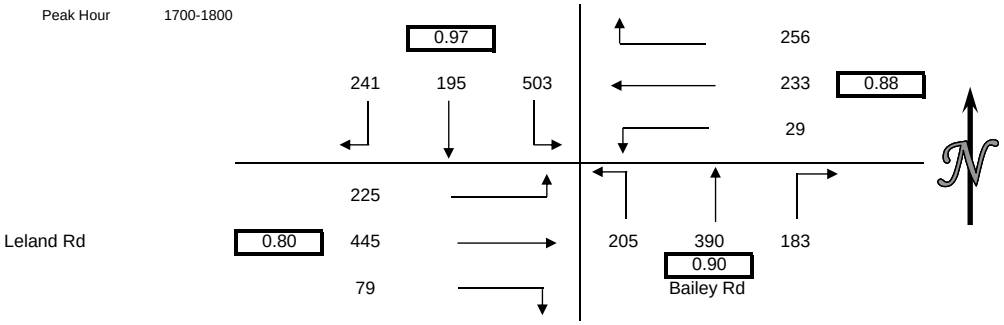
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-018
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

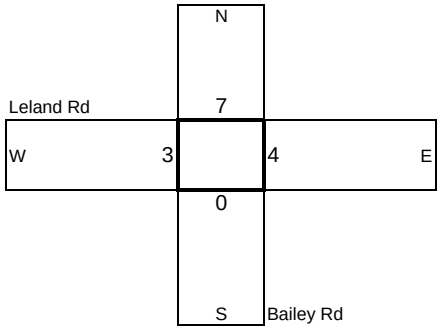
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	52	37	131	56	35	6	29	76	38	12	69	43	584
1615-1630	50	49	116	60	42	8	26	86	25	12	86	35	595
1630-1645	60	46	107	75	60	8	39	84	50	32	73	37	671
1645-1700	44	44	102	63	43	8	37	81	41	8	74	53	598
1700-1715	63	56	121	67	71	9	43	91	44	14	68	33	680
1715-1730	67	48	105	59	57	7	48	111	56	23	96	56	733
1730-1745	58	49	134	62	52	8	40	101	58	25	135	73	795
1745-1800	53	42	143	68	53	5	52	87	47	17	146	63	776
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	206	176	456	254	180	30	131	327	154	64	302	168	2448
1615-1715	217	195	446	265	216	33	145	342	160	66	301	158	2544
1630-1730	234	194	435	264	231	32	167	367	191	77	311	179	2682
1645-1745	232	197	462	251	223	32	168	384	199	70	373	215	2806
1700-1800	241	195	503	256	233	29	183	390	205	79	445	225	2984

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	2	1	1	0	4
1615-1630	6	3	1	1	11
1630-1645	3	1	0	0	4
1645-1700	1	1	0	3	5
1700-1715	0	0	0	2	2
1715-1730	4	3	0	0	7
1730-1745	2	1	0	0	3
1745-1800	1	0	0	1	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	12	6	2	4	24
1615-1715	10	5	1	6	22
1630-1730	8	5	0	5	18
1645-1745	7	5	0	5	17
1700-1800	7	4	0	3	14



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	1	0	0	0	1	0	2
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	1	0	0	0	1	0	2
1615-1715	0	0	0	0	0	0	1	0	0	0	1	0	2
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0

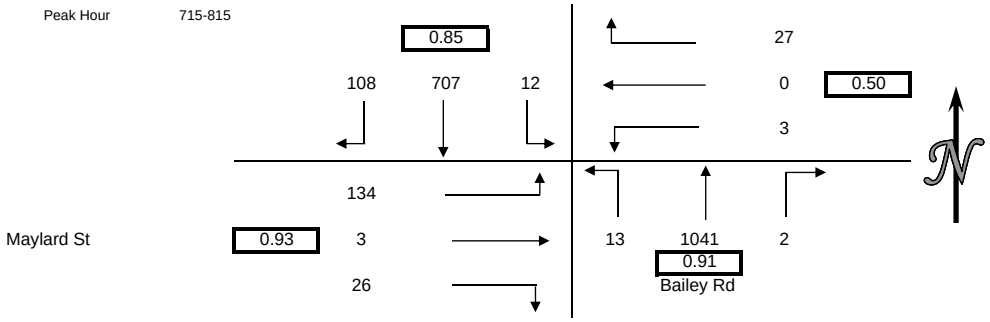
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-019
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Maylard St
CITY:		Pittsburg

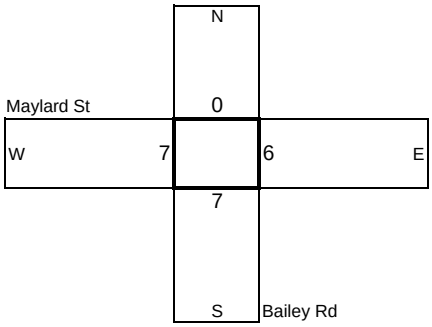
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	14	157	0	2	0	0	2	239	7	5	0	20	446
715-730	23	163	1	6	0	1	1	271	1	6	0	34	507
730-745	16	163	3	14	0	1	1	280	0	7	0	37	522
745-800	30	181	5	6	0	1	0	283	8	7	2	30	553
800-815	39	200	3	1	0	0	0	207	4	6	1	33	494
815-830	28	156	2	0	0	0	0	188	3	6	0	39	422
830-845	23	147	6	2	0	0	1	172	5	8	0	39	403
845-900	37	136	4	2	0	0	1	161	6	5	0	29	381
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	83	664	9	28	0	3	4	1073	16	25	2	121	2028
715-815	108	707	12	27	0	3	2	1041	13	26	3	134	2076
730-830	113	700	13	21	0	2	1	958	15	26	3	139	1991
745-845	120	684	16	9	0	1	1	850	20	27	3	141	1872
800-900	127	639	15	5	0	0	2	728	18	25	1	140	1700



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	3	3	3	0	9
715-730	0	1	3	4	8
730-745	0	4	3	0	7
745-800	0	0	0	1	1
800-815	0	1	1	2	4
815-830	0	0	0	1	1
830-845	0	1	0	0	1
845-900	0	1	1	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	3	8	9	5	25
715-815	0	6	7	7	20
730-830	0	5	4	4	13
745-845	0	2	1	4	7
800-900	0	3	2	3	8



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	1	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	1	1

National Data and Surveying Services

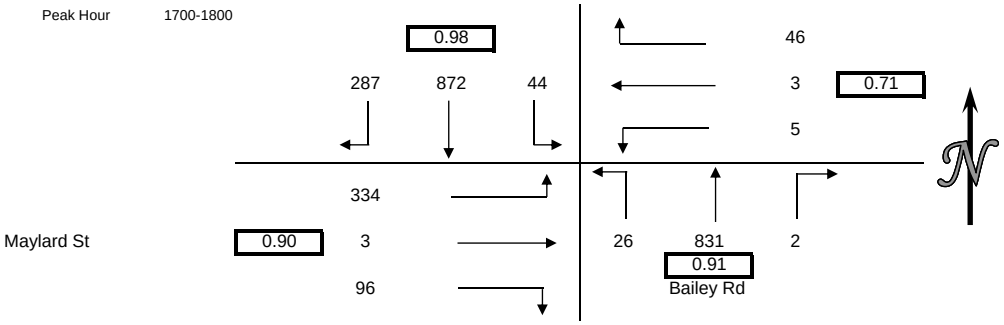
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-019
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Maylard St
CITY:		Pittsburg

VEHICLE COUNTS

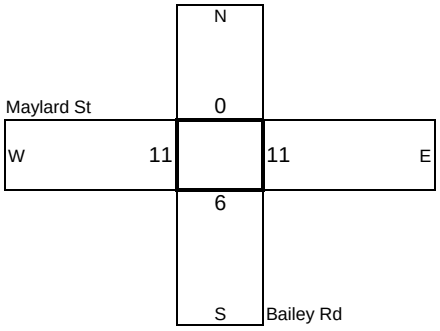
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	41	183	31	5	0	1	1	152	3	17	1	74	509
1615-1630	48	174	33	8	0	0	2	176	6	14	0	62	523
1630-1645	56	211	6	4	1	1	1	190	9	14	1	70	564
1645-1700	61	192	8	8	0	0	1	204	6	16	1	59	556
1700-1715	69	217	13	10	0	0	1	180	3	17	0	87	597
1715-1730	71	215	7	6	0	0	1	208	9	20	2	74	613
1730-1745	72	221	14	16	1	2	0	214	6	30	0	83	659
1745-1800	75	219	10	14	2	3	0	229	8	29	1	90	680
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	206	760	78	25	1	2	5	722	24	61	3	265	2152
1615-1715	234	794	60	30	1	1	5	750	24	61	2	278	2240
1630-1730	257	835	34	28	1	1	4	782	27	67	4	290	2330
1645-1745	273	845	42	40	1	2	3	806	24	83	3	303	2425
1700-1800	287	872	44	46	3	5	2	831	26	96	3	334	2549

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	2	6	1	9
1615-1630	0	2	2	3	7
1630-1645	0	0	1	2	3
1645-1700	1	5	4	3	13
1700-1715	0	1	0	4	5
1715-1730	0	2	3	5	10
1730-1745	0	4	3	2	9
1745-1800	0	4	0	0	4
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	1	9	13	9	32
1615-1715	1	8	7	12	28
1630-1730	1	8	8	14	31
1645-1745	1	12	10	14	37
1700-1800	0	11	6	11	28



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	1	0	0	0	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	1	0	0	0	0	1	0	0	0	0	2
1745-1800	1	1	0	0	0	0	0	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	1	0	0	0	0	1
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	1	0	0	0	0	1	0	0	0	0	2
1700-1800	1	1	1	0	0	0	0	1	0	0	0	0	4

National Data and Surveying Services

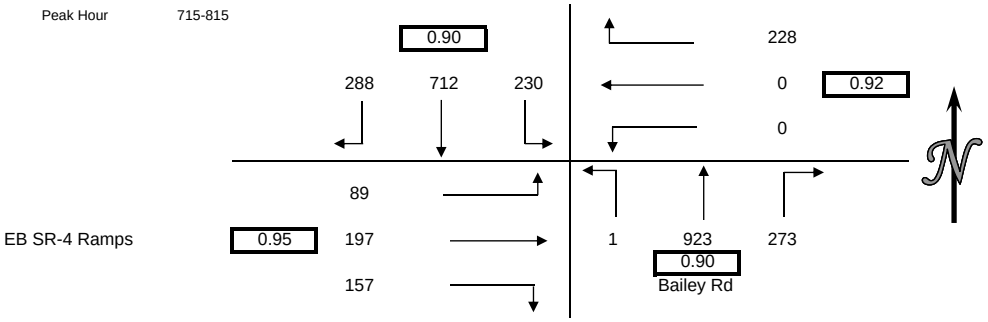
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-020
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	EB SR-4 Ramps
CITY:		Pittsburg

VEHICLE COUNTS

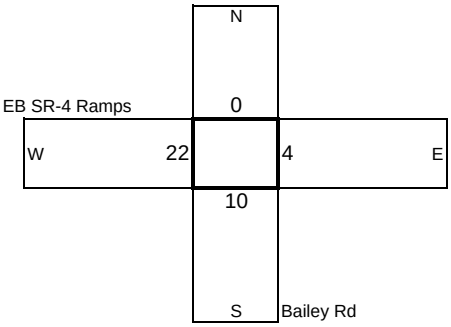
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	90	148	30	51	0	0	45	201	0	37	69	34	705
715-730	96	168	32	48	0	0	51	263	0	26	61	29	774
730-745	71	152	61	58	0	0	70	263	1	35	56	25	792
745-800	58	187	62	62	0	0	80	214	0	43	46	19	771
800-815	63	205	75	60	0	0	72	183	0	53	34	16	761
815-830	64	151	61	54	0	0	70	175	0	46	39	15	675
830-845	55	149	63	38	0	0	79	143	0	44	40	23	634
845-900	39	113	73	36	0	0	65	153	0	45	27	10	561
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	315	655	185	219	0	0	246	941	1	141	232	107	3042
715-815	288	712	230	228	0	0	273	923	1	157	197	89	3098
730-830	256	695	259	234	0	0	292	835	1	177	175	75	2999
745-845	240	692	261	214	0	0	301	715	0	186	159	73	2841
800-900	221	618	272	188	0	0	286	654	0	188	140	64	2631

Peak Hour 715-815



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	3	7	14	24
715-730	0	0	6	9	15
730-745	0	2	4	5	11
745-800	0	1	0	3	4
800-815	0	1	0	5	6
815-830	0	1	0	4	5
830-845	0	2	1	5	8
845-900	0	0	1	3	4
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	6	17	31	54
715-815	0	4	10	22	36
730-830	0	5	4	17	26
745-845	0	5	1	17	23
800-900	0	4	2	17	23



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	2	0	0	0	0	0	0	0	0	0	0	1	3
715-730	1	0	0	0	0	0	0	0	0	0	1	0	2
730-745	0	0	0	0	0	0	0	0	0	0	2	1	3
745-800	0	0	0	0	0	0	0	0	0	0	1	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	1	0	0	1	1	3
830-845	0	0	0	1	0	0	0	0	0	0	0	1	2
845-900	1	0	0	0	0	0	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	3	0	0	0	0	0	0	0	0	0	4	2	9
715-815	1	0	0	0	0	0	0	0	0	0	4	1	6
730-830	0	0	0	0	0	0	0	1	0	0	4	2	7
745-845	0	0	0	1	0	0	0	1	0	0	2	2	6
800-900	1	0	0	1	0	0	0	1	0	0	1	2	6

Peak Hour 700-800

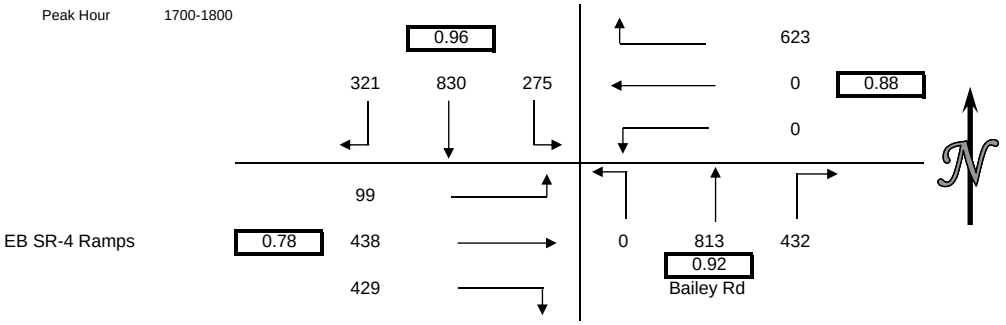
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-020
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	EB SR-4 Ramps
CITY:		Pittsburg

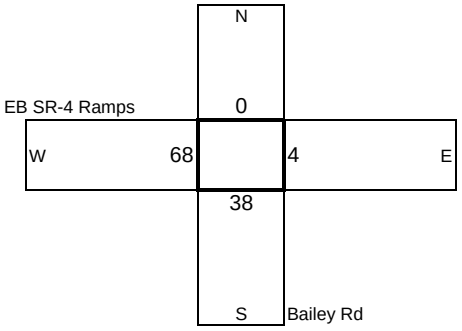
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	40	154	52	126	0	0	77	173	0	110	124	18	874
1615-1630	49	158	59	141	0	0	79	175	0	109	76	22	868
1630-1645	49	183	77	160	0	0	82	205	0	97	40	11	904
1645-1700	56	163	61	149	0	0	83	187	0	111	115	25	950
1700-1715	73	208	74	160	0	0	70	201	0	99	10	9	904
1715-1730	87	213	70	136	0	0	118	194	0	94	132	18	1062
1730-1745	84	212	65	150	0	0	134	204	0	108	167	36	1160
1745-1800	77	197	66	177	0	0	110	214	0	128	129	36	1134
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	194	658	249	576	0	0	321	740	0	427	355	76	3596
1615-1715	227	712	271	610	0	0	314	768	0	416	241	67	3626
1630-1730	265	767	282	605	0	0	353	787	0	401	297	63	3820
1645-1745	300	796	270	595	0	0	405	786	0	412	424	88	4076
1700-1800	321	830	275	623	0	0	432	813	0	429	438	99	4260



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	2	3	16	21
1615-1630	0	0	2	9	11
1630-1645	0	2	1	4	7
1645-1700	0	0	9	18	27
1700-1715	0	1	2	2	5
1715-1730	0	1	22	34	57
1730-1745	0	1	10	23	34
1745-1800	0	1	4	9	14
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	4	15	47	66
1615-1715	0	3	14	33	50
1630-1730	0	4	34	58	96
1645-1745	0	3	43	77	123
1700-1800	0	4	38	68	110



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	1	1	0	0	1	0	0	0	0	0	0	0	3
1615-1630	0	1	0	0	0	0	0	1	0	0	0	0	2
1630-1645	0	0	0	0	0	0	0	2	0	0	0	2	4
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	2	2
1715-1730	0	0	0	0	1	0	0	0	0	1	3	2	7
1730-1745	0	0	0	0	0	0	0	0	0	0	0	3	3
1745-1800	0	0	0	0	0	0	0	0	0	0	0	1	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	1	2	0	0	1	0	0	3	0	0	0	2	9
1615-1715	0	1	0	0	0	0	0	3	0	0	0	4	8
1630-1730	0	0	0	0	1	0	0	2	0	1	3	6	13
1645-1745	0	0	0	0	1	0	0	0	0	1	3	7	12
1700-1800	0	0	0	0	1	0	0	0	0	1	3	8	13

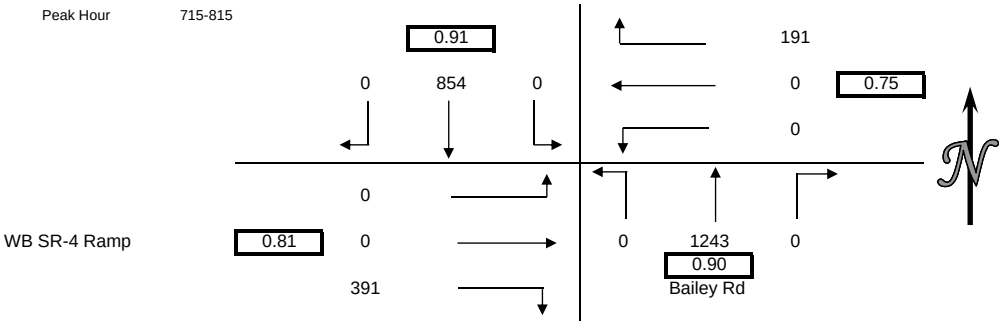
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-021
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	WB SR-4 Ramp
CITY:		Bay Point

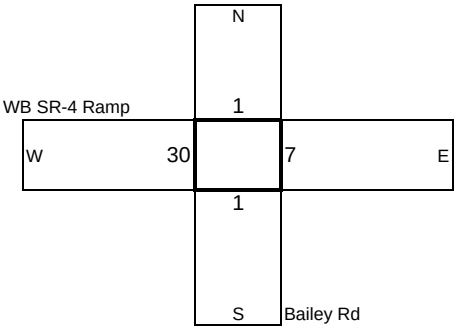
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	156	0	34	0	0	0	280	0	100	0	0	570
715-730	0	188	0	32	0	0	0	339	0	120	0	0	679
730-745	0	210	0	39	0	0	0	346	0	72	0	0	667
745-800	0	221	0	64	0	0	0	299	0	89	0	0	673
800-815	0	235	0	56	0	0	0	259	0	110	0	0	660
815-830	0	153	0	73	0	0	0	245	0	118	0	0	589
830-845	0	167	0	41	0	0	0	215	0	106	0	0	529
845-900	0	144	0	35	0	0	0	200	0	80	0	0	459
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	775	0	169	0	0	0	1264	0	381	0	0	2589
715-815	0	854	0	191	0	0	0	1243	0	391	0	0	2679
730-830	0	819	0	232	0	0	0	1149	0	389	0	0	2589
745-845	0	776	0	234	0	0	0	1018	0	423	0	0	2451
800-900	0	699	0	205	0	0	0	919	0	414	0	0	2237



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	4	0	8	12
715-730	0	1	1	8	10
730-745	0	2	0	8	10
745-800	1	2	0	5	8
800-815	0	2	0	9	11
815-830	0	1	0	9	10
830-845	0	2	0	7	9
845-900	0	0	0	3	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	1	9	1	29	40
715-815	1	7	1	30	39
730-830	1	7	0	31	39
745-845	1	7	0	30	38
800-900	0	5	0	28	33



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	2	0	0	0	0	0	1	0	0	0	0	3
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	1	0	0	0	0	0	0	0	0	0	0	1
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	1	0	0	0	0	1
830-845	0	0	0	0	0	0	0	1	0	0	0	0	1
845-900	0	0	0	0	0	0	0	1	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	3	0	0	0	0	0	1	0	0	0	0	4
715-815	0	1	0	0	0	0	0	0	0	0	0	0	1
730-830	0	1	0	0	0	0	0	1	0	0	0	0	2
745-845	0	0	0	0	0	0	0	2	0	0	0	0	2
800-900	0	0	0	0	0	0	0	3	0	0	0	0	3

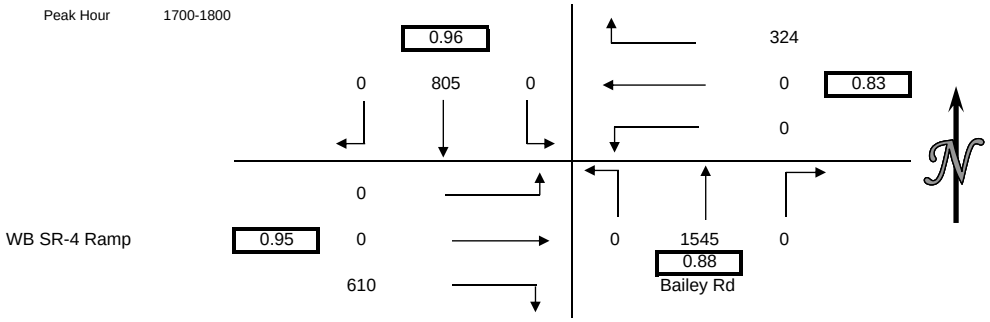
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-021
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	WB SR-4 Ramp
CITY:		Bay Point

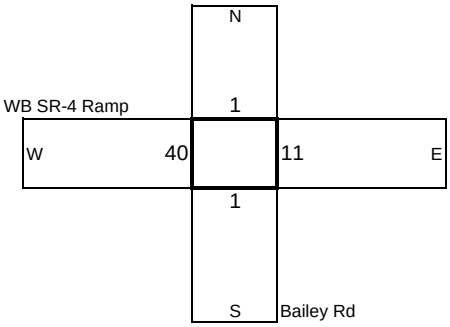
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	149	0	78	0	0	0	316	0	105	0	0	648
1615-1630	0	151	0	79	0	0	0	337	0	104	0	0	671
1630-1645	0	191	0	81	0	0	0	391	0	116	0	0	779
1645-1700	0	162	0	75	0	0	0	364	0	120	0	0	721
1700-1715	0	209	0	80	0	0	0	381	0	160	0	0	830
1715-1730	0	201	0	98	0	0	0	332	0	160	0	0	791
1730-1745	0	201	0	81	0	0	0	395	0	159	0	0	836
1745-1800	0	194	0	65	0	0	0	437	0	131	0	0	827
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	653	0	313	0	0	0	1408	0	445	0	0	2819
1615-1715	0	713	0	315	0	0	0	1473	0	500	0	0	3001
1630-1730	0	763	0	334	0	0	0	1468	0	556	0	0	3121
1645-1745	0	773	0	334	0	0	0	1472	0	599	0	0	3178
1700-1800	0	805	0	324	0	0	0	1545	0	610	0	0	3284



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	7	0	8	15
1615-1630	0	2	0	15	17
1630-1645	0	2	0	3	5
1645-1700	1	1	0	11	13
1700-1715	0	1	0	2	3
1715-1730	1	2	0	14	17
1730-1745	0	2	0	15	17
1745-1800	0	6	1	9	16
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	1	12	0	37	50
1615-1715	1	6	0	31	38
1630-1730	2	6	0	30	38
1645-1745	2	6	0	42	50
1700-1800	1	11	1	40	53



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	1	0	0	1
1615-1630	0	0	0	0	0	0	0	1	0	0	0	0	1
1630-1645	0	0	0	0	0	0	0	1	1	0	0	0	2
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	1	1	0	0	0	2
1715-1730	0	0	0	0	0	0	0	3	0	0	0	0	3
1730-1745	0	0	0	0	0	0	0	4	0	0	0	0	4
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	2	1	1	0	0	4
1615-1715	0	0	0	0	0	0	0	3	2	0	0	0	5
1630-1730	0	0	0	0	0	0	0	5	2	0	0	0	7
1645-1745	0	0	0	0	0	0	0	8	1	0	0	0	9
1700-1800	0	0	0	0	0	0	0	8	1	0	0	0	9

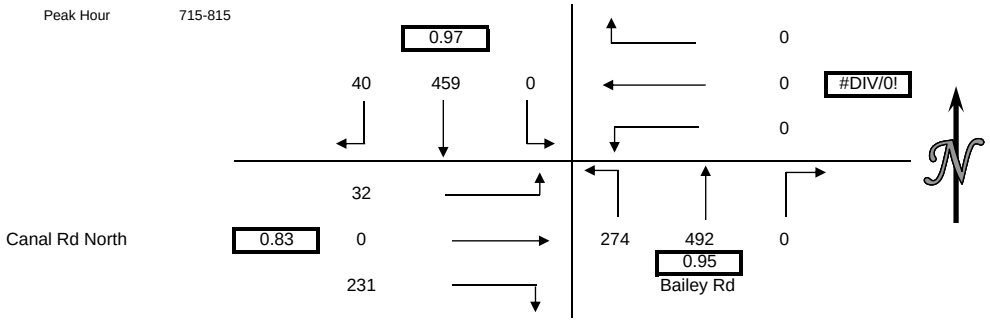
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-022
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Canal Rd North
CITY:		Bay Point

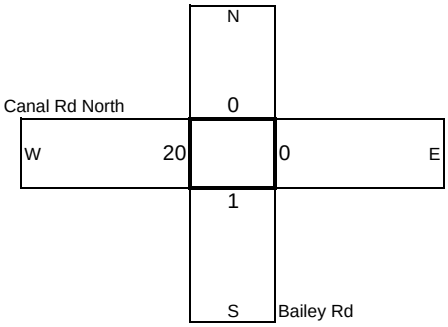
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	10	102	0	0	0	0	0	101	50	32	0	6	301
715-730	16	111	0	0	0	0	0	114	67	47	0	5	360
730-745	7	119	0	0	0	0	0	116	68	71	0	8	389
745-800	13	116	0	0	0	0	0	125	76	58	0	11	399
800-815	4	113	0	0	0	0	0	137	63	55	0	8	380
815-830	3	80	0	0	0	0	0	122	55	41	0	10	311
830-845	8	103	0	0	0	0	0	85	37	22	0	9	264
845-900	7	83	0	0	0	0	0	84	41	15	0	5	235
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	46	448	0	0	0	0	0	456	261	208	0	30	1449
715-815	40	459	0	0	0	0	0	492	274	231	0	32	1528
730-830	27	428	0	0	0	0	0	500	262	225	0	37	1479
745-845	28	412	0	0	0	0	0	469	231	176	0	38	1354
800-900	22	379	0	0	0	0	0	428	196	133	0	32	1190



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	2	14	16
715-730	0	0	0	3	3
730-745	0	0	0	6	6
745-800	0	0	0	4	4
800-815	0	0	1	7	8
815-830	0	0	0	5	5
830-845	0	0	0	1	1
845-900	0	0	1	1	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	2	27	29
715-815	0	0	1	20	21
730-830	0	0	1	22	23
745-845	0	0	1	17	18
800-900	0	0	2	14	16



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	1	0	0	0	0	0	0	0	0	0	0	1
745-800	0	1	0	0	0	0	0	0	0	0	0	0	1
800-815	0	0	0	0	0	0	0	1	0	0	0	0	1
815-830	0	0	0	0	0	0	0	1	0	0	0	0	1
830-845	0	1	0	0	0	0	0	1	0	0	0	0	2
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	2	0	0	0	0	0	0	0	0	0	0	2
715-815	0	2	0	0	0	0	0	1	0	0	0	0	3
730-830	0	2	0	0	0	0	0	2	0	0	0	0	4
745-845	0	2	0	0	0	0	0	3	0	0	0	0	5
800-900	0	1	0	0	0	0	0	3	0	0	0	0	4

National Data and Surveying Services

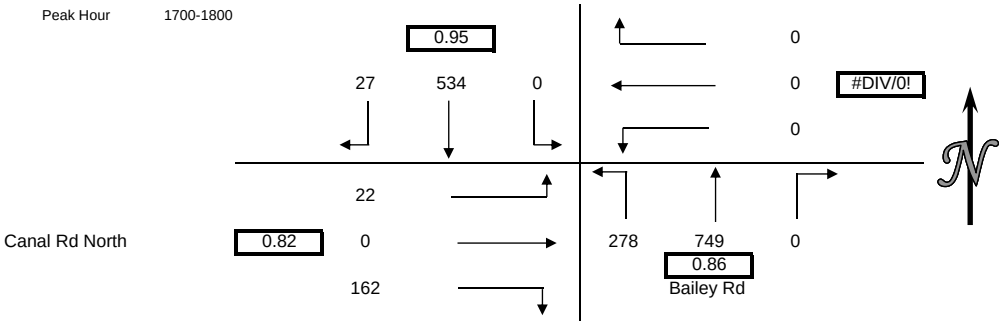
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-022
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Canal Rd North
CITY:		Bay Point

VEHICLE COUNTS

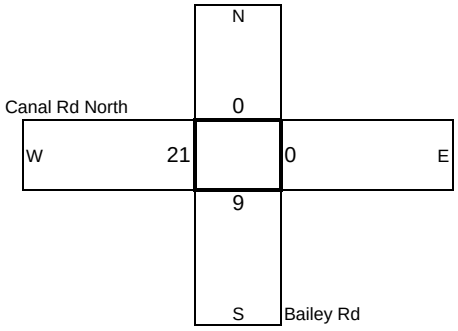
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	6	100	0	0	0	0	0	174	52	31	0	6	369
1615-1630	8	125	0	0	0	0	0	203	51	32	0	8	427
1630-1645	4	131	0	0	0	0	0	187	65	37	0	6	430
1645-1700	9	128	0	0	0	0	0	152	59	35	0	10	393
1700-1715	7	135	0	0	0	0	0	174	53	34	0	7	410
1715-1730	6	141	0	0	0	0	0	159	75	34	0	3	418
1730-1745	8	137	0	0	0	0	0	197	69	51	0	5	467
1745-1800	6	121	0	0	0	0	0	219	81	43	0	7	477
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	27	484	0	0	0	0	0	716	227	135	0	30	1619
1615-1715	28	519	0	0	0	0	0	716	228	138	0	31	1660
1630-1730	26	535	0	0	0	0	0	672	252	140	0	26	1651
1645-1745	30	541	0	0	0	0	0	682	256	154	0	25	1688
1700-1800	27	534	0	0	0	0	0	749	278	162	0	22	1772

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	2	5	7
1615-1630	0	0	2	7	9
1630-1645	0	0	0	4	4
1645-1700	0	0	0	5	5
1700-1715	0	0	1	3	4
1715-1730	0	0	2	4	6
1730-1745	0	0	2	7	9
1745-1800	0	0	4	7	11
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	4	21	25
1615-1715	0	0	3	19	22
1630-1730	0	0	3	16	19
1645-1745	0	0	5	19	24
1700-1800	0	0	9	21	30



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	1	0	0	0	0	0	0	0	0	0	0	1
1630-1645	1	0	0	0	0	0	0	3	0	0	0	0	4
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	1	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	3	0	0	0	0	3
1730-1745	0	0	0	0	0	0	0	3	0	0	0	0	3
1745-1800	0	1	0	0	0	0	0	2	0	0	0	0	3
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	1	1	0	0	0	0	0	3	0	0	0	0	5
1615-1715	1	1	0	0	0	0	0	4	0	0	0	0	6
1630-1730	1	0	0	0	0	0	0	7	0	0	0	0	8
1645-1745	0	0	0	0	0	0	0	7	0	0	0	0	7
1700-1800	0	1	0	0	0	0	0	9	0	0	0	0	10

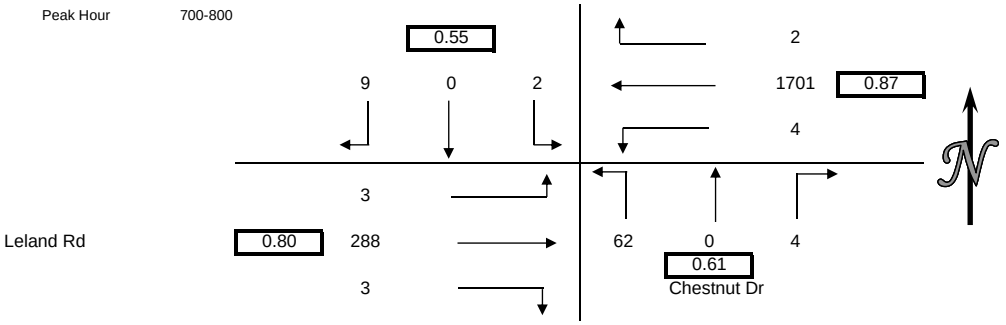
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-023
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Chestnut Dr
	E/W	Leland Rd
CITY:		Pittsburg

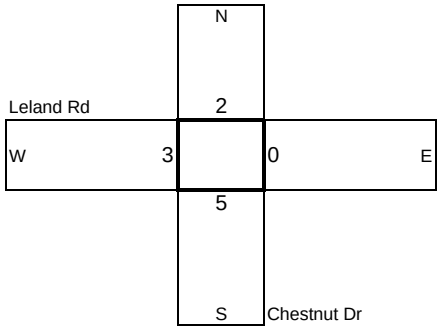
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	1	0	0	1	480	1	1	0	18	1	54	1	558
715-730	5	0	0	0	492	1	1	0	26	0	68	2	595
730-745	1	0	1	0	396	0	2	0	12	1	75	0	488
745-800	2	0	1	1	333	2	0	0	6	1	91	0	437
800-815	2	0	0	1	280	1	0	0	7	1	118	0	410
815-830	3	0	1	1	263	1	1	0	8	3	97	2	380
830-845	0	0	0	0	200	2	0	0	5	1	69	1	278
845-900	2	0	0	0	140	1	3	0	9	6	74	0	235
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	9	0	2	2	1701	4	4	0	62	3	288	3	2078
715-815	10	0	2	2	1501	4	3	0	51	3	352	2	1930
730-830	8	0	3	3	1272	4	3	0	33	6	381	2	1715
745-845	7	0	2	3	1076	6	1	0	26	6	375	3	1505
800-900	7	0	1	2	883	5	4	0	29	11	358	3	1303



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	0	1	2	4
715-730	1	0	0	0	1
730-745	0	0	0	1	1
745-800	0	0	4	0	4
800-815	1	0	0	0	1
815-830	0	0	1	3	4
830-845	0	0	3	1	4
845-900	0	0	0	1	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	2	0	5	3	10
715-815	2	0	4	1	7
730-830	1	0	5	4	10
745-845	1	0	8	4	13
800-900	1	0	4	5	10



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	1	0	1
815-830	0	0	0	0	0	0	0	0	0	0	1	0	1
830-845	0	0	0	0	1	0	0	0	0	0	0	0	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	0	0	0	0	0	0	1
715-815	0	0	0	0	0	0	0	0	0	0	1	0	1
730-830	0	0	0	0	0	0	0	0	0	0	2	0	2
745-845	0	0	0	0	1	0	0	0	0	0	2	0	3
800-900	0	0	0	0	1	0	0	0	0	0	2	0	3

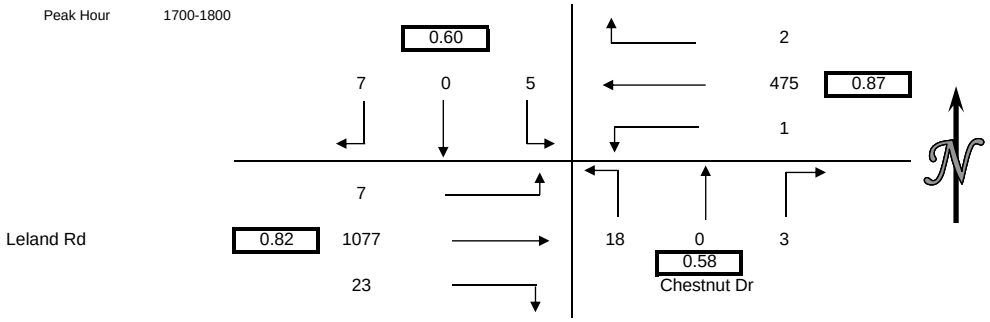
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-023
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Chestnut Dr
	E/W	Leland Rd
CITY:		Pittsburg

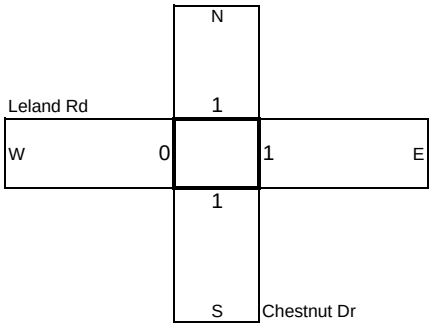
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	1	93	1	1	0	1	6	212	2	317
1615-1630	2	0	0	0	106	1	1	0	4	5	213	0	332
1630-1645	0	0	1	1	146	1	2	0	5	3	209	0	368
1645-1700	2	0	0	0	93	1	3	0	7	11	195	1	313
1700-1715	1	0	1	0	137	1	0	0	9	5	226	0	380
1715-1730	2	0	0	1	110	0	2	0	5	2	229	5	356
1730-1745	2	0	1	0	112	0	1	0	1	6	294	2	419
1745-1800	2	0	3	1	116	0	0	0	3	10	328	0	463
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	4	0	1	2	438	4	7	0	17	25	829	3	1330
1615-1715	5	0	2	1	482	4	6	0	25	24	843	1	1393
1630-1730	5	0	2	2	486	3	7	0	26	21	859	6	1417
1645-1745	7	0	2	1	452	2	6	0	22	24	944	8	1468
1700-1800	7	0	5	2	475	1	3	0	18	23	1077	7	1618



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	1	0	1
1615-1630	0	0	2	0	2
1630-1645	2	0	0	0	2
1645-1700	0	0	0	0	0
1700-1715	0	0	1	0	1
1715-1730	1	1	0	0	2
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	2	0	3	0	5
1615-1715	2	0	3	0	5
1630-1730	3	1	1	0	5
1645-1745	1	1	1	0	3
1700-1800	1	1	1	0	3



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	2	0	2
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	1	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	2	0	2
1615-1715	0	0	0	0	0	0	0	0	0	0	2	0	2
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	1	0	1

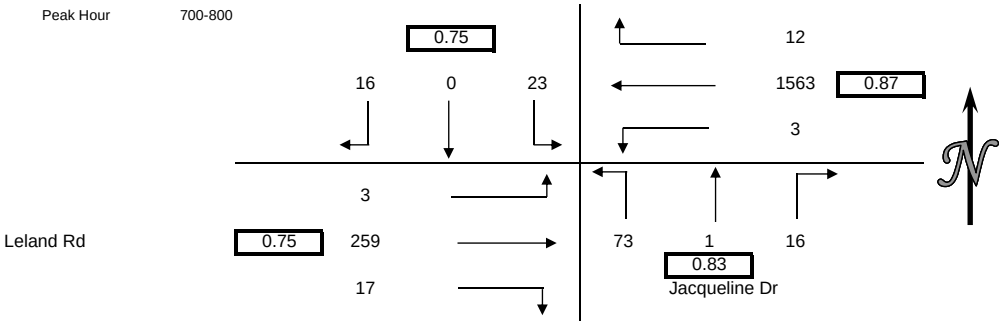
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-024
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Jacqueline Dr
	E/W	Leland Rd
CITY:		Pittsburg

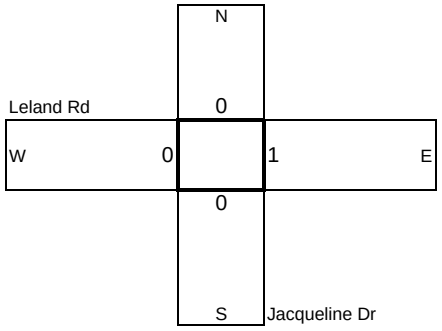
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	6	0	2	2	451	0	2	0	18	4	46	1	532
715-730	2	0	7	3	446	0	3	0	24	3	61	1	550
730-745	6	0	7	2	365	0	7	1	11	4	66	0	469
745-800	2	0	7	5	301	3	4	0	20	6	86	1	435
800-815	5	0	7	1	253	0	7	0	14	9	95	1	392
815-830	4	0	5	2	233	5	3	0	19	5	105	1	382
830-845	3	0	2	5	178	2	6	0	12	5	60	1	274
845-900	4	0	4	3	117	1	3	0	14	4	61	5	216
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	16	0	23	12	1563	3	16	1	73	17	259	3	1986
715-815	15	0	28	11	1365	3	21	1	69	22	308	3	1846
730-830	17	0	26	10	1152	8	21	1	64	24	352	3	1678
745-845	14	0	21	13	965	10	20	0	65	25	346	4	1483
800-900	16	0	18	11	781	8	19	0	59	23	321	8	1264



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	1	0	0	1
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	1	1
845-900	0	3	2	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	0	0	1
715-815	0	1	0	0	1
730-830	0	1	0	0	1
745-845	0	1	0	1	2
800-900	0	3	2	1	6



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	1	0	0	0	0	0	0	0	1
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	2	0	2
830-845	0	0	0	0	1	0	0	0	0	0	0	0	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	2	0	0	0	0	0	0	0	2
715-815	0	0	0	0	1	0	0	0	0	0	0	0	1
730-830	0	0	0	0	0	0	0	0	0	0	2	0	2
745-845	0	0	0	0	1	0	0	0	0	0	2	0	3
800-900	0	0	0	0	1	0	0	0	0	0	2	0	3

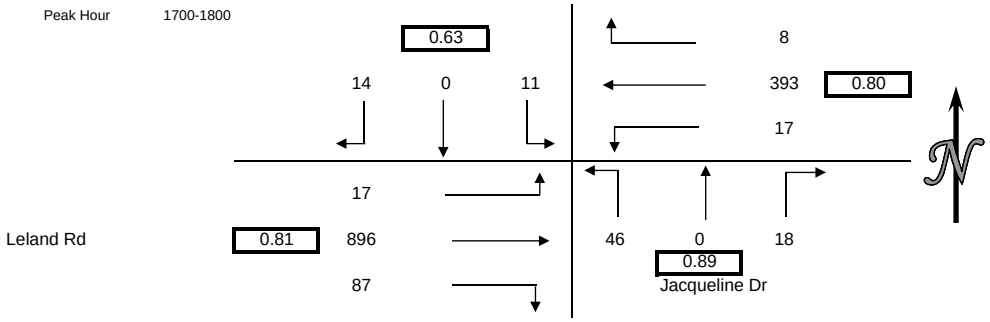
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-024
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Jacqueline Dr
	E/W	Leland Rd
CITY:		Pittsburg

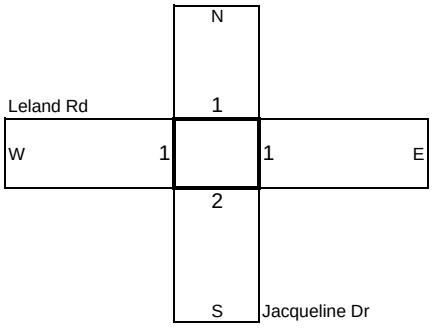
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	1	0	2	0	84	1	5	0	8	18	166	5	290
1615-1630	3	0	4	1	93	4	6	0	5	24	181	2	323
1630-1645	1	1	0	3	117	0	3	0	13	14	175	4	331
1645-1700	3	0	2	3	83	3	2	0	9	14	179	2	300
1700-1715	4	0	2	2	119	9	5	0	9	23	166	4	343
1715-1730	2	0	1	2	81	3	0	0	17	25	200	3	334
1730-1745	4	0	6	2	94	2	7	0	11	18	248	6	398
1745-1800	4	0	2	2	99	3	6	0	9	21	282	4	432
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	8	1	8	7	377	8	16	0	35	70	701	13	1244
1615-1715	11	1	8	9	412	16	16	0	36	75	701	12	1297
1630-1730	10	1	5	10	400	15	10	0	48	76	720	13	1308
1645-1745	13	0	11	9	377	17	14	0	46	80	793	15	1375
1700-1800	14	0	11	8	393	17	18	0	46	87	896	17	1507



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	1	0	1
1645-1700	0	0	1	0	1
1700-1715	0	0	2	0	2
1715-1730	1	0	0	1	2
1730-1745	0	1	0	0	1
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	2	0	2
1615-1715	0	0	4	0	4
1630-1730	1	0	4	1	6
1645-1745	1	1	3	1	6
1700-1800	1	1	2	1	5



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	1	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	1	0	1
1630-1645	0	0	0	0	0	0	0	0	0	0	1	0	1
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	3	0	3
1615-1715	0	0	0	0	0	0	0	0	0	0	2	0	2
1630-1730	0	0	0	0	0	0	0	0	0	0	1	0	1
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0

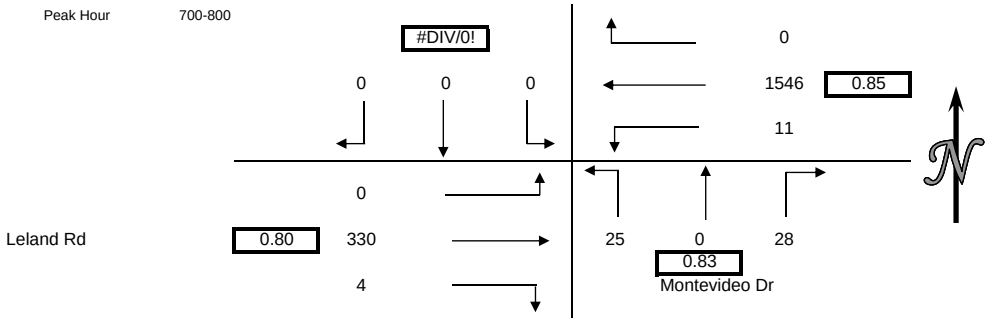
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-025
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Montevideo Dr
	E/W	Leland Rd
CITY:		Pittsburg

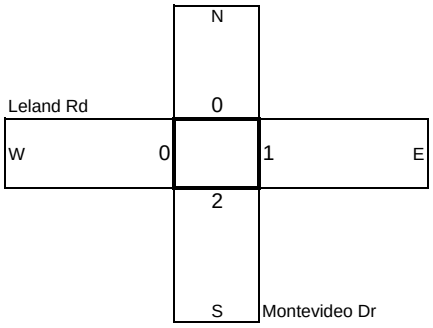
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	430	1	5	0	6	0	58	0	500
715-730	0	0	0	0	455	1	8	0	8	1	84	0	557
730-745	0	0	0	0	355	5	6	0	7	1	86	0	460
745-800	0	0	0	0	306	4	9	0	4	2	102	0	427
800-815	0	0	0	0	254	10	6	0	5	3	120	0	398
815-830	0	0	0	0	243	3	5	0	2	2	122	0	377
830-845	0	0	0	0	174	3	2	0	4	3	70	0	256
845-900	0	0	0	0	121	3	4	0	1	0	78	0	207
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1546	11	28	0	25	4	330	0	1944
715-815	0	0	0	0	1370	20	29	0	24	7	392	0	1842
730-830	0	0	0	0	1158	22	26	0	18	8	430	0	1662
745-845	0	0	0	0	977	20	22	0	15	10	414	0	1458
800-900	0	0	0	0	792	19	17	0	12	8	390	0	1238



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	0	1	1	0	2
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	3	1	0	4
815-830	0	0	0	0	0
830-845	0	0	1	0	1
845-900	0	3	0	0	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	2	0	3
715-815	0	4	2	0	6
730-830	0	3	1	0	4
745-845	0	3	2	0	5
800-900	0	6	2	0	8



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	2	0	0	0	0	0	0	0	2
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	2	0	2
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	2	0	0	0	0	0	0	0	2
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	2	0	2
745-845	0	0	0	0	0	0	0	0	0	0	2	0	2
800-900	0	0	0	0	0	0	0	0	0	0	2	0	2

National Data and Surveying Services

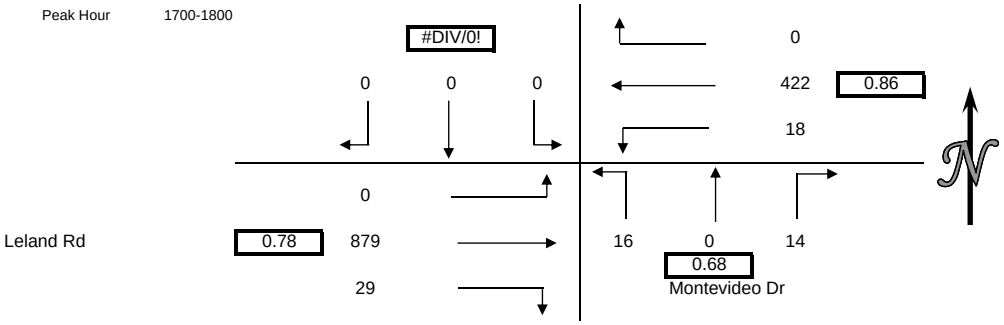
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-025
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Montevideo Dr
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

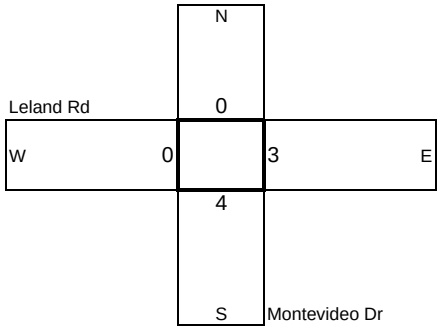
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	91	2	1	0	1	7	171	0	273
1615-1630	0	0	0	0	104	5	3	0	4	10	182	0	308
1630-1645	0	0	0	0	127	2	7	0	5	5	179	0	325
1645-1700	0	0	0	0	97	3	2	0	2	7	167	0	278
1700-1715	0	0	0	0	124	4	2	0	7	5	168	0	310
1715-1730	0	0	0	0	97	5	1	0	1	8	178	0	290
1730-1745	0	0	0	0	97	4	4	0	4	7	251	0	367
1745-1800	0	0	0	0	104	5	7	0	4	9	282	0	411
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	419	12	13	0	12	29	699	0	1184
1615-1715	0	0	0	0	452	14	14	0	18	27	696	0	1221
1630-1730	0	0	0	0	445	14	12	0	15	25	692	0	1203
1645-1745	0	0	0	0	415	16	9	0	14	27	764	0	1245
1700-1800	0	0	0	0	422	18	14	0	16	29	879	0	1378

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	4	0	0	4
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	1	2	0	3
1715-1730	0	1	0	0	1
1730-1745	0	0	2	0	2
1745-1800	0	1	0	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	4	0	0	4
1615-1715	0	1	2	0	3
1630-1730	0	2	2	0	4
1645-1745	0	2	4	0	6
1700-1800	0	3	4	0	7



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	1	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	1	0	1
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	1	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	2	0	2
1615-1715	0	0	0	0	0	0	0	0	0	0	1	0	1
1630-1730	0	0	0	0	0	0	0	0	0	0	1	0	1
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	1	0	1

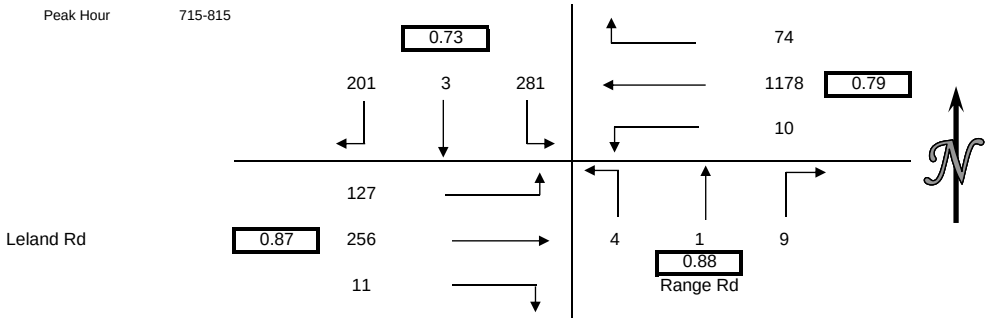
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-026
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Range Rd
	E/W	Leland Rd
CITY:		Pittsburg

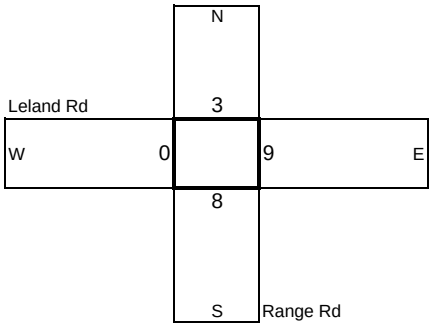
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	48	0	22	5	377	1	0	0	0	1	56	13	523
715-730	51	1	41	4	393	1	1	1	1	4	55	25	578
730-745	40	0	54	13	314	4	4	0	0	2	66	24	521
745-800	48	1	82	19	263	2	1	0	2	2	68	35	523
800-815	62	1	104	38	208	3	3	0	1	3	67	43	533
815-830	67	0	83	25	164	2	1	0	1	3	84	47	477
830-845	35	0	29	22	140	4	3	0	3	3	54	15	308
845-900	22	0	27	14	98	2	2	0	1	3	69	10	248
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	187	2	199	41	1347	8	6	1	3	9	245	97	2145
715-815	201	3	281	74	1178	10	9	1	4	11	256	127	2155
730-830	217	2	323	95	949	11	9	0	4	10	285	149	2054
745-845	212	2	298	104	775	11	8	0	7	11	273	140	1841
800-900	186	1	243	99	610	11	9	0	6	12	274	115	1566



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	2	3	0	0	5
715-730	0	1	2	0	3
730-745	1	4	1	0	6
745-800	1	2	4	0	7
800-815	1	2	1	0	4
815-830	0	1	1	0	2
830-845	1	3	2	0	6
845-900	0	2	0	1	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	4	10	7	0	21
715-815	3	9	8	0	20
730-830	3	9	7	0	19
745-845	3	8	8	0	19
800-900	2	8	4	1	15



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	2	0	0	0	0	0	0	0	0	0	2
745-800	0	0	1	0	0	0	0	0	0	0	0	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	1	0	1
830-845	0	0	0	0	0	0	0	0	0	0	1	0	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	3	0	1	0	0	0	0	0	0	0	4
715-815	0	0	3	0	0	0	0	0	0	0	0	0	3
730-830	0	0	3	0	0	0	0	0	0	0	1	0	4
745-845	0	0	1	0	0	0	0	0	0	0	2	0	3
800-900	0	0	0	0	0	0	0	0	0	0	2	0	2

National Data and Surveying Services

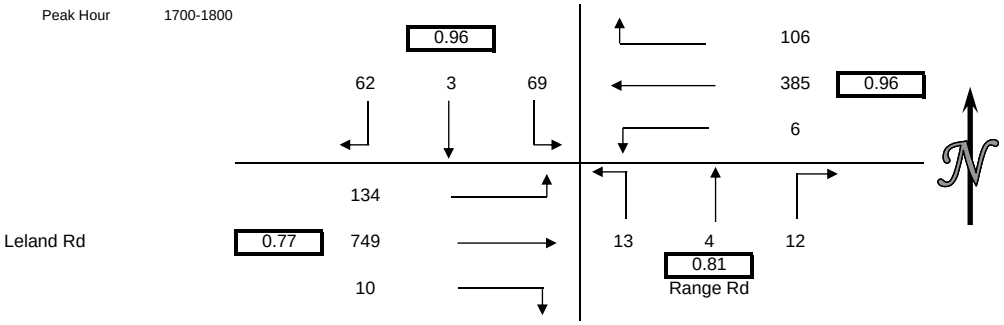
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-026
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Range Rd
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

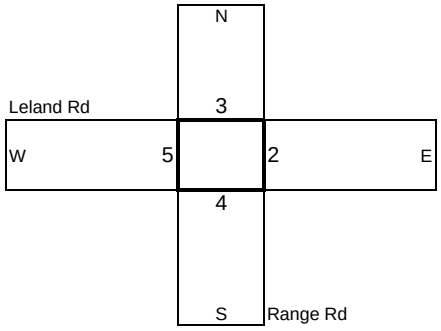
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	25	0	10	22	71	2	1	0	0	3	134	31	299
1615-1630	15	0	20	19	86	1	1	0	2	0	153	23	320
1630-1645	16	0	18	20	110	1	0	0	2	2	161	25	355
1645-1700	10	0	19	19	92	0	0	0	0	2	138	26	306
1700-1715	16	2	17	30	100	0	5	1	3	1	139	29	343
1715-1730	13	1	18	26	85	4	4	2	2	3	135	35	328
1730-1745	18	0	16	28	95	1	0	0	6	4	224	34	426
1745-1800	15	0	18	22	105	1	3	1	2	2	251	36	456
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	66	0	67	80	359	4	2	0	4	7	586	105	1280
1615-1715	57	2	74	88	388	2	6	1	7	5	591	103	1324
1630-1730	55	3	72	95	387	5	9	3	7	8	573	115	1332
1645-1745	57	3	70	103	372	5	9	3	11	10	636	124	1403
1700-1800	62	3	69	106	385	6	12	4	13	10	749	134	1553

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	1	0	0	1
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	1	1	0	1	3
1715-1730	1	0	2	4	7
1730-1745	0	0	2	0	2
1745-1800	1	1	0	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	1	0	0	1
1615-1715	1	1	0	1	3
1630-1730	2	1	2	5	10
1645-1745	2	1	4	5	12
1700-1800	3	2	4	5	14



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	1	0	0	0	0	0	0	0	1	0	2
1615-1630	0	0	0	1	0	0	0	0	0	0	0	0	1
1630-1645	0	0	0	0	3	0	0	0	0	0	1	0	4
1645-1700	0	0	0	1	0	0	0	0	0	0	1	0	2
1700-1715	0	0	0	0	0	0	0	0	0	0	3	0	3
1715-1730	0	0	2	1	0	0	0	0	0	0	0	0	3
1730-1745	0	0	1	0	0	0	0	0	0	0	0	0	1
1745-1800	0	0	0	1	0	0	0	0	0	0	2	0	3
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	1	2	3	0	0	0	0	0	3	0	9
1615-1715	0	0	0	2	3	0	0	0	0	0	5	0	10
1630-1730	0	0	2	2	3	0	0	0	0	0	5	0	12
1645-1745	0	0	3	2	0	0	0	0	0	0	4	0	9
1700-1800	0	0	3	2	0	0	0	0	0	0	5	0	10

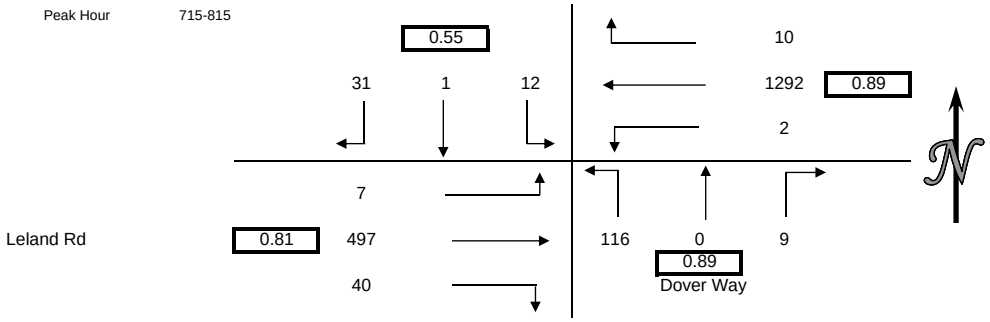
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-027
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Dover Way
	E/W	Leland Rd
CITY:		Pittsburg

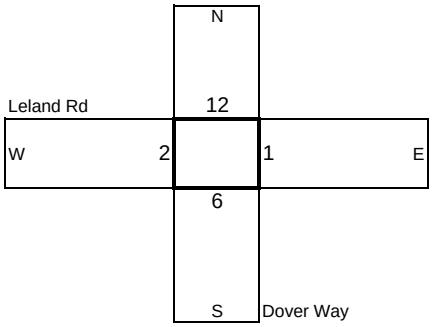
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	12	0	6	0	360	2	3	0	20	2	73	1	479
715-730	6	1	1	1	366	0	0	0	35	6	90	1	507
730-745	4	0	4	1	357	1	3	0	22	10	109	0	511
745-800	6	0	2	3	288	0	0	0	30	9	151	0	489
800-815	15	0	5	5	281	1	6	0	29	15	147	6	510
815-830	6	0	6	4	237	2	0	0	25	18	146	5	449
830-845	6	0	5	0	142	4	2	0	20	8	78	2	267
845-900	4	1	5	0	125	1	5	1	9	9	81	1	242
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	28	1	13	5	1371	3	6	0	107	27	423	2	1986
715-815	31	1	12	10	1292	2	9	0	116	40	497	7	2017
730-830	31	0	17	13	1163	4	9	0	106	52	553	11	1959
745-845	33	0	18	12	948	7	8	0	104	50	522	13	1715
800-900	31	1	21	9	785	8	13	1	83	50	452	14	1468



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	2	0	0	0	2
715-730	1	1	0	1	3
730-745	0	0	6	1	7
745-800	7	0	0	0	7
800-815	4	0	0	0	4
815-830	3	0	0	0	3
830-845	0	0	0	0	0
845-900	1	1	0	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	10	1	6	2	19
715-815	12	1	6	2	21
730-830	14	0	6	1	21
745-845	14	0	0	0	14
800-900	8	1	0	0	9



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	1	1
830-845	0	0	0	0	0	0	0	0	0	0	0	1	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	0	0	0	0	0	0	1
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	1	1
745-845	0	0	0	0	0	0	0	0	0	0	0	2	2
800-900	0	0	0	0	0	0	0	0	0	0	0	2	2

National Data and Surveying Services

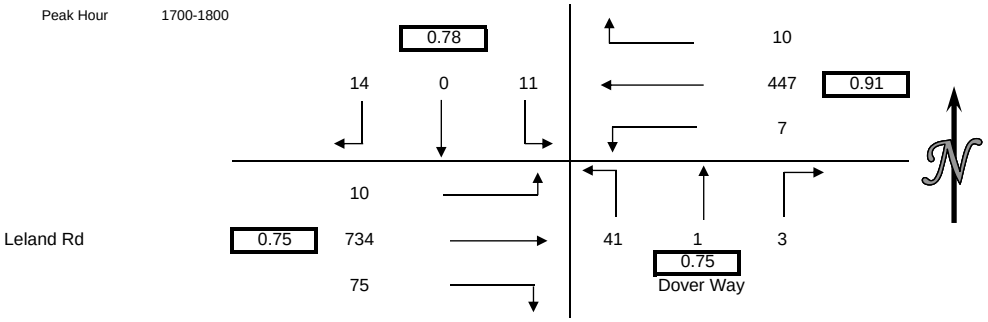
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-027
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Dover Way
	E/W	Leland Rd
CITY:		Pittsburg

VEHICLE COUNTS

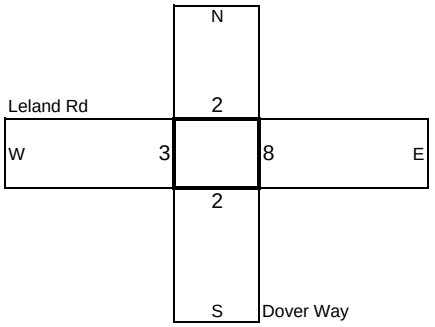
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	1	0	2	3	90	1	2	0	5	19	119	2	244
1615-1630	1	1	2	3	101	2	2	0	10	14	156	4	296
1630-1645	2	0	0	1	117	3	2	0	6	26	157	2	316
1645-1700	1	0	2	2	101	3	1	0	12	16	135	4	277
1700-1715	2	0	4	5	122	1	1	1	7	15	141	5	304
1715-1730	2	0	3	1	104	1	2	0	13	13	148	2	289
1730-1745	3	0	3	1	109	3	0	0	8	20	202	0	349
1745-1800	7	0	1	3	112	2	0	0	13	27	243	3	411
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	5	1	6	9	409	9	7	0	33	75	567	12	1133
1615-1715	6	1	8	11	441	9	6	1	35	71	589	15	1193
1630-1730	7	0	9	9	444	8	6	1	38	70	581	13	1186
1645-1745	8	0	12	9	436	8	4	1	40	64	626	11	1219
1700-1800	14	0	11	10	447	7	3	1	41	75	734	10	1353

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	1	0	0	0	1
1615-1630	1	0	1	0	2
1630-1645	0	0	0	0	0
1645-1700	0	0	0	1	1
1700-1715	0	4	0	0	4
1715-1730	2	0	0	3	5
1730-1745	0	0	0	0	0
1745-1800	0	4	2	0	6
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	2	0	1	1	4
1615-1715	1	4	1	1	7
1630-1730	2	4	0	4	10
1645-1745	2	4	0	4	10
1700-1800	2	8	2	3	15



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	1	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	3	0	0	0	0	0	0	0	3
1645-1700	0	0	0	0	0	0	0	0	0	0	1	0	1
1700-1715	0	0	0	0	0	0	0	0	0	0	3	0	3
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	1	1	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	3	0	0	0	0	0	2	0	5
1615-1715	0	0	0	0	3	0	0	0	0	0	4	0	7
1630-1730	0	0	0	0	3	0	0	0	0	0	4	0	7
1645-1745	0	0	0	0	0	0	0	0	0	0	4	0	4
1700-1800	0	0	0	0	0	0	0	0	0	0	4	1	5

Peak Hour 1615-1715

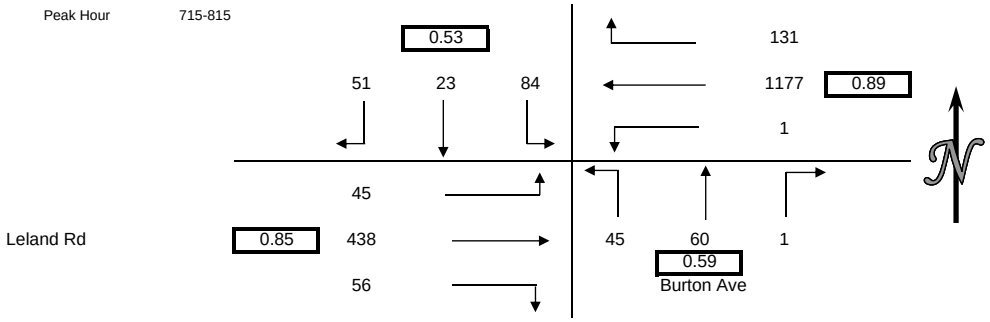
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-028
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Burton Ave
	E/W	Leland Rd
CITY:		Pittsburg

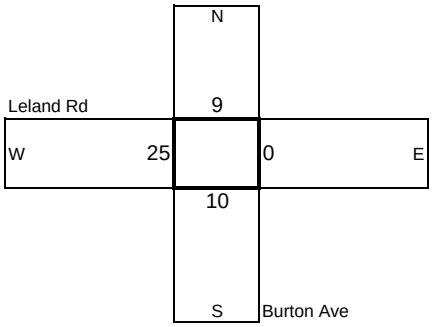
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	10	1	8	5	346	0	2	0	6	2	87	5	472
715-730	14	2	9	10	357	1	0	0	16	4	102	6	521
730-745	8	3	17	23	320	0	0	4	10	6	112	4	507
745-800	10	5	16	44	284	0	1	21	9	15	124	19	548
800-815	19	13	42	54	216	0	0	35	10	31	100	16	536
815-830	16	10	50	30	182	1	0	23	3	16	122	30	483
830-845	6	3	25	13	124	0	0	3	7	4	91	8	284
845-900	3	2	13	13	100	1	2	0	3	1	97	9	244
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	42	11	50	82	1307	1	3	25	41	27	425	34	2048
715-815	51	23	84	131	1177	1	1	60	45	56	438	45	2112
730-830	53	31	125	151	1002	1	1	83	32	68	458	69	2074
745-845	51	31	133	141	806	1	1	82	29	66	437	73	1851
800-900	44	28	130	110	622	2	2	61	23	52	410	63	1547



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	0	1	2	4
715-730	1	0	0	3	4
730-745	4	0	3	13	20
745-800	0	0	3	0	3
800-815	4	0	4	9	17
815-830	5	0	4	8	17
830-845	0	0	0	1	1
845-900	0	0	1	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	6	0	7	18	31
715-815	9	0	10	25	44
730-830	13	0	14	30	57
745-845	9	0	11	18	38
800-900	9	0	9	18	36



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	1	0	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	0	0	0	0	0	0	1
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	1	0	1
800-900	0	0	0	0	0	0	0	0	0	0	1	0	1

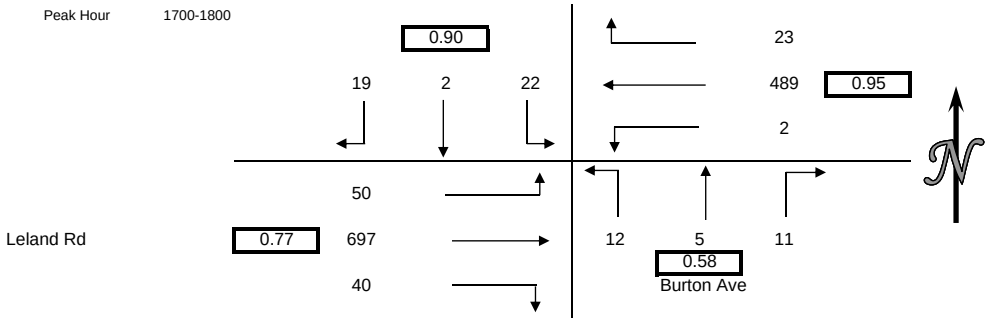
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-028
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Burton Ave
	E/W	Leland Rd
CITY:		Pittsburg

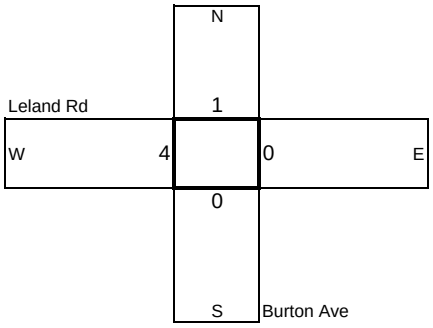
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	5	1	8	6	110	1	2	0	5	7	115	7	267
1615-1630	6	0	3	10	118	0	2	0	3	13	142	10	307
1630-1645	4	3	4	3	115	1	1	0	2	13	153	4	303
1645-1700	9	4	6	3	114	1	0	1	3	11	142	5	299
1700-1715	8	0	4	5	127	0	2	1	2	11	132	10	302
1715-1730	2	0	8	5	115	0	2	0	2	8	147	12	301
1730-1745	5	2	2	8	126	1	2	2	3	13	184	16	364
1745-1800	4	0	8	5	121	1	5	2	5	8	234	12	405
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	24	8	21	22	457	3	5	1	13	44	552	26	1176
1615-1715	27	7	17	21	474	2	5	2	10	48	569	29	1211
1630-1730	23	7	22	16	471	2	5	2	9	43	574	31	1205
1645-1745	24	6	20	21	482	2	6	4	10	43	605	43	1266
1700-1800	19	2	22	23	489	2	11	5	12	40	697	50	1372



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	3	0	0	1	4
1615-1630	3	0	0	0	3
1630-1645	0	0	1	1	2
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	1	1
1730-1745	0	0	0	3	3
1745-1800	1	0	0	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	6	0	1	2	9
1615-1715	3	0	1	1	5
1630-1730	0	0	1	2	3
1645-1745	0	0	0	4	4
1700-1800	1	0	0	4	5



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	1	0	0	0	0	0	0	0	0	1	0	1	3
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	1	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	1	0	0	0	0	0	0	0	0	1	0	1	3
1615-1715	0	0	0	0	0	0	0	0	0	0	1	0	1
1630-1730	0	0	0	0	0	0	0	0	0	0	1	0	1
1645-1745	0	0	0	0	0	0	0	0	0	0	1	0	1
1700-1800	0	0	0	0	0	0	0	0	0	0	1	0	1

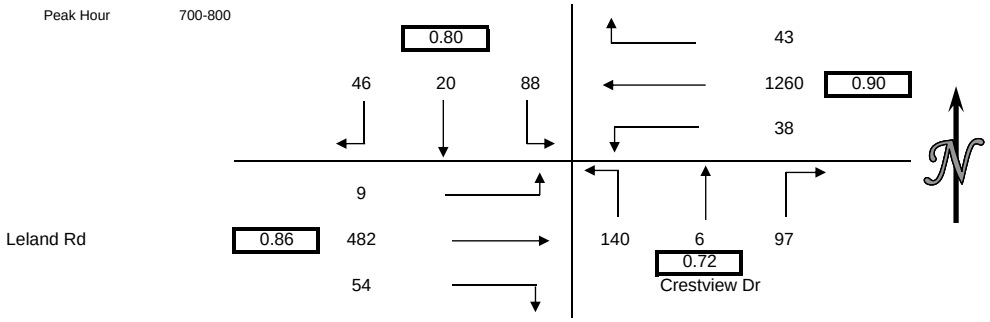
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-029
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Crestview Dr
	E/W	Leland Rd
CITY:		Pittsburg

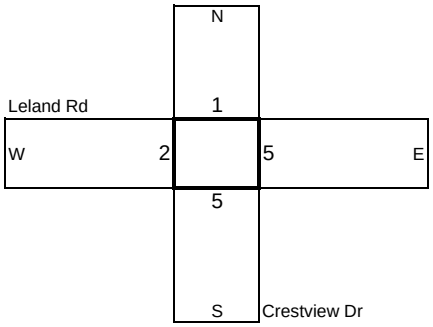
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	10	2	17	6	331	7	22	2	26	11	99	2	535
715-730	10	4	24	8	360	5	28	0	25	12	114	0	590
730-745	8	8	32	16	269	13	34	2	48	13	134	1	578
745-800	18	6	15	13	300	13	13	2	41	18	135	6	580
800-815	19	2	8	20	232	16	13	3	34	15	122	12	496
815-830	16	0	16	4	179	12	18	1	16	18	153	10	443
830-845	7	3	12	8	119	17	21	3	20	9	104	3	326
845-900	4	1	13	6	86	13	27	1	21	7	116	0	295
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	46	20	88	43	1260	38	97	6	140	54	482	9	2283
715-815	55	20	79	57	1161	47	88	7	148	58	505	19	2244
730-830	61	16	71	53	980	54	78	8	139	64	544	29	2097
745-845	60	11	51	45	830	58	65	9	111	60	514	31	1845
800-900	46	6	49	38	616	58	79	8	91	49	495	25	1560



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	0	1	0	2	3
730-745	1	2	0	0	3
745-800	0	2	4	0	6
800-815	0	2	1	5	8
815-830	3	0	0	0	3
830-845	0	0	0	0	0
845-900	0	1	1	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	1	5	5	2	13
715-815	1	7	5	7	20
730-830	4	6	5	5	20
745-845	3	4	5	5	17
800-900	3	3	2	5	13



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	1	0	0	1
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	1	0	1	0	2
845-900	0	0	0	0	0	0	0	0	0	0	1	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	0	0	0	0	0	0	1
715-815	0	0	0	0	0	0	0	0	0	1	0	0	1
730-830	0	0	0	0	0	0	0	0	0	1	0	0	1
745-845	0	0	0	0	0	0	0	0	1	1	1	0	3
800-900	0	0	0	0	0	0	0	0	1	1	2	0	4

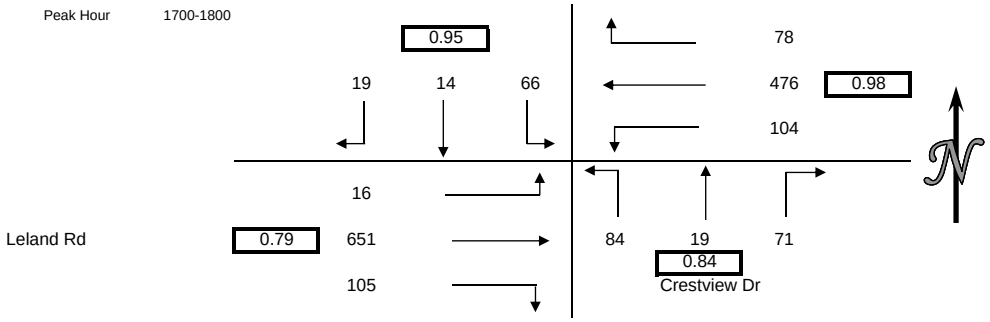
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-029
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Crestview Dr
	E/W	Leland Rd
CITY:		Pittsburg

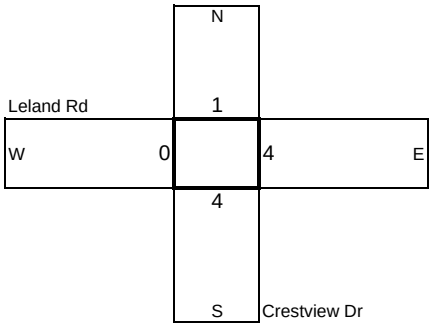
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	7	3	25	16	110	28	15	4	24	22	110	3	367
1615-1630	10	3	16	22	116	12	14	0	14	19	145	4	375
1630-1645	2	1	15	12	110	24	17	4	26	18	128	7	364
1645-1700	1	2	18	22	123	26	20	4	19	17	124	6	382
1700-1715	2	3	18	16	123	24	15	0	25	26	135	3	390
1715-1730	6	3	15	21	119	20	19	7	19	20	126	4	379
1730-1745	5	3	18	22	121	25	17	6	14	33	177	4	445
1745-1800	6	5	15	19	113	35	20	6	26	26	213	5	489
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	20	9	74	72	459	90	66	12	83	76	507	20	1488
1615-1715	15	9	67	72	472	86	66	8	84	80	532	20	1511
1630-1730	11	9	66	71	475	94	71	15	89	81	513	20	1515
1645-1745	14	11	69	81	486	95	71	17	77	96	562	17	1596
1700-1800	19	14	66	78	476	104	71	19	84	105	651	16	1703



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	2	1	0	1	4
1615-1630	3	3	0	0	6
1630-1645	1	1	1	0	3
1645-1700	0	1	0	2	3
1700-1715	0	2	0	0	2
1715-1730	0	2	1	0	3
1730-1745	1	0	0	0	1
1745-1800	0	0	3	0	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	6	6	1	3	16
1615-1715	4	7	1	2	14
1630-1730	1	6	2	2	11
1645-1745	1	5	1	2	9
1700-1800	1	4	4	0	9



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	1	0	0	1	0	0	1	0	0	0	0	3
1630-1645	0	0	0	0	0	0	0	1	0	0	0	0	1
1645-1700	0	0	0	1	0	0	0	0	0	0	0	0	1
1700-1715	0	1	0	0	0	0	1	0	0	0	0	0	2
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	1	0	0	0	0	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	1	0	1	1	0	0	2	0	0	0	0	5
1615-1715	0	2	0	1	1	0	1	2	0	0	0	0	7
1630-1730	0	1	0	1	0	0	1	1	0	0	0	0	4
1645-1745	0	1	0	1	0	0	1	0	0	0	0	0	3
1700-1800	0	2	0	0	0	0	1	0	0	0	0	0	3

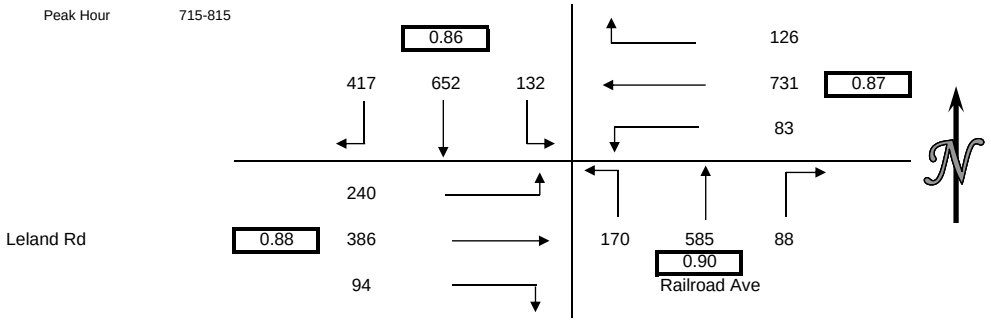
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-030
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	Leland Rd
CITY:		Pittsburg

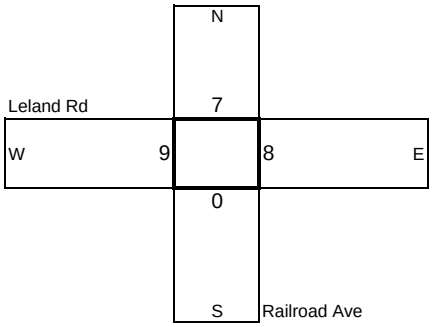
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	81	125	20	24	244	27	6	103	40	18	54	52	794
715-730	89	143	30	18	239	14	10	120	35	23	93	68	882
730-745	93	163	37	38	184	13	25	138	49	25	120	60	945
745-800	122	184	42	37	179	28	25	158	49	19	114	62	1019
800-815	113	162	23	33	129	28	28	169	37	27	59	50	858
815-830	62	132	45	52	108	29	15	124	37	35	106	67	812
830-845	41	120	37	35	84	18	21	146	29	17	67	61	676
845-900	45	120	39	47	52	22	17	138	20	17	101	68	686
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	385	615	129	117	846	82	66	519	173	85	381	242	3640
715-815	417	652	132	126	731	83	88	585	170	94	386	240	3704
730-830	390	641	147	160	600	98	93	589	172	106	399	239	3634
745-845	338	598	147	157	500	103	89	597	152	98	346	240	3365
800-900	261	534	144	167	373	97	81	577	123	96	333	246	3032



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	3	0	1	4
715-730	3	2	0	2	7
730-745	0	1	0	2	3
745-800	2	0	0	2	4
800-815	2	5	0	3	10
815-830	0	0	1	1	2
830-845	1	3	2	6	12
845-900	0	0	1	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	5	6	0	7	18
715-815	7	8	0	9	24
730-830	4	6	1	8	19
745-845	5	8	3	12	28
800-900	3	8	4	10	25



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	2	0	0	0	0	2
730-745	0	0	0	0	0	0	0	1	0	0	0	0	1
745-800	0	0	0	0	0	0	0	1	0	0	0	0	1
800-815	0	0	0	0	0	0	0	1	0	0	0	0	1
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	1	0	0	0	1	0	2
845-900	0	0	0	0	0	1	0	1	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	4	0	0	0	0	4
715-815	0	0	0	0	0	0	0	5	0	0	0	0	5
730-830	0	0	0	0	0	0	0	3	0	0	0	0	3
745-845	0	0	0	0	0	0	1	2	0	0	1	0	4
800-900	0	0	0	0	0	1	1	2	0	0	1	0	5

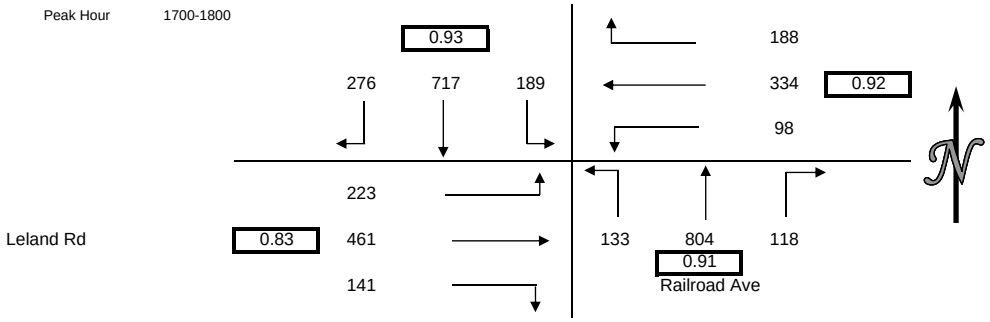
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-030
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	Leland Rd
CITY:		Pittsburg

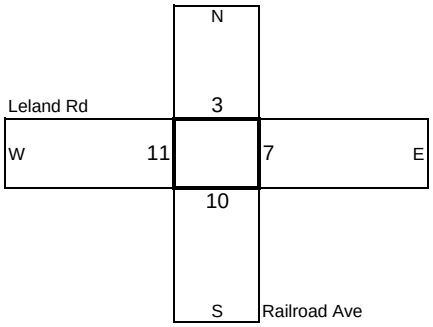
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	54	163	41	48	78	24	35	194	31	25	89	52	834
1615-1630	65	166	42	36	80	21	36	209	35	35	103	46	874
1630-1645	52	171	41	46	84	21	38	228	35	20	100	52	888
1645-1700	66	201	47	52	86	20	27	212	39	25	118	41	934
1700-1715	56	167	48	49	94	26	25	230	35	39	86	46	901
1715-1730	65	198	47	46	88	20	35	198	32	31	96	56	912
1730-1745	78	160	46	59	74	24	33	202	35	35	126	61	933
1745-1800	77	192	48	34	78	28	25	174	31	36	153	60	936
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	237	701	171	182	328	86	136	843	140	105	410	191	3530
1615-1715	239	705	178	183	344	88	126	879	144	119	407	185	3597
1630-1730	239	737	183	193	352	87	125	868	141	115	400	195	3635
1645-1745	265	726	188	206	342	90	120	842	141	130	426	204	3680
1700-1800	276	717	189	188	334	98	118	804	133	141	461	223	3682



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	3	2	0	0	5
1615-1630	0	0	2	5	7
1630-1645	2	4	2	1	9
1645-1700	3	0	0	3	6
1700-1715	1	2	0	5	8
1715-1730	0	2	1	0	3
1730-1745	1	1	1	3	6
1745-1800	1	2	8	3	14
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	8	6	4	9	27
1615-1715	6	6	4	14	30
1630-1730	6	8	3	9	26
1645-1745	5	5	2	11	23
1700-1800	3	7	10	11	31



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	1	1	0	0	0	0	1	0	0	1	0	4
1615-1630	0	2	0	0	1	0	0	2	0	0	0	0	5
1630-1645	0	0	0	0	0	0	0	0	0	0	1	0	1
1645-1700	0	1	0	0	0	1	0	0	0	0	0	1	3
1700-1715	0	0	0	0	0	0	1	0	0	0	0	0	1
1715-1730	0	1	0	0	0	0	0	0	0	0	0	0	1
1730-1745	0	1	2	0	0	0	0	1	1	0	0	0	5
1745-1800	0	2	0	0	0	0	0	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	4	1	0	1	1	0	3	0	0	2	1	13
1615-1715	0	3	0	0	1	1	1	2	0	0	1	1	10
1630-1730	0	2	0	0	0	1	1	0	0	0	1	1	6
1645-1745	0	3	2	0	0	1	1	1	1	0	0	1	10
1700-1800	0	4	2	0	0	0	1	1	1	0	0	0	9

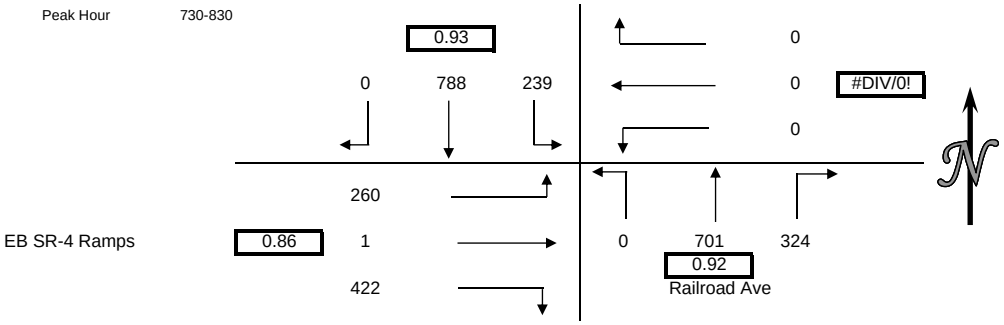
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-031
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	EB SR-4 Ramps
CITY:		Pittsburg

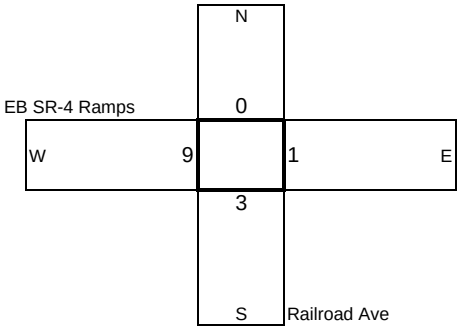
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	185	39	0	0	0	58	114	0	59	2	48	505
715-730	0	179	57	0	0	0	71	148	0	74	0	57	586
730-745	0	191	65	0	0	0	87	180	0	96	0	70	689
745-800	0	231	44	0	0	0	91	188	0	127	0	72	753
800-815	0	205	65	0	0	0	74	165	0	105	0	61	675
815-830	0	161	65	0	0	0	72	168	0	94	1	57	618
830-845	0	124	67	0	0	0	66	158	0	86	0	63	564
845-900	0	123	68	0	0	0	79	164	0	91	0	85	610
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	786	205	0	0	0	307	630	0	356	2	247	2533
715-815	0	806	231	0	0	0	323	681	0	402	0	260	2703
730-830	0	788	239	0	0	0	324	701	0	422	1	260	2735
745-845	0	721	241	0	0	0	303	679	0	412	1	253	2610
800-900	0	613	265	0	0	0	291	655	0	376	1	266	2467



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	2	3	5
715-730	0	0	0	1	1
730-745	0	0	2	4	6
745-800	0	1	1	0	2
800-815	0	0	0	2	2
815-830	0	0	0	3	3
830-845	0	0	0	0	0
845-900	0	0	0	3	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	5	8	14
715-815	0	1	3	7	11
730-830	0	1	3	9	13
745-845	0	1	1	5	7
800-900	0	0	0	8	8



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	1	0	0	0	0	0	0	0	0	0	0	1
715-730	0	1	0	0	0	0	0	0	0	0	0	0	1
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	1	0	0	0	0	0	0	0	0	0	0	1
815-830	0	1	0	0	0	0	0	2	0	0	0	0	3
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	2	0	0	0	0	0	0	0	0	0	0	2
715-815	0	2	0	0	0	0	0	0	0	0	0	0	2
730-830	0	2	0	0	0	0	0	2	0	0	0	0	4
745-845	0	2	0	0	0	0	0	2	0	0	0	0	4
800-900	0	2	0	0	0	0	0	2	0	0	0	0	4

National Data and Surveying Services

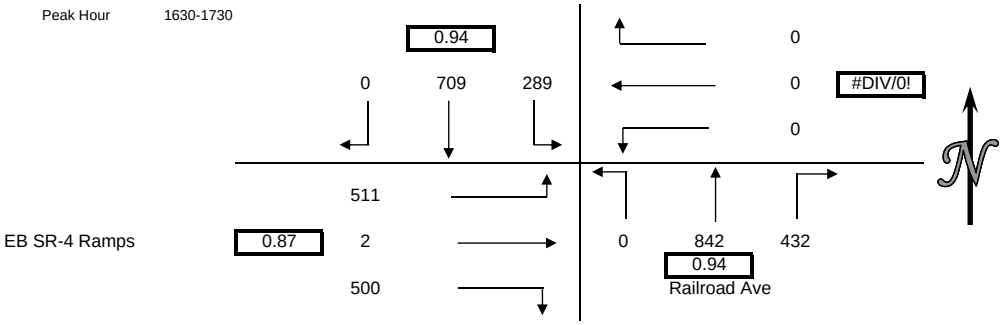
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-031
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	EB SR-4 Ramps
CITY:		Pittsburg

VEHICLE COUNTS

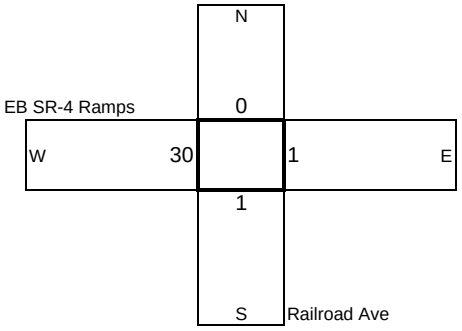
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	174	74	0	0	0	97	188	0	93	2	122	750
1615-1630	0	162	76	0	0	0	110	203	0	99	2	116	768
1630-1645	0	166	72	0	0	0	115	205	0	128	1	125	812
1645-1700	0	190	75	0	0	0	98	200	0	158	1	132	854
1700-1715	0	163	76	0	0	0	118	220	0	123	0	120	820
1715-1730	0	190	66	0	0	0	101	217	0	91	0	134	799
1730-1745	0	182	59	0	0	0	99	222	0	113	0	98	773
1745-1800	0	209	62	0	0	0	93	198	0	120	0	112	794
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	692	297	0	0	0	420	796	0	478	6	495	3184
1615-1715	0	681	299	0	0	0	441	828	0	508	4	493	3254
1630-1730	0	709	289	0	0	0	432	842	0	500	2	511	3285
1645-1745	0	725	276	0	0	0	416	859	0	485	1	484	3246
1700-1800	0	744	263	0	0	0	411	857	0	447	0	464	3186

Peak Hour 1630-1730



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	6	6
1615-1630	0	1	1	6	8
1630-1645	0	1	0	6	7
1645-1700	0	0	0	7	7
1700-1715	0	0	0	3	3
1715-1730	0	0	1	14	15
1730-1745	0	0	0	9	9
1745-1800	0	0	0	6	6
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	2	1	25	28
1615-1715	0	2	1	22	25
1630-1730	0	1	1	30	32
1645-1745	0	0	1	33	34
1700-1800	0	0	1	32	33



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	2	0	0	0	0	2
1615-1630	0	1	0	0	0	1	0	0	0	0	0	0	2
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	2	0	0	0	0	0	2	0	0	0	0	4
1700-1715	0	0	0	0	0	0	0	1	0	0	0	0	1
1715-1730	1	0	0	0	0	0	0	1	0	0	0	0	2
1730-1745	1	0	0	0	0	0	0	0	0	0	0	0	1
1745-1800	0	0	0	0	0	0	0	1	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	3	0	0	0	1	0	4	0	0	0	0	8
1615-1715	0	3	0	0	0	1	0	3	0	0	0	0	7
1630-1730	1	2	0	0	0	0	0	4	0	0	0	0	7
1645-1745	2	2	0	0	0	0	0	4	0	0	0	0	8
1700-1800	2	0	0	0	0	0	0	3	0	0	0	0	5

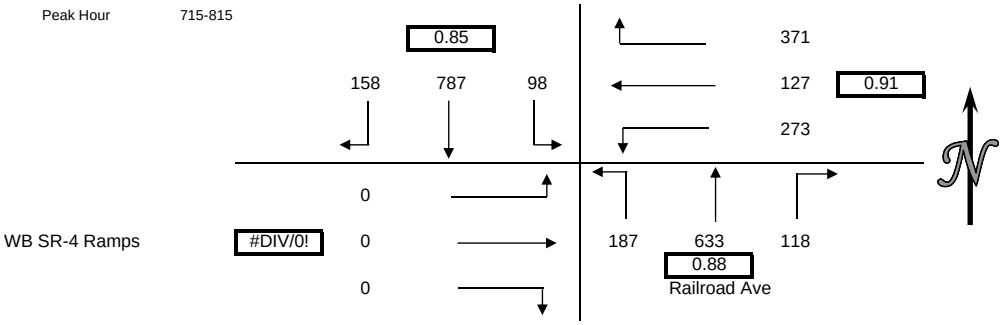
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-032
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	WB SR-4 Ramps
CITY:		Pittsburg

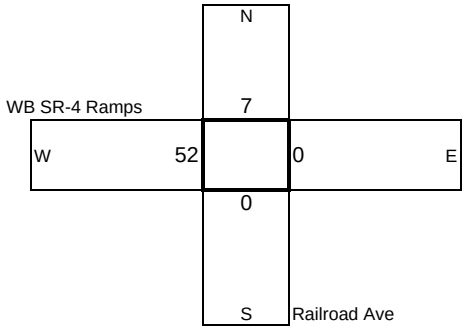
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	41	164	13	95	35	71	18	123	29	0	0	0	589
715-730	31	142	19	92	31	82	19	148	49	0	0	0	613
730-745	39	214	21	74	27	56	33	183	50	0	0	0	697
745-800	39	209	22	103	30	78	44	169	38	0	0	0	732
800-815	49	222	36	102	39	57	22	133	50	0	0	0	710
815-830	30	137	20	89	39	52	17	149	71	0	0	0	604
830-845	50	159	16	69	33	43	13	142	59	0	0	0	584
845-900	47	168	17	99	56	38	14	168	78	0	0	0	685
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	150	729	75	364	123	287	114	623	166	0	0	0	2631
715-815	158	787	98	371	127	273	118	633	187	0	0	0	2752
730-830	157	782	99	368	135	243	116	634	209	0	0	0	2743
745-845	168	727	94	363	141	230	96	593	218	0	0	0	2630
800-900	176	686	89	359	167	190	66	592	258	0	0	0	2583



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	0	0	16	17
715-730	1	0	0	10	11
730-745	4	0	0	21	25
745-800	2	0	0	15	17
800-815	0	0	0	6	6
815-830	0	0	0	18	18
830-845	0	0	0	7	7
845-900	0	0	0	7	7
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	8	0	0	62	70
715-815	7	0	0	52	59
730-830	6	0	0	60	66
745-845	2	0	0	46	48
800-900	0	0	0	38	38



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	1	0	0	0	0	0	0	0	0	0	0	1
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	1	0	0	0	0	0	1	0	0	0	0	2
815-830	0	0	1	0	0	0	0	0	0	0	0	0	1
830-845	0	1	0	0	0	0	0	0	0	0	0	0	1
845-900	0	0	0	0	0	1	0	0	1	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	1	0	0	0	0	0	0	0	0	0	0	1
715-815	0	2	0	0	0	0	0	1	0	0	0	0	3
730-830	0	2	1	0	0	0	0	1	0	0	0	0	4
745-845	0	2	1	0	0	0	0	1	0	0	0	0	4
800-900	0	2	1	0	0	1	0	1	1	0	0	0	6

National Data and Surveying Services

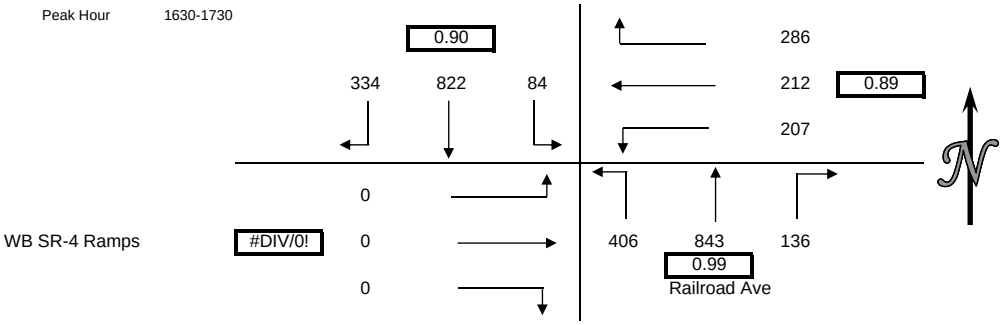
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-032
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Railroad Ave
	E/W	WB SR-4 Ramps
CITY:		Pittsburg

VEHICLE COUNTS

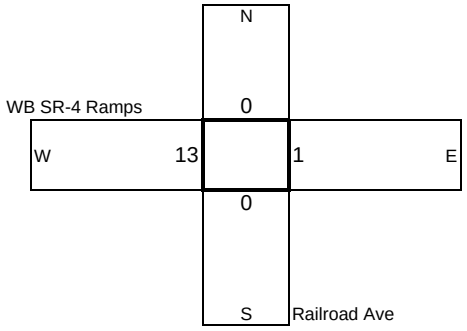
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	76	188	21	96	43	50	31	185	111	0	0	0	801
1615-1630	65	186	22	82	50	36	29	214	97	0	0	0	781
1630-1645	80	185	16	67	53	40	35	209	105	0	0	0	790
1645-1700	71	225	18	70	43	52	42	220	89	0	0	0	830
1700-1715	108	215	23	82	63	38	30	209	107	0	0	0	875
1715-1730	75	197	27	67	53	77	29	205	105	0	0	0	835
1730-1745	75	176	18	58	39	50	26	189	77	0	0	0	708
1745-1800	57	235	21	77	32	53	36	164	86	0	0	0	761
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	292	784	77	315	189	178	137	828	402	0	0	0	3202
1615-1715	324	811	79	301	209	166	136	852	398	0	0	0	3276
1630-1730	334	822	84	286	212	207	136	843	406	0	0	0	3330
1645-1745	329	813	86	277	198	217	127	823	378	0	0	0	3248
1700-1800	315	823	89	284	187	218	121	767	375	0	0	0	3179

Peak Hour 1630-1730



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	1	0	5	6
1615-1630	0	0	0	8	8
1630-1645	0	0	0	5	5
1645-1700	0	1	0	3	4
1700-1715	0	0	0	4	4
1715-1730	0	0	0	1	1
1730-1745	0	0	0	0	0
1745-1800	3	0	0	6	9
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	2	0	21	23
1615-1715	0	1	0	20	21
1630-1730	0	1	0	13	14
1645-1745	0	1	0	8	9
1700-1800	3	0	0	11	14



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	1	0	1	0	0	0	1	0	0	0	0	3
1615-1630	0	1	0	0	0	0	0	1	0	0	0	0	2
1630-1645	0	2	0	0	0	0	0	0	0	0	0	0	2
1645-1700	0	1	0	0	0	0	0	0	1	0	0	0	2
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	2	0	0	0	0	2
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	2	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	5	0	1	0	0	0	2	1	0	0	0	9
1615-1715	0	4	0	0	0	0	0	1	1	0	0	0	6
1630-1730	0	3	0	0	0	0	0	2	1	0	0	0	6
1645-1745	0	1	0	0	0	0	0	2	1	0	0	0	4
1700-1800	0	0	0	0	0	0	0	4	0	0	0	0	4

National Data and Surveying Services

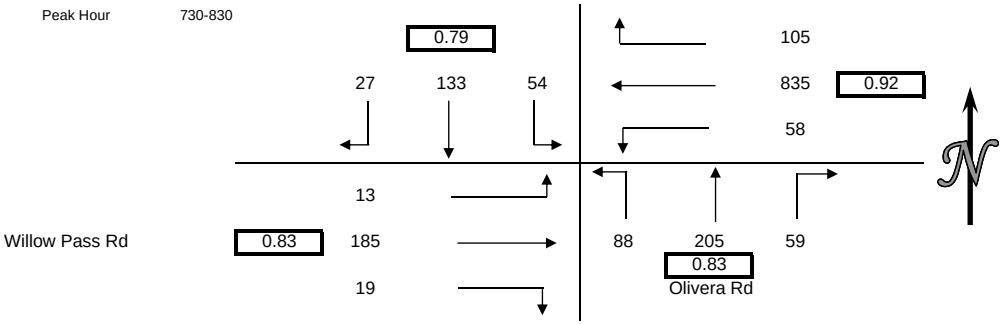
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-033
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Olivera Rd
	E/W	Willow Pass Rd
CITY:		Concord

VEHICLE COUNTS

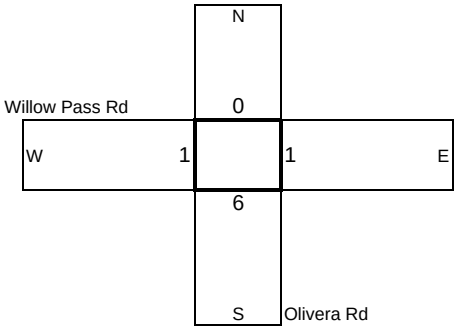
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	3	19	10	25	190	21	13	57	19	4	27	0	388
715-730	1	27	10	26	206	12	12	65	25	3	33	3	423
730-745	8	30	12	32	224	15	15	63	28	6	39	2	474
745-800	7	23	13	24	220	16	18	39	24	4	58	3	449
800-815	6	30	17	19	192	12	11	58	20	5	51	6	427
815-830	6	50	12	30	199	15	15	45	16	4	37	2	431
830-845	3	44	17	16	168	14	16	63	20	11	52	3	427
845-900	2	38	9	21	195	19	9	40	23	9	29	2	396
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	19	99	45	107	840	64	58	224	96	17	157	8	1734
715-815	22	110	52	101	842	55	56	225	97	18	181	14	1773
730-830	27	133	54	105	835	58	59	205	88	19	185	13	1781
745-845	22	147	59	89	779	57	60	205	80	24	198	14	1734
800-900	17	162	55	86	754	60	51	206	79	29	169	13	1681

Peak Hour 730-830



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	1	3	0	4
715-730	0	0	2	0	2
730-745	0	0	1	0	1
745-800	0	0	1	0	1
800-815	0	0	3	0	3
815-830	0	1	1	1	3
830-845	0	0	0	0	0
845-900	0	0	2	1	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	7	0	8
715-815	0	0	7	0	7
730-830	0	1	6	1	8
745-845	0	1	5	1	7
800-900	0	1	6	2	9



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	1	0	1
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	1	0	1
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	1	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	1	0	1
715-815	0	0	0	0	0	0	0	0	0	0	2	0	2
730-830	0	0	0	0	0	0	0	0	0	0	1	0	1
745-845	0	0	0	0	0	0	0	0	0	0	1	0	1
800-900	0	0	0	0	0	0	0	1	0	0	1	0	2

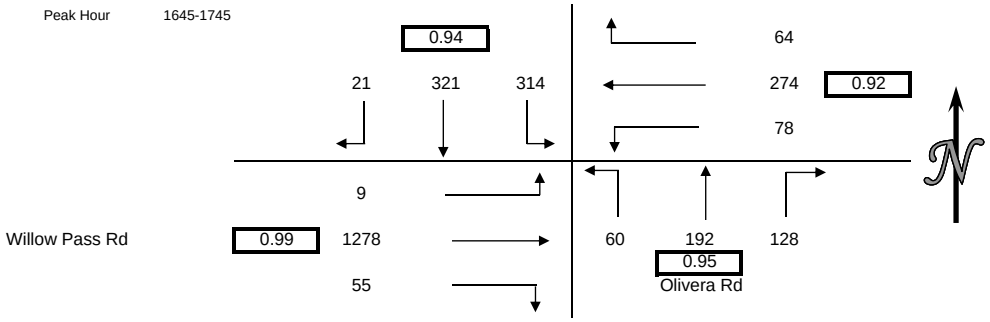
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-033
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Olivera Rd
	E/W	Willow Pass Rd
CITY:		Concord

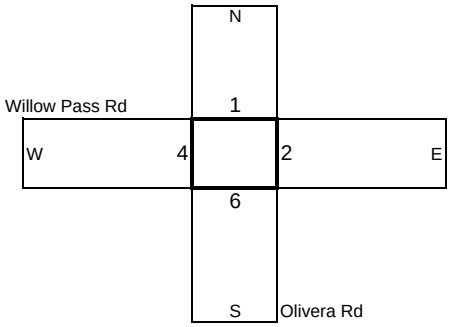
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	5	80	92	11	71	13	24	22	11	18	295	2	644
1615-1630	9	68	84	14	59	19	29	54	11	13	288	2	650
1630-1645	4	86	76	9	80	11	29	43	11	19	302	3	673
1645-1700	4	84	75	13	70	27	33	39	12	9	327	0	693
1700-1715	6	75	88	14	62	22	34	49	15	18	310	4	697
1715-1730	2	84	63	12	65	18	30	50	20	13	319	3	679
1730-1745	9	78	88	25	77	11	31	54	13	15	322	2	725
1745-1800	2	53	65	15	54	23	45	57	17	16	307	8	662
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	22	318	327	47	280	70	115	158	45	59	1212	7	2660
1615-1715	23	313	323	50	271	79	125	185	49	59	1227	9	2713
1630-1730	16	329	302	48	277	78	126	181	58	59	1258	10	2742
1645-1745	21	321	314	64	274	78	128	192	60	55	1278	9	2794
1700-1800	19	290	304	66	258	74	140	210	65	62	1258	17	2763



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	1	1	2
1630-1645	0	0	1	0	1
1645-1700	0	0	4	2	6
1700-1715	0	0	0	0	0
1715-1730	0	1	0	0	1
1730-1745	1	1	2	2	6
1745-1800	2	2	1	2	7
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	6	3	9
1615-1715	0	0	6	3	9
1630-1730	0	1	5	2	8
1645-1745	1	2	6	4	13
1700-1800	3	4	3	4	14



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	2	0	2
1615-1630	0	0	1	0	0	0	0	0	0	0	0	0	1
1630-1645	0	0	2	0	0	0	0	0	0	0	0	0	2
1645-1700	0	0	0	2	0	0	0	0	0	0	0	0	2
1700-1715	0	1	0	0	0	0	0	0	0	0	1	0	2
1715-1730	0	0	0	0	2	0	0	0	0	0	0	0	2
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	1	0	0	0	0	0	0	0	1	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	3	2	0	0	0	0	0	0	2	0	7
1615-1715	0	1	3	2	0	0	0	0	0	0	1	0	7
1630-1730	0	1	2	2	2	0	0	0	0	0	1	0	8
1645-1745	0	1	0	2	2	0	0	0	0	0	1	0	6
1700-1800	0	2	0	0	2	0	0	0	0	1	1	0	6

National Data and Surveying Services

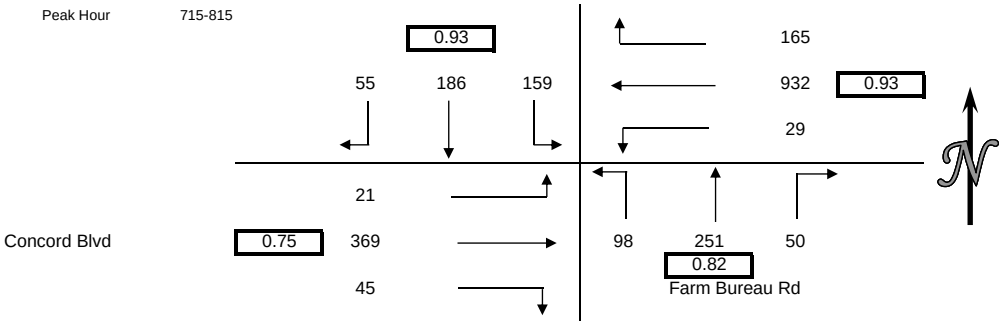
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-034
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Farm Bureau Rd
	E/W	Concord Blvd
CITY:		Concord

VEHICLE COUNTS

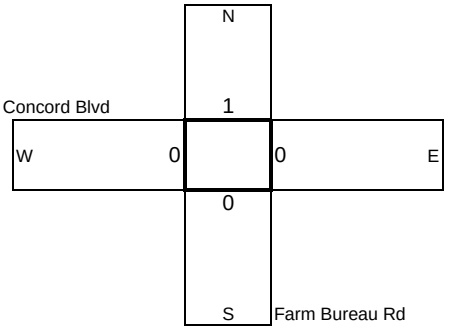
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	14	38	23	29	245	6	2	32	13	8	52	11	473
715-730	17	54	36	40	257	5	8	44	14	6	74	5	560
730-745	10	42	51	41	250	6	15	73	20	7	104	3	622
745-800	13	48	27	41	221	11	17	73	31	23	112	10	627
800-815	15	42	45	43	204	7	10	61	33	9	79	3	551
815-830	11	44	27	48	240	9	4	51	25	13	64	9	545
830-845	10	31	18	36	200	10	5	42	20	4	54	3	433
845-900	15	39	24	31	166	6	6	36	15	7	56	7	408
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	54	182	137	151	973	28	42	222	78	44	342	29	2282
715-815	55	186	159	165	932	29	50	251	98	45	369	21	2360
730-830	49	176	150	173	915	33	46	258	109	52	359	25	2345
745-845	49	165	117	168	865	37	36	227	109	49	309	25	2156
800-900	51	156	114	158	810	32	25	190	93	33	253	22	1937

Peak Hour 715-815



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	1	0	0	0	1
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	1	0	0	0	1
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	1	0	0	0	1
715-815	1	0	0	0	1
730-830	1	0	0	0	1
745-845	1	0	0	0	1
800-900	1	0	0	0	1



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	1	0	0	0	0	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	1	1	
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	1	0	0	1	0	0	2	0	4
800-815	0	0	0	0	1	0	0	0	0	0	0	0	1
815-830	1	0	0	0	2	0	0	0	0	0	0	0	3
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	1	2	0	0	0	0	0	0	0	3
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	1	0	0	0	1	0	0	1	0	0	2	1	6
715-815	0	0	0	0	2	0	0	1	0	0	2	1	6
730-830	1	0	0	0	4	0	0	1	0	0	2	0	8
745-845	1	0	0	0	4	0	0	1	0	0	2	0	8
800-900	1	0	0	1	5	0	0	0	0	0	0	0	7

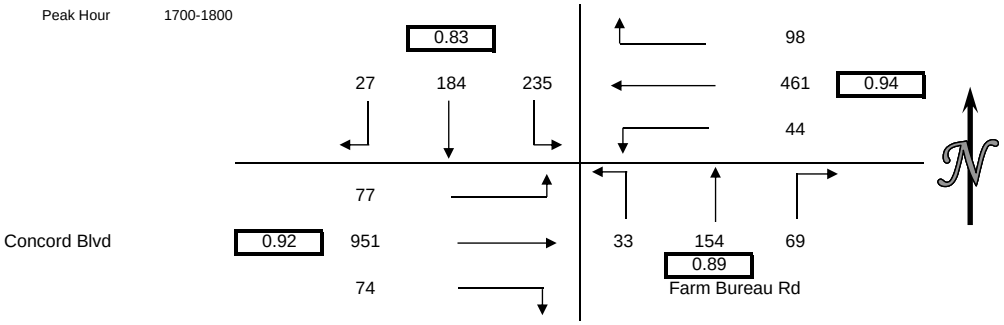
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-034
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Farm Bureau Rd
	E/W	Concord Blvd
CITY:		Concord

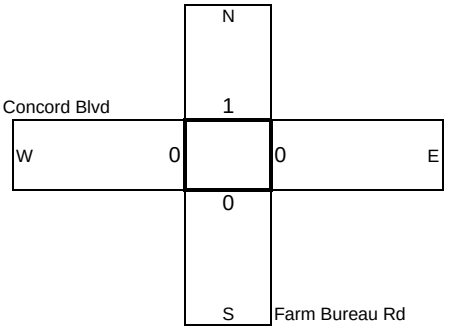
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	9	33	44	17	93	13	23	37	19	20	185	12	505
1615-1630	5	43	71	13	95	5	11	35	18	17	189	11	513
1630-1645	10	41	54	14	89	7	16	43	14	15	215	16	534
1645-1700	7	45	47	26	96	13	12	43	12	15	212	18	546
1700-1715	9	52	53	26	124	10	20	41	10	19	255	19	638
1715-1730	9	49	77	21	117	13	22	44	6	11	221	20	610
1730-1745	5	43	39	22	118	11	14	35	9	35	240	26	597
1745-1800	4	40	66	29	102	10	13	34	8	9	235	12	562
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	31	162	216	70	373	38	62	158	63	67	801	57	2098
1615-1715	31	181	225	79	404	35	59	162	54	66	871	64	2231
1630-1730	35	187	231	87	426	43	70	171	42	60	903	73	2328
1645-1745	30	189	216	95	455	47	68	163	37	80	928	83	2391
1700-1800	27	184	235	98	461	44	69	154	33	74	951	77	2407



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	1	1
1630-1645	2	0	0	0	2
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	1	0	0	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	2	0	0	1	3
1615-1715	2	0	0	1	3
1630-1730	2	0	0	0	2
1645-1745	0	0	0	0	0
1700-1800	1	0	0	0	1



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	1	0	0	0	0	0	0	0	0	0	0	1
1630-1645	0	0	0	0	1	0	0	0	0	0	0	0	1
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	1	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	1	0	1
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	1	0	0	1	0	0	0	0	0	0	0	2
1615-1715	0	1	0	0	1	0	0	0	0	0	1	0	3
1630-1730	0	0	0	0	1	0	0	0	0	0	1	0	2
1645-1745	0	0	0	0	0	0	0	0	0	0	2	0	2
1700-1800	0	0	0	0	0	0	0	0	0	0	2	0	2

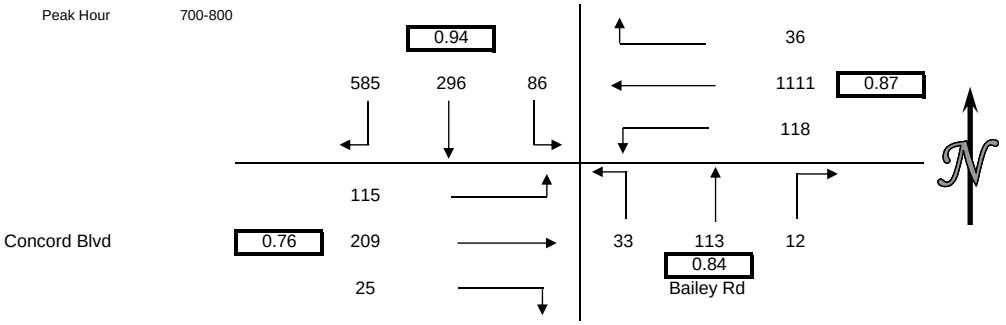
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-035
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Concord Blvd
CITY:		Concord

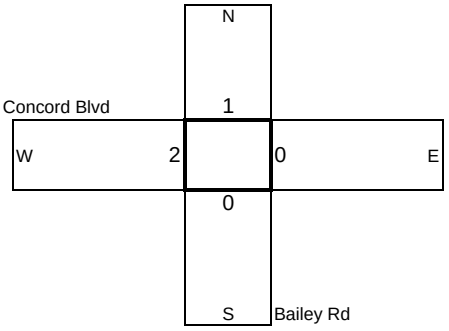
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	153	86	19	7	269	20	1	18	11	1	34	16	635
715-730	156	64	25	6	331	27	3	27	5	6	42	26	718
730-745	160	76	21	5	280	37	2	32	13	7	65	37	735
745-800	116	70	21	18	231	34	6	36	4	11	68	36	651
800-815	100	54	31	16	173	11	7	37	6	8	96	46	585
815-830	58	56	33	19	216	23	8	36	16	9	73	23	570
830-845	52	60	22	14	169	4	10	26	14	13	65	15	464
845-900	40	45	23	6	151	14	4	24	5	9	69	17	407
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	585	296	86	36	1111	118	12	113	33	25	209	115	2739
715-815	532	264	98	45	1015	109	18	132	28	32	271	145	2689
730-830	434	256	106	58	900	105	23	141	39	35	302	142	2541
745-845	326	240	107	67	789	72	31	135	40	41	302	120	2270
800-900	250	215	109	55	709	52	29	123	41	39	303	101	2026



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	0	0	1	2
715-730	0	0	0	0	0
730-745	0	0	0	1	1
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	1	1
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	1	0	0	2	3
715-815	0	0	0	1	1
730-830	0	0	0	1	1
745-845	0	0	0	1	1
800-900	0	0	0	1	1



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	1	0	1
730-745	0	0	0	0	1	0	0	0	0	0	0	0	1
745-800	0	0	0	0	0	0	0	0	0	0	1	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	1	0	0	0	0	0	1	0	2
845-900	1	0	0	0	1	0	0	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	2	0	0	0	0	0	2	0	4
715-815	0	0	0	0	1	0	0	0	0	0	2	0	3
730-830	0	0	0	0	1	0	0	0	0	0	1	0	2
745-845	0	0	0	0	1	0	0	0	0	0	2	0	3
800-900	1	0	0	0	2	0	0	0	0	0	1	0	4

National Data and Surveying Services

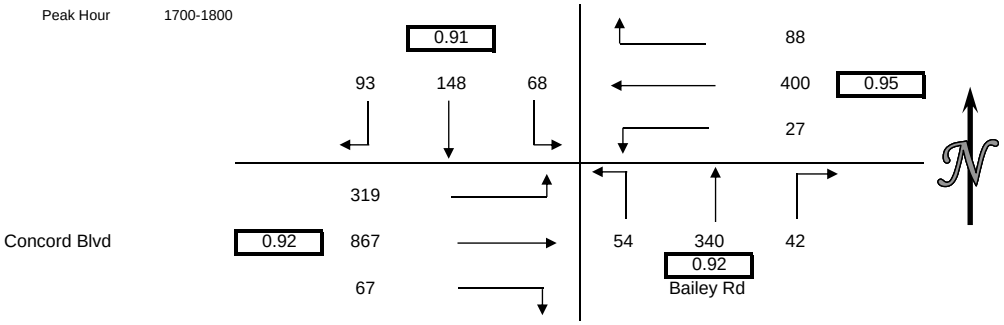
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-035
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Concord Blvd
CITY:		Concord

VEHICLE COUNTS

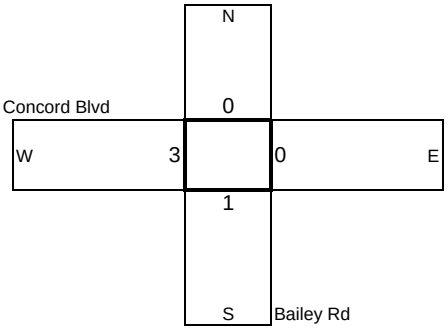
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	19	46	14	20	85	6	7	55	14	14	161	50	491
1615-1630	18	28	13	27	90	10	6	74	13	22	180	54	535
1630-1645	35	31	20	36	92	11	12	71	12	19	177	50	566
1645-1700	20	38	19	29	91	13	7	99	7	17	193	71	604
1700-1715	22	30	9	22	99	6	11	70	14	15	214	73	585
1715-1730	19	39	25	25	98	10	13	93	13	22	202	85	644
1730-1745	22	44	19	20	113	2	8	89	15	16	237	88	673
1745-1800	30	35	15	21	90	9	10	88	12	14	214	73	611
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	92	143	66	112	358	40	32	299	46	72	711	225	2196
1615-1715	95	127	61	114	372	40	36	314	46	73	764	248	2290
1630-1730	96	138	73	112	380	40	43	333	46	73	786	279	2399
1645-1745	83	151	72	96	401	31	39	351	49	70	846	317	2506
1700-1800	93	148	68	88	400	27	42	340	54	67	867	319	2513

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	1	2	3
1630-1645	0	1	1	1	3
1645-1700	0	0	1	0	1
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	1	2	3
1745-1800	0	0	0	1	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	1	3	3	7
1615-1715	0	1	3	3	7
1630-1730	0	1	2	1	4
1645-1745	0	0	2	2	4
1700-1800	0	0	1	3	4



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	1	0	0	0	0	1	0	0	0	0	0	0	2
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	1	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	1	0	0	0	0	0	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	1	0	0	0	0	1	0	0	0	0	0	0	2
1615-1715	1	0	0	0	0	1	0	0	0	0	0	0	2
1630-1730	0	0	0	0	0	0	0	0	0	0	1	0	1
1645-1745	0	0	0	0	0	0	0	0	0	0	1	0	1
1700-1800	1	0	0	0	0	0	0	0	0	0	1	0	2

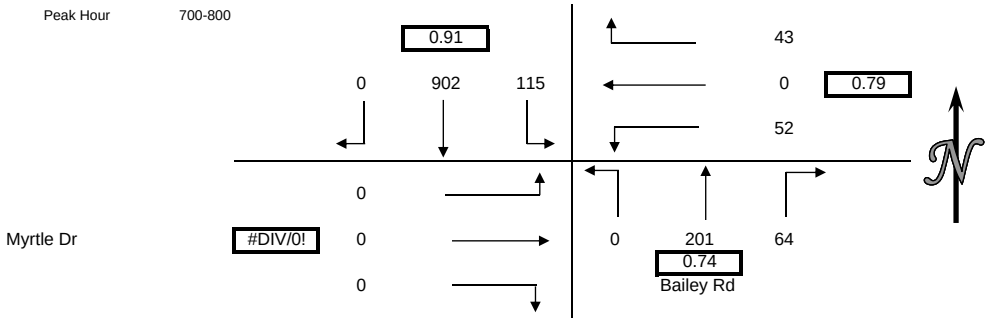
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-036
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Myrtle Dr
CITY:		Concord

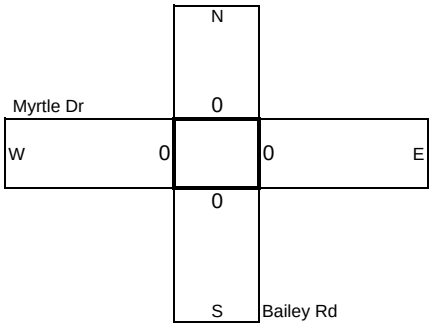
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	234	23	6	0	11	10	29	0	0	0	0	313
715-730	0	250	29	8	0	10	21	42	0	0	0	0	360
730-745	0	236	41	17	0	13	25	49	0	0	0	0	381
745-800	0	182	22	12	0	18	8	81	0	0	0	0	323
800-815	0	153	32	16	0	12	12	70	0	0	0	0	295
815-830	0	135	20	20	0	7	7	72	0	0	0	0	261
830-845	0	107	11	9	0	10	2	62	0	0	0	0	201
845-900	0	100	10	5	0	3	12	35	0	0	0	0	165
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	902	115	43	0	52	64	201	0	0	0	0	1377
715-815	0	821	124	53	0	53	66	242	0	0	0	0	1359
730-830	0	706	115	65	0	50	52	272	0	0	0	0	1260
745-845	0	577	85	57	0	47	29	285	0	0	0	0	1080
800-900	0	495	73	50	0	32	33	239	0	0	0	0	922



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	0	0	0	0	0
730-830	0	0	0	0	0
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

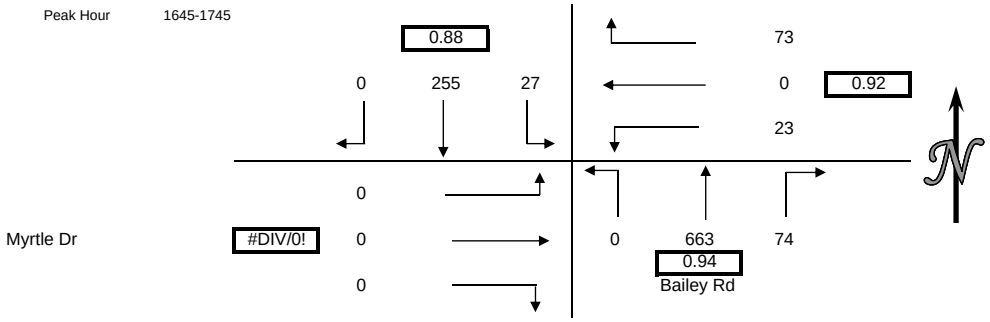
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-036
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Myrtle Dr
CITY:		Concord

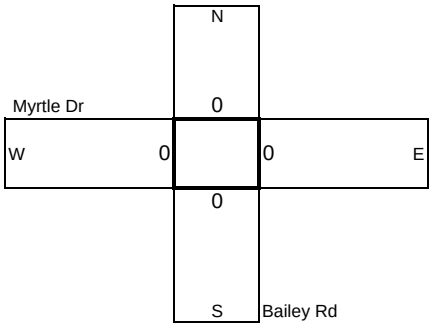
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	59	2	17	0	6	16	96	0	0	0	0	196
1615-1630	0	54	0	16	0	9	17	128	0	0	0	0	224
1630-1645	0	76	11	18	0	3	10	138	0	0	0	0	256
1645-1700	0	56	6	17	0	9	21	163	0	0	0	0	272
1700-1715	0	59	7	18	0	6	17	148	0	0	0	0	255
1715-1730	0	69	5	18	0	3	18	178	0	0	0	0	291
1730-1745	0	71	9	20	0	5	18	174	0	0	0	0	297
1745-1800	0	64	7	14	0	5	23	150	0	0	0	0	263
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	245	19	68	0	27	64	525	0	0	0	0	948
1615-1715	0	245	24	69	0	27	65	577	0	0	0	0	1007
1630-1730	0	260	29	71	0	21	66	627	0	0	0	0	1074
1645-1745	0	255	27	73	0	23	74	663	0	0	0	0	1115
1700-1800	0	263	28	70	0	19	76	650	0	0	0	0	1106



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	1	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	1	0	0	0	0	0	0	1

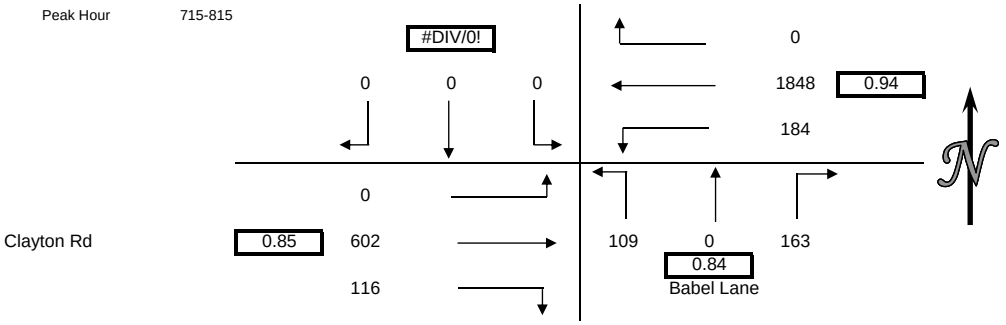
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-037
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Babel Lane
	E/W	Clayton Rd
CITY:		Concord

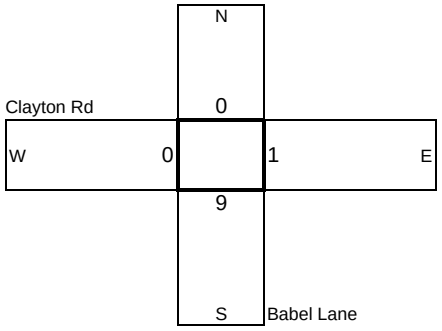
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	430	35	14	0	23	16	89	0	607
715-730	0	0	0	0	464	41	22	0	19	27	98	0	671
730-745	0	0	0	0	455	53	49	0	29	25	165	0	776
745-800	0	0	0	0	483	57	46	0	35	32	159	0	812
800-815	0	0	0	0	446	33	46	0	26	32	180	0	763
815-830	0	0	0	0	324	36	17	0	32	20	145	0	574
830-845	0	0	0	0	346	28	16	0	29	21	125	0	565
845-900	0	0	0	0	289	26	22	0	18	26	103	0	484
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1832	186	131	0	106	100	511	0	2866
715-815	0	0	0	0	1848	184	163	0	109	116	602	0	3022
730-830	0	0	0	0	1708	179	158	0	122	109	649	0	2925
745-845	0	0	0	0	1599	154	125	0	122	105	609	0	2714
800-900	0	0	0	0	1405	123	101	0	105	99	553	0	2386



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	0	0	2	0	2
730-745	0	0	4	0	4
745-800	0	1	1	0	2
800-815	0	0	2	0	2
815-830	0	1	0	0	1
830-845	0	1	2	0	3
845-900	0	2	3	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	8	0	9
715-815	0	1	9	0	10
730-830	0	2	7	0	9
745-845	0	3	5	0	8
800-900	0	4	7	0	11



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	1	0	0	0	0	0	2	0	3
730-745	0	0	0	0	1	0	0	0	0	0	0	0	1
745-800	0	0	0	0	2	1	0	0	1	0	1	0	5
800-815	0	0	0	0	1	0	0	0	1	1	0	0	3
815-830	0	0	0	0	1	0	0	0	0	1	0	0	2
830-845	0	0	0	0	1	0	0	0	0	1	0	0	2
845-900	0	0	0	0	2	0	0	0	0	0	1	0	3
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	5	1	0	0	1	0	3	0	10
715-815	0	0	0	0	5	1	0	0	2	1	3	0	12
730-830	0	0	0	0	5	1	0	0	2	2	1	0	11
745-845	0	0	0	0	5	1	0	0	2	3	1	0	12
800-900	0	0	0	0	5	0	0	0	1	3	1	0	10

National Data and Surveying Services

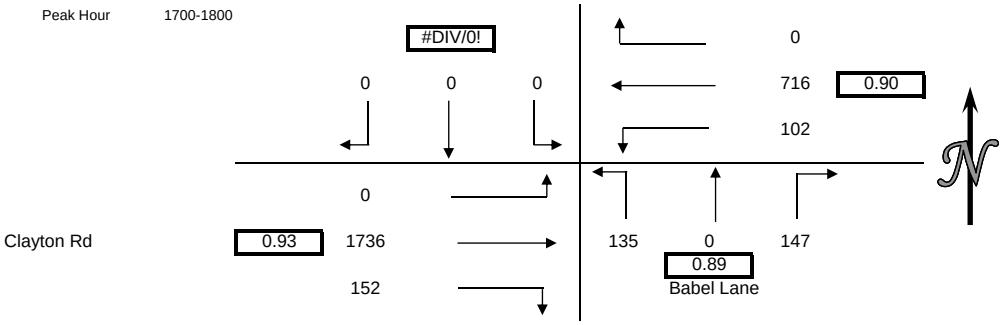
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-037
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Babel Lane
	E/W	Clayton Rd
CITY:		Concord

VEHICLE COUNTS

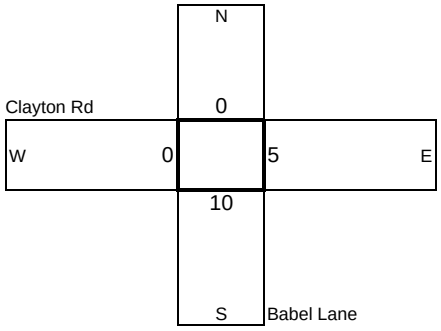
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	195	34	37	0	23	34	319	0	642
1615-1630	0	0	0	0	166	19	27	0	25	29	349	0	615
1630-1645	0	0	0	0	181	19	41	0	31	38	331	0	641
1645-1700	0	0	0	0	184	18	30	0	34	46	376	0	688
1700-1715	0	0	0	0	162	19	27	0	38	34	377	0	657
1715-1730	0	0	0	0	190	27	41	0	38	43	456	0	795
1730-1745	0	0	0	0	198	29	35	0	24	42	468	0	796
1745-1800	0	0	0	0	166	27	44	0	35	33	435	0	740
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	726	90	135	0	113	147	1375	0	2586
1615-1715	0	0	0	0	693	75	125	0	128	147	1433	0	2601
1630-1730	0	0	0	0	717	83	139	0	141	161	1540	0	2781
1645-1745	0	0	0	0	734	93	133	0	134	165	1677	0	2936
1700-1800	0	0	0	0	716	102	147	0	135	152	1736	0	2988

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	3	0	0	3
1615-1630	0	1	1	0	2
1630-1645	0	2	0	0	2
1645-1700	0	2	1	0	3
1700-1715	0	2	3	0	5
1715-1730	0	2	2	0	4
1730-1745	0	1	1	0	2
1745-1800	0	0	4	0	4
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	8	2	0	10
1615-1715	0	7	5	0	12
1630-1730	0	8	6	0	14
1645-1745	0	7	7	0	14
1700-1800	0	5	10	0	15



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	1	0	0	0	0	0	2	0	3
1615-1630	0	0	0	0	0	0	0	0	0	0	1	0	1
1630-1645	0	0	0	0	0	0	0	0	0	0	2	0	2
1645-1700	0	0	0	0	0	0	0	0	0	0	1	0	1
1700-1715	0	0	0	0	1	0	0	0	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	1	0	0	0	0	0	0	0	1
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	1	0	0	0	0	0	6	0	7
1615-1715	0	0	0	0	1	0	0	0	0	0	4	0	5
1630-1730	0	0	0	0	1	0	0	0	0	0	3	0	4
1645-1745	0	0	0	0	2	0	0	0	0	0	1	0	3
1700-1800	0	0	0	0	2	0	0	0	0	0	0	0	2

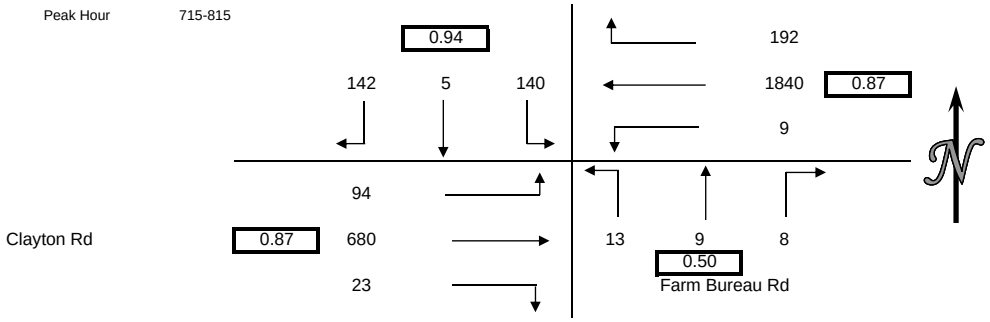
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-038
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Farm Bureau Rd
	E/W	Clayton Rd
CITY:		Concord

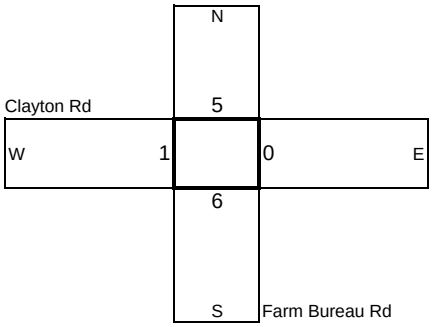
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	38	1	25	28	427	2	0	1	1	4	95	11	633
715-730	40	2	21	30	488	0	0	0	3	2	110	17	713
730-745	35	3	38	53	423	3	4	6	5	6	189	23	788
745-800	36	0	36	60	522	4	4	2	2	6	189	34	895
800-815	31	0	45	49	407	2	0	1	3	9	192	20	759
815-830	26	2	36	56	339	3	1	1	2	5	149	18	638
830-845	33	4	18	35	317	3	2	0	1	2	128	20	563
845-900	19	0	30	38	268	5	0	0	1	3	113	19	496
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	149	6	120	171	1860	9	8	9	11	18	583	85	3029
715-815	142	5	140	192	1840	9	8	9	13	23	680	94	3155
730-830	128	5	155	218	1691	12	9	10	12	26	719	95	3080
745-845	126	6	135	200	1585	12	7	4	8	22	658	92	2855
800-900	109	6	129	178	1331	13	3	2	7	19	582	77	2456



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	3	0	2	1	6
730-745	0	0	2	0	2
745-800	1	0	0	0	1
800-815	1	0	2	0	3
815-830	2	0	1	0	3
830-845	0	0	0	0	0
845-900	0	0	2	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	4	0	5	1	10
715-815	5	0	6	1	12
730-830	4	0	5	0	9
745-845	4	0	3	0	7
800-900	3	0	5	0	8



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	1	0	0	0	0	0	1	0	2
730-745	0	0	0	0	1	0	0	0	0	0	0	0	1
745-800	0	0	0	0	1	0	0	0	0	0	1	0	2
800-815	0	0	0	0	1	0	0	0	0	0	0	0	1
815-830	0	0	0	0	1	0	0	0	0	0	0	0	1
830-845	0	0	0	0	1	0	0	0	0	0	0	0	1
845-900	0	0	0	0	2	0	0	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	4	0	0	0	0	0	2	0	6
715-815	0	0	0	0	4	0	0	0	0	0	2	0	6
730-830	0	0	0	0	4	0	0	0	0	0	1	0	5
745-845	0	0	0	0	4	0	0	0	0	0	1	0	5
800-900	0	0	0	0	5	0	0	0	0	0	0	0	5

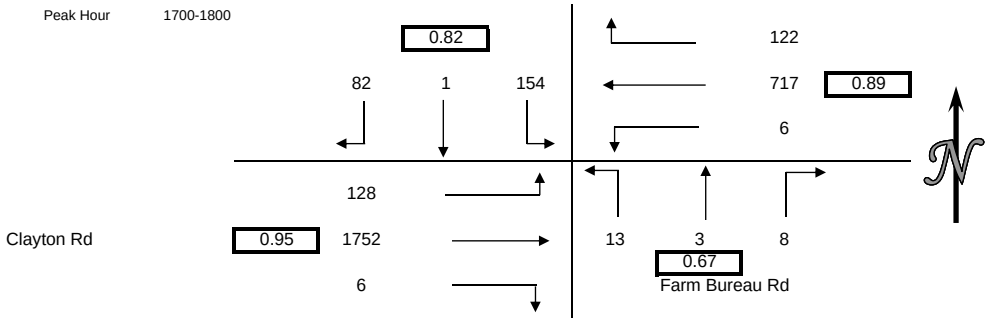
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-038
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Farm Bureau Rd
	E/W	Clayton Rd
CITY:		Concord

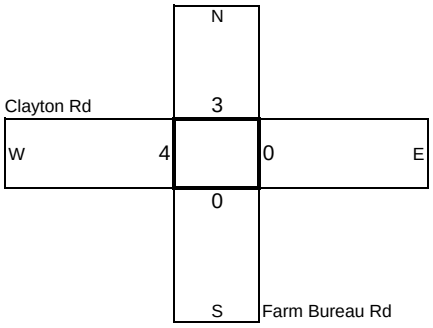
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	23	0	39	44	193	2	2	3	5	1	318	33	663
1615-1630	19	2	37	37	173	2	2	2	2	2	354	16	648
1630-1645	20	0	38	35	183	3	3	2	3	1	344	32	664
1645-1700	28	0	32	31	179	1	1	2	3	3	379	25	684
1700-1715	24	0	48	30	161	2	1	0	6	1	391	21	685
1715-1730	25	1	32	36	201	0	3	2	4	1	457	36	798
1730-1745	10	0	48	31	182	1	2	0	2	4	461	30	771
1745-1800	23	0	26	25	173	3	2	1	1	0	443	41	738
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	90	2	146	147	728	8	8	9	13	7	1395	106	2659
1615-1715	91	2	155	133	696	8	7	6	14	7	1468	94	2681
1630-1730	97	1	150	132	724	6	8	6	16	6	1571	114	2831
1645-1745	87	1	160	128	723	4	7	4	15	9	1688	112	2938
1700-1800	82	1	154	122	717	6	8	3	13	6	1752	128	2992



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	1	0	0	0	1
1615-1630	2	0	0	0	2
1630-1645	0	0	2	2	4
1645-1700	0	0	3	1	4
1700-1715	0	0	0	2	2
1715-1730	3	0	0	0	3
1730-1745	0	0	0	2	2
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	3	0	5	3	11
1615-1715	2	0	5	5	12
1630-1730	3	0	5	5	13
1645-1745	3	0	3	5	11
1700-1800	3	0	0	4	7



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	1	0	0	0	0	0	2	0	3
1615-1630	0	0	0	0	0	0	0	0	0	0	2	0	2
1630-1645	0	0	0	0	0	0	0	0	0	0	2	0	2
1645-1700	0	0	0	0	1	0	0	0	0	0	1	0	2
1700-1715	0	0	0	0	1	0	0	0	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	1	0	0	0	0	0	0	0	1
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	2	0	0	0	0	0	7	0	9
1615-1715	0	0	0	0	2	0	0	0	0	0	5	0	7
1630-1730	0	0	0	0	2	0	0	0	0	0	3	0	5
1645-1745	0	0	0	0	3	0	0	0	0	0	1	0	4
1700-1800	0	0	0	0	2	0	0	0	0	0	0	0	2

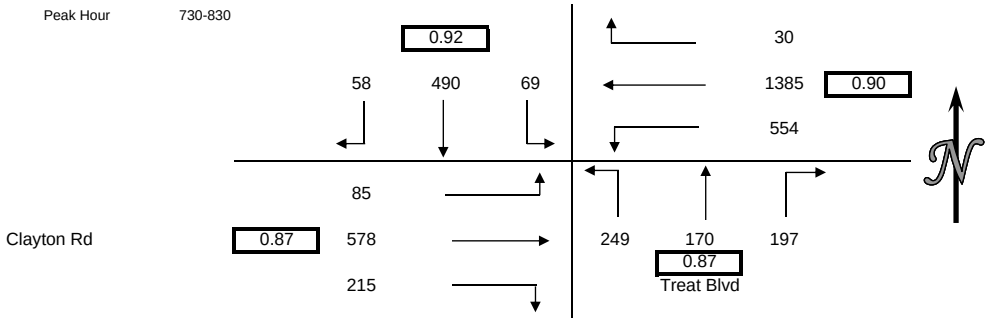
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-039
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Treat Blvd
	E/W	Clayton Rd
CITY:		Concord

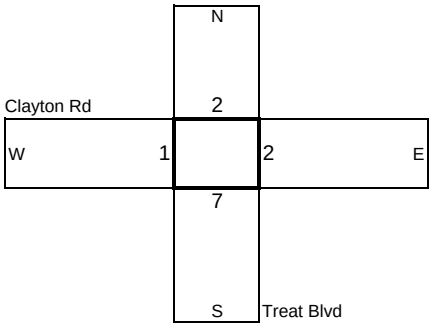
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	11	168	4	7	401	170	27	19	43	41	92	15	998
715-730	18	142	7	7	362	133	34	43	53	41	90	9	939
730-745	16	142	9	4	329	137	44	50	58	28	123	26	966
745-800	19	109	20	5	400	145	55	39	83	57	142	30	1104
800-815	12	120	15	13	352	142	53	44	59	57	149	13	1029
815-830	11	119	25	8	304	130	45	37	49	73	164	16	981
830-845	11	99	17	14	263	140	47	28	51	47	122	14	853
845-900	12	105	27	11	239	133	43	27	43	47	112	17	816
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	64	561	40	23	1492	585	160	151	237	167	447	80	4007
715-815	65	513	51	29	1443	557	186	176	253	183	504	78	4038
730-830	58	490	69	30	1385	554	197	170	249	215	578	85	4080
745-845	53	447	77	40	1319	557	200	148	242	234	577	73	3967
800-900	46	443	84	46	1158	545	188	136	202	224	547	60	3679



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	0	1	0	2
715-730	1	0	1	1	3
730-745	0	0	2	1	3
745-800	0	2	1	0	3
800-815	0	0	2	0	2
815-830	2	0	2	0	4
830-845	3	0	1	1	5
845-900	1	1	0	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	2	2	5	2	11
715-815	1	2	6	2	11
730-830	2	2	7	1	12
745-845	5	2	6	1	14
800-900	6	1	5	1	13



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	1	1	0	0	0	0	0	0	2
730-745	0	0	0	1	0	1	0	0	0	0	1	0	3
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	1	0	1
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	1	0	0	1	1	0	0	0	0	0	0	3
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	1	1	2	0	0	0	0	1	0	5
715-815	0	0	0	1	1	2	0	0	0	0	2	0	6
730-830	0	0	0	1	0	1	0	0	0	0	2	0	4
745-845	0	1	0	0	1	1	0	0	0	0	1	0	4
800-900	0	1	0	0	1	1	0	0	0	0	1	0	4

National Data and Surveying Services

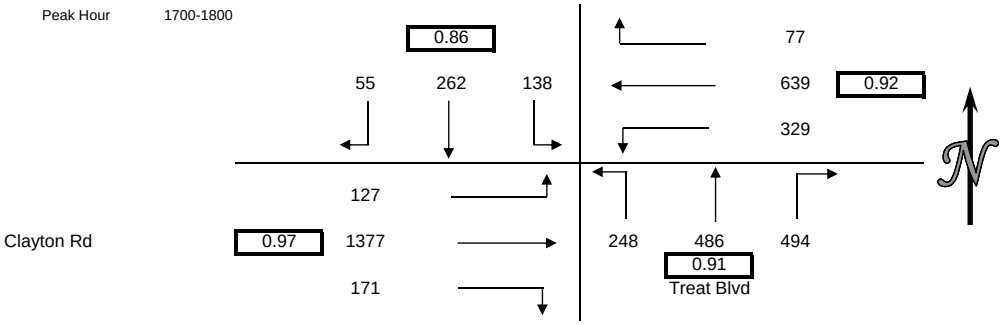
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-039
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Treat Blvd
	E/W	Clayton Rd
CITY:		Concord

VEHICLE COUNTS

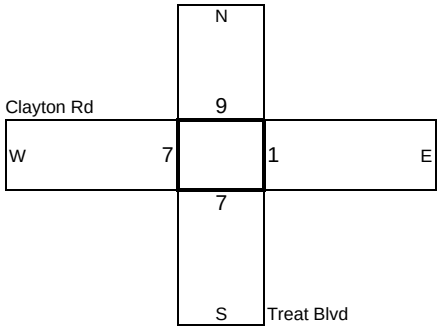
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	10	64	38	21	168	94	118	108	56	32	297	22	1028
1615-1630	17	68	41	18	135	91	118	109	79	37	285	19	1017
1630-1645	15	57	30	13	151	98	119	109	58	28	315	24	1017
1645-1700	7	70	31	13	141	81	127	116	50	42	361	25	1064
1700-1715	11	42	32	21	162	91	134	139	65	40	358	26	1121
1715-1730	12	80	36	16	180	88	121	86	54	44	357	31	1105
1730-1745	16	65	28	23	143	86	133	128	69	43	318	37	1089
1745-1800	16	75	42	17	154	64	106	133	60	44	344	33	1088
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	49	259	140	65	595	364	482	442	243	139	1258	90	4126
1615-1715	50	237	134	65	589	361	498	473	252	147	1319	94	4219
1630-1730	45	249	129	63	634	358	501	450	227	154	1391	106	4307
1645-1745	46	257	127	73	626	346	515	469	238	169	1394	119	4379
1700-1800	55	262	138	77	639	329	494	486	248	171	1377	127	4403

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	1	3	5	4	13
1615-1630	3	1	4	3	11
1630-1645	1	0	3	2	6
1645-1700	5	0	2	3	10
1700-1715	1	0	1	1	3
1715-1730	3	0	3	2	8
1730-1745	2	0	1	4	7
1745-1800	3	1	2	0	6
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	10	4	14	12	40
1615-1715	10	1	10	9	30
1630-1730	10	0	9	8	27
1645-1745	11	0	7	10	28
1700-1800	9	1	7	7	24



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	1	0	0	0	0	0	0	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	2	0	2
1630-1645	0	0	0	0	0	2	0	0	0	0	2	0	4
1645-1700	0	0	0	0	1	0	0	0	0	0	0	0	1
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	1	0	0	0	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	1	0	1	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	2	2	0	0	0	0	4	0	8
1615-1715	0	0	0	0	1	2	0	0	0	0	4	0	7
1630-1730	0	0	0	0	2	2	0	0	0	0	2	0	6
1645-1745	0	0	0	0	2	0	0	0	0	0	0	0	2
1700-1800	0	0	0	0	2	0	1	0	0	0	0	0	3

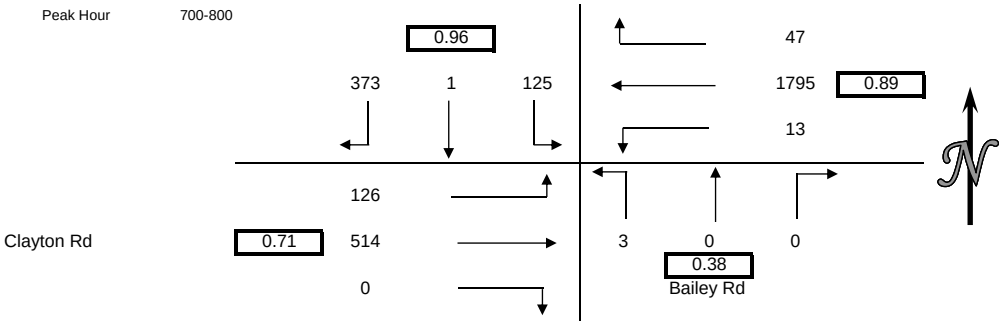
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-040
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Clayton Rd
CITY:		Concord

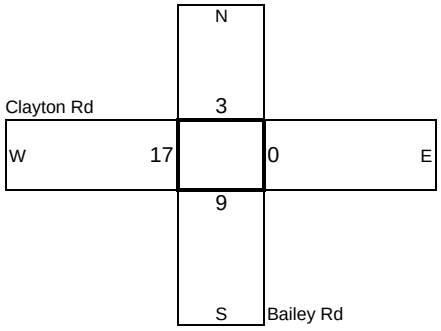
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	101	0	22	7	442	7	0	0	0	0	92	25	696
715-730	87	0	31	17	443	0	0	0	0	0	115	29	722
730-745	93	1	36	7	413	0	0	0	1	0	121	32	704
745-800	92	0	36	16	497	6	0	0	2	0	186	40	875
800-815	63	0	43	20	338	3	2	0	1	0	173	45	688
815-830	74	0	27	20	365	10	1	1	0	1	179	28	706
830-845	75	0	23	17	325	12	2	0	4	0	144	35	637
845-900	51	0	26	10	271	12	1	1	2	0	138	27	539
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	373	1	125	47	1795	13	0	0	3	0	514	126	2997
715-815	335	1	146	60	1691	9	2	0	4	0	595	146	2989
730-830	322	1	142	63	1613	19	3	1	4	1	659	145	2973
745-845	304	0	129	73	1525	31	5	1	7	1	682	148	2906
800-900	263	0	119	67	1299	37	6	2	7	1	634	135	2570



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	2	5	7
715-730	2	0	2	2	6
730-745	0	0	2	10	12
745-800	1	0	3	0	4
800-815	2	0	1	1	4
815-830	2	0	1	1	4
830-845	3	0	2	4	9
845-900	4	0	1	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	3	0	9	17	29
715-815	5	0	8	13	26
730-830	5	0	7	12	24
745-845	8	0	7	6	21
800-900	11	0	5	6	22



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	2	0	0	0	0	0	0	0	2
730-745	0	0	0	0	1	0	0	0	0	0	0	0	1
745-800	0	0	0	0	1	0	0	0	0	0	0	0	1
800-815	0	0	0	0	0	0	0	0	0	0	1	0	1
815-830	0	0	1	0	2	0	0	0	0	0	0	0	3
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	1	0	0	0	0	0	1	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	4	0	0	0	0	0	0	0	4
715-815	0	0	0	0	4	0	0	0	0	0	1	0	5
730-830	0	0	1	0	4	0	0	0	0	0	1	0	6
745-845	0	0	1	0	3	0	0	0	0	0	1	0	5
800-900	0	0	1	0	3	0	0	0	0	0	2	0	6

National Data and Surveying Services

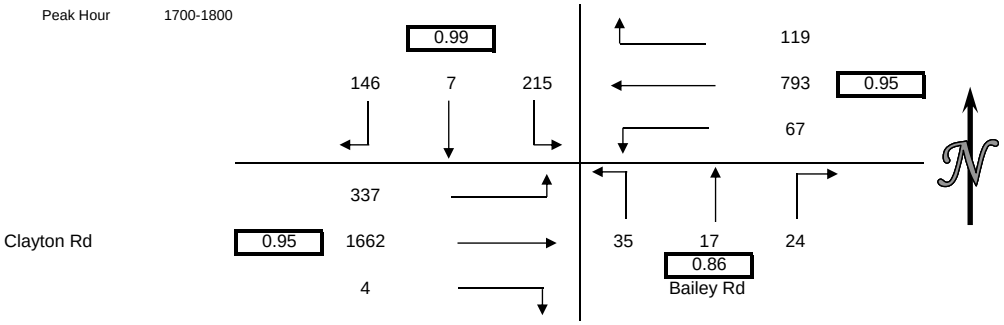
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-040
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Clayton Rd
CITY:		Concord

VEHICLE COUNTS

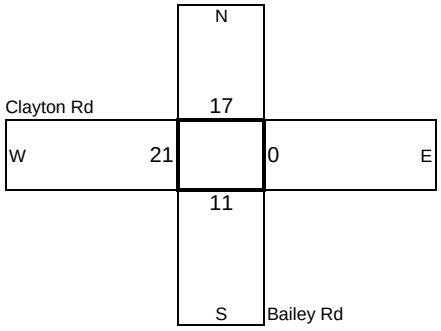
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	36	2	45	31	219	7	4	2	4	0	386	52	788
1615-1630	32	5	57	32	197	14	5	9	2	4	351	73	781
1630-1645	43	2	37	29	194	9	3	1	7	1	398	78	802
1645-1700	45	3	58	32	190	8	2	6	7	2	422	82	857
1700-1715	40	1	50	34	207	17	7	1	6	2	389	81	835
1715-1730	37	2	53	21	215	16	4	8	9	0	412	87	864
1730-1745	27	2	63	33	168	21	7	2	13	1	414	88	839
1745-1800	42	2	49	31	203	13	6	6	7	1	447	81	888
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	156	12	197	124	800	38	14	18	20	7	1557	285	3228
1615-1715	160	11	202	127	788	48	17	17	22	9	1560	314	3275
1630-1730	165	8	198	116	806	50	16	16	29	5	1621	328	3358
1645-1745	149	8	224	120	780	62	20	17	35	5	1637	338	3395
1700-1800	146	7	215	119	793	67	24	17	35	4	1662	337	3426

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	1	0	5	7	13
1615-1630	1	0	0	2	3
1630-1645	3	0	4	8	15
1645-1700	2	0	1	4	7
1700-1715	2	0	1	1	4
1715-1730	5	0	3	6	14
1730-1745	1	0	4	5	10
1745-1800	9	0	3	9	21
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	7	0	10	21	38
1615-1715	8	0	6	15	29
1630-1730	12	0	9	19	40
1645-1745	10	0	9	16	35
1700-1800	17	0	11	21	49



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	1	0	0	0	0	0	0	0	1
1615-1630	0	0	0	0	2	0	0	0	0	0	1	0	3
1630-1645	0	0	0	0	1	0	0	0	0	0	1	0	2
1645-1700	0	0	0	0	1	0	0	0	0	0	1	1	3
1700-1715	0	0	0	0	1	0	0	0	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	1	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	2	0	2
1745-1800	0	0	0	0	0	1	0	1	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	5	0	0	0	0	0	3	1	9
1615-1715	0	0	0	0	5	0	0	0	0	0	3	1	9
1630-1730	0	0	0	0	3	0	0	0	0	0	3	1	7
1645-1745	0	0	0	0	2	0	0	0	0	0	4	1	7
1700-1800	0	0	0	0	1	1	0	1	0	0	3	0	6

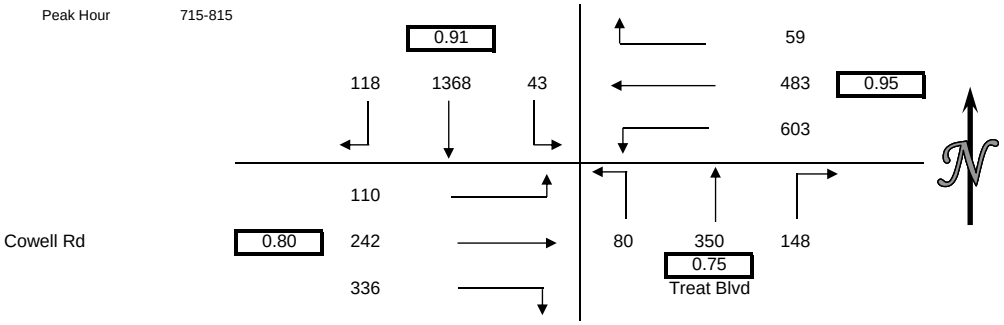
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-041
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Treat Blvd
	E/W	Cowell Rd
CITY:		Concord

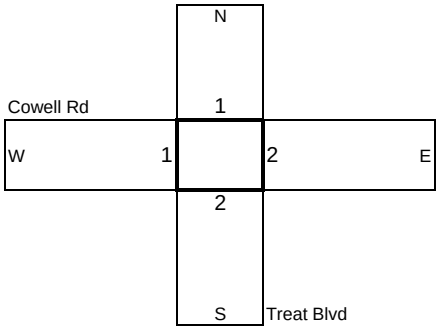
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	20	393	6	7	78	114	15	62	20	76	42	22	855
715-730	22	390	6	8	106	152	27	86	13	82	51	21	964
730-745	22	355	11	18	106	156	29	65	19	116	42	29	968
745-800	40	319	14	9	139	149	39	85	22	91	92	33	1032
800-815	34	304	12	24	132	146	53	114	26	47	57	27	976
815-830	34	282	12	14	114	122	36	97	32	62	72	15	892
830-845	37	299	11	13	101	126	36	60	25	53	44	24	829
845-900	28	246	18	15	88	99	24	71	25	51	49	26	740
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	104	1457	37	42	429	571	110	298	74	365	227	105	3819
715-815	118	1368	43	59	483	603	148	350	80	336	242	110	3940
730-830	130	1260	49	65	491	573	157	361	99	316	263	104	3868
745-845	145	1204	49	60	486	543	164	356	105	253	265	99	3729
800-900	133	1131	53	66	435	493	149	342	108	213	222	92	3437



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	4	5	1	11
715-730	0	1	1	0	2
730-745	1	0	0	1	2
745-800	0	1	1	0	2
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	2	6	7	2	17
715-815	1	2	2	1	6
730-830	1	1	1	1	4
745-845	0	1	1	0	2
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	1	0	1	0	0	0	0	0	0	0	0	2
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	3	0	0	2	0	0	0	0	0	0	0	5
830-845	0	1	0	0	0	0	0	1	0	0	0	0	2
845-900	0	0	0	0	0	0	0	0	0	0	0	2	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	1	0	1	0	0	0	0	0	0	0	0	2
715-815	0	1	0	1	0	0	0	0	0	0	0	0	2
730-830	0	4	0	1	2	0	0	0	0	0	0	0	7
745-845	0	4	0	0	2	0	0	1	0	0	0	0	7
800-900	0	4	0	0	2	0	0	1	0	0	0	2	9

National Data and Surveying Services

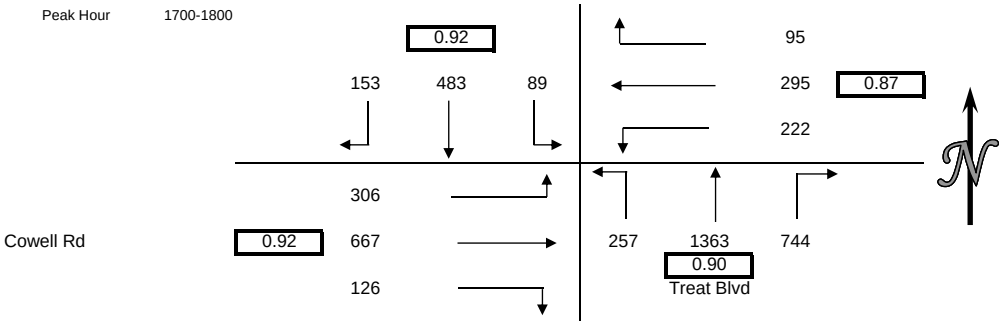
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-041
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Treat Blvd
	E/W	Cowell Rd
CITY:		Concord

VEHICLE COUNTS

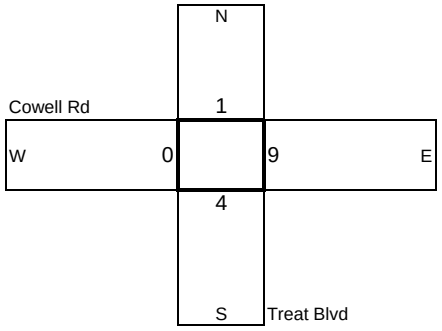
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	38	97	24	47	86	58	80	225	51	27	115	61	909
1615-1630	39	126	27	25	58	40	129	317	58	35	137	60	1051
1630-1645	39	91	26	32	83	65	120	275	48	39	110	71	999
1645-1700	33	132	27	33	80	41	114	306	58	33	124	66	1047
1700-1715	40	134	17	26	90	60	169	356	58	26	134	81	1191
1715-1730	40	130	28	22	61	56	160	294	75	30	191	67	1154
1730-1745	37	113	23	27	78	47	208	392	60	31	162	77	1255
1745-1800	36	106	21	20	66	59	207	321	64	39	180	81	1200
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	149	446	104	137	307	204	443	1123	215	134	486	258	4006
1615-1715	151	483	97	116	311	206	532	1254	222	133	505	278	4288
1630-1730	152	487	98	113	314	222	563	1231	239	128	559	285	4391
1645-1745	150	509	95	108	309	204	651	1348	251	120	611	291	4647
1700-1800	153	483	89	95	295	222	744	1363	257	126	667	306	4800

Peak Hour 1700-1800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	2	2	0	0	4
1615-1630	0	0	0	0	0
1630-1645	0	1	0	0	1
1645-1700	0	0	2	0	2
1700-1715	0	0	2	0	2
1715-1730	0	0	2	0	2
1730-1745	1	4	0	0	5
1745-1800	0	5	0	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	2	3	2	0	7
1615-1715	0	1	4	0	5
1630-1730	0	1	6	0	7
1645-1745	1	4	6	0	11
1700-1800	1	9	4	0	14



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	1	0	0	0	0	0	0	0	0	0	2	0	3
1645-1700	0	0	2	0	0	0	0	1	0	0	0	0	3
1700-1715	0	0	0	0	0	0	0	3	0	0	0	0	3
1715-1730	0	0	0	0	0	0	0	0	0	0	1	0	1
1730-1745	0	0	0	0	1	1	0	2	0	0	1	0	5
1745-1800	1	0	0	0	0	0	0	1	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	1	0	2	0	0	0	0	1	0	0	2	0	6
1615-1715	1	0	2	0	0	0	0	4	0	0	2	0	9
1630-1730	1	0	2	0	0	0	0	4	0	0	3	0	10
1645-1745	0	0	2	0	1	1	0	6	0	0	2	0	12
1700-1800	1	0	0	0	1	1	0	6	0	0	2	0	11

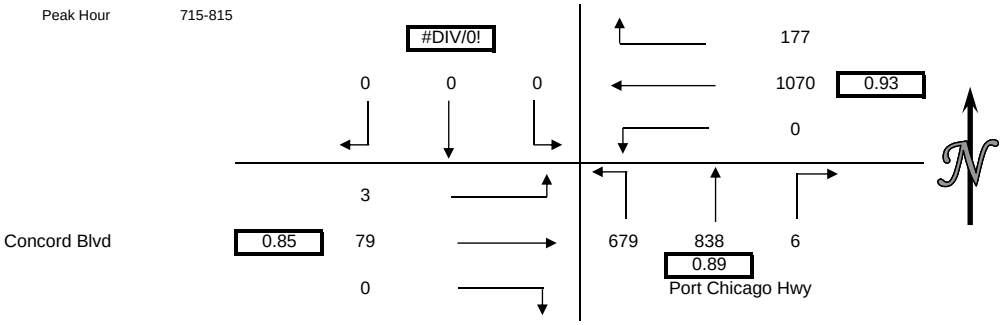
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-044
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Port Chicago Hwy
	E/W	Concord Blvd
CITY:		Concord

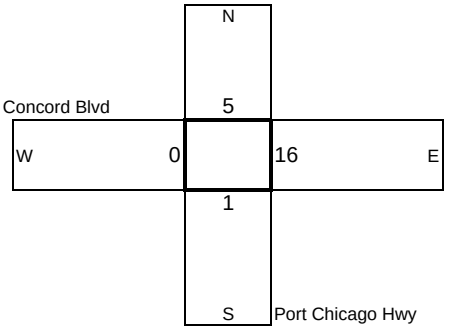
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	31	266	0	0	163	143	0	5	0	608
715-730	0	0	0	39	297	0	0	184	139	0	16	1	676
730-745	0	0	0	50	274	0	2	196	180	0	20	2	724
745-800	0	0	0	36	266	0	2	218	173	0	24	0	719
800-815	0	0	0	52	233	0	2	240	187	0	19	0	733
815-830	0	0	0	50	233	0	0	192	171	0	12	0	658
830-845	0	0	0	45	219	0	2	169	124	0	10	1	570
845-900	0	0	0	33	173	0	3	180	151	0	6	0	546
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	156	1103	0	4	761	635	0	65	3	2727
715-815	0	0	0	177	1070	0	6	838	679	0	79	3	2852
730-830	0	0	0	188	1006	0	6	846	711	0	75	2	2834
745-845	0	0	0	183	951	0	6	819	655	0	65	1	2680
800-900	0	0	0	180	858	0	7	781	633	0	47	1	2507



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	2	1	0	4
715-730	2	7	1	0	10
730-745	0	0	0	0	0
745-800	0	4	0	0	4
800-815	3	5	0	0	8
815-830	0	1	0	0	1
830-845	1	2	0	0	3
845-900	3	1	1	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	3	13	2	0	18
715-815	5	16	1	0	22
730-830	3	10	0	0	13
745-845	4	12	0	0	16
800-900	7	9	1	0	17



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	1	1	0	0	0	0	0	0	2
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	1	1
800-815	0	1	0	0	0	0	0	0	0	0	0	0	1
815-830	0	0	0	0	0	0	0	1	0	0	0	0	1
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	1	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	2	1	0	0	0	0	0	1	4
715-815	0	1	0	0	1	1	0	0	0	0	0	1	4
730-830	0	1	0	0	0	0	0	1	0	0	0	1	3
745-845	0	1	0	0	0	0	0	1	0	0	0	1	3
800-900	0	1	0	0	0	0	0	1	0	0	1	0	3

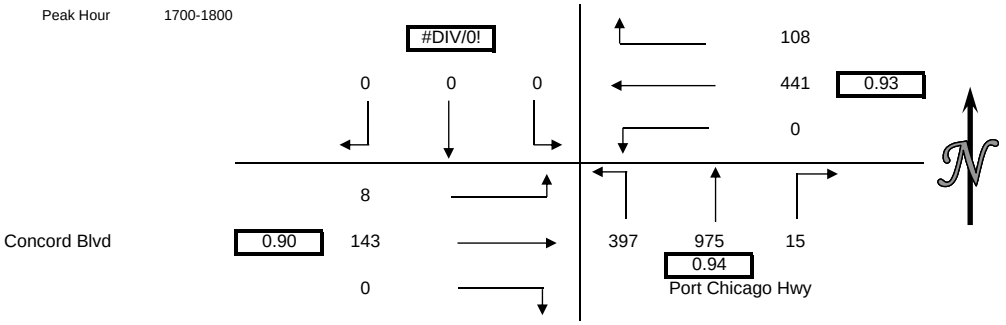
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-044
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Port Chicago Hwy
	E/W	Concord Blvd
CITY:		Concord

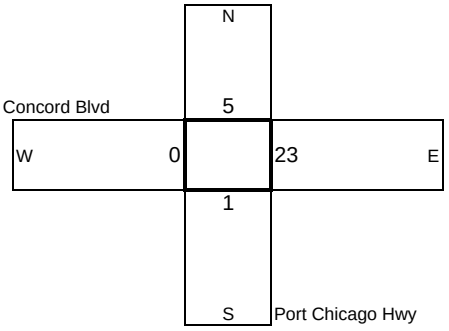
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	22	111	0	0	181	106	0	27	0	447
1615-1630	0	0	0	27	127	0	1	209	87	0	29	2	482
1630-1645	0	0	0	24	96	0	1	202	96	0	24	2	445
1645-1700	0	0	0	20	99	0	1	181	99	0	30	3	433
1700-1715	0	0	0	27	121	0	5	225	89	0	38	3	508
1715-1730	0	0	0	25	116	0	3	266	98	0	39	1	548
1730-1745	0	0	0	25	100	0	4	239	108	0	27	1	504
1745-1800	0	0	0	31	104	0	3	245	102	0	39	3	527
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	93	433	0	3	773	388	0	110	7	1807
1615-1715	0	0	0	98	443	0	8	817	371	0	121	10	1868
1630-1730	0	0	0	96	432	0	10	874	382	0	131	9	1934
1645-1745	0	0	0	97	436	0	13	911	394	0	134	8	1993
1700-1800	0	0	0	108	441	0	15	975	397	0	143	8	2087



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	3	5	2	0	10
1615-1630	1	5	1	0	7
1630-1645	1	3	1	0	5
1645-1700	2	6	0	0	8
1700-1715	0	2	0	0	2
1715-1730	2	13	0	0	15
1730-1745	2	6	1	0	9
1745-1800	1	2	0	0	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	7	19	4	0	30
1615-1715	4	16	2	0	22
1630-1730	5	24	1	0	30
1645-1745	6	27	1	0	34
1700-1800	5	23	1	0	29



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	1	0	0	0	1	1	0	0	0	3
1615-1630	0	0	0	0	0	0	0	1	0	0	0	0	1
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	1	0	0	0	0	1
1700-1715	0	0	0	0	0	0	0	0	0	0	1	0	1
1715-1730	0	0	0	1	0	0	0	0	1	0	1	0	3
1730-1745	0	0	0	0	1	0	0	0	0	0	1	0	2
1745-1800	0	0	0	0	0	0	0	1	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	1	0	0	0	3	1	0	0	0	5
1615-1715	0	0	0	0	0	0	0	2	0	0	1	0	3
1630-1730	0	0	0	1	0	0	0	1	1	0	2	0	5
1645-1745	0	0	0	1	1	0	0	1	1	0	3	0	7
1700-1800	0	0	0	1	1	0	0	1	1	0	3	0	7

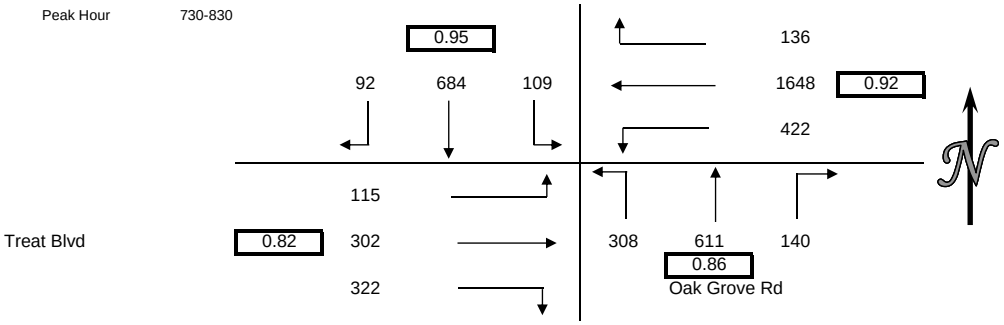
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-045
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Oak Grove Rd
	E/W	Treat Blvd
CITY:		Concord

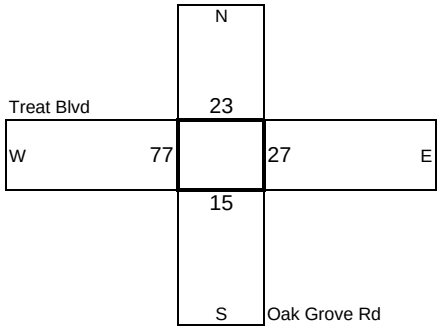
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	28	109	27	36	571	74	11	62	65	27	62	12	1084
715-730	28	138	26	37	447	92	14	84	62	42	78	27	1075
730-745	28	179	27	31	453	118	19	112	71	55	49	19	1161
745-800	19	172	27	28	436	103	33	150	84	97	84	33	1266
800-815	22	161	27	26	399	106	43	184	82	101	89	36	1276
815-830	23	172	28	51	360	95	45	165	71	69	80	27	1186
830-845	30	137	33	41	344	104	13	89	56	71	86	29	1033
845-900	33	123	22	34	319	110	27	70	60	67	81	27	973
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	103	598	107	132	1907	387	77	408	282	221	273	91	4586
715-815	97	650	107	122	1735	419	109	530	299	295	300	115	4778
730-830	92	684	109	136	1648	422	140	611	308	322	302	115	4889
745-845	94	642	115	146	1539	408	134	588	293	338	339	125	4761
800-900	108	593	110	152	1422	415	128	508	269	308	336	119	4468



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	1	2	11	14
715-730	4	4	7	22	37
730-745	4	7	5	24	40
745-800	3	6	3	10	22
800-815	13	7	4	31	55
815-830	3	7	3	12	25
830-845	2	4	1	2	9
845-900	1	3	1	5	10
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	11	18	17	67	113
715-815	24	24	19	87	154
730-830	23	27	15	77	142
745-845	21	24	11	55	111
800-900	19	21	9	50	99



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	6	0	0	1	0	0	0	0	1	0	0	8
715-730	0	2	0	0	0	0	0	1	1	0	0	0	4
730-745	0	1	0	0	0	1	0	1	0	0	0	0	3
745-800	1	4	0	0	0	0	0	0	0	0	0	0	5
800-815	0	3	0	0	0	0	0	1	0	0	0	0	4
815-830	0	4	0	0	0	0	0	0	0	0	0	0	4
830-845	0	4	0	0	0	0	0	0	0	0	0	0	4
845-900	0	1	0	0	0	0	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	1	13	0	0	1	1	0	2	1	1	0	0	20
715-815	1	10	0	0	0	1	0	3	1	0	0	0	16
730-830	1	12	0	0	0	1	0	2	0	0	0	0	16
745-845	1	15	0	0	0	0	0	1	0	0	0	0	17
800-900	0	12	0	0	0	0	0	1	0	0	0	0	13

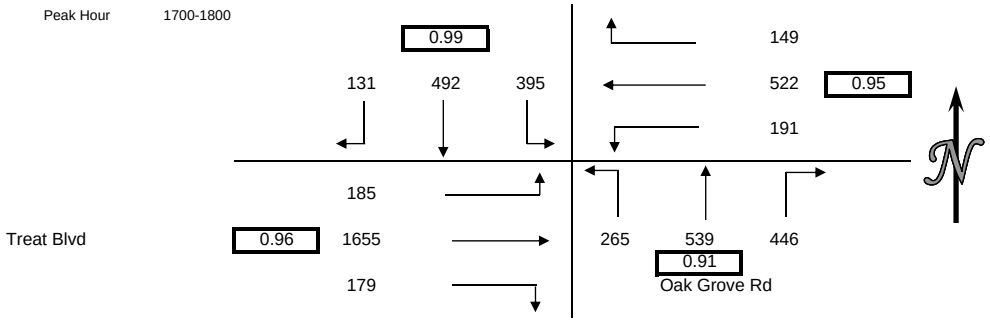
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-045
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Oak Grove Rd
	E/W	Treat Blvd
CITY:		Concord

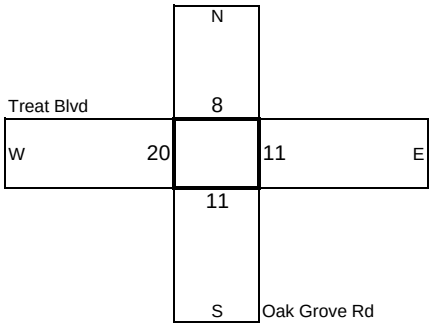
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	35	128	37	23	110	52	80	171	69	49	318	59	1131
1615-1630	33	116	61	35	142	44	75	122	63	46	382	45	1164
1630-1645	32	109	72	23	129	39	86	164	65	51	377	44	1191
1645-1700	31	122	55	36	150	61	89	136	60	34	385	60	1219
1700-1715	34	126	91	35	138	36	111	144	89	48	418	54	1324
1715-1730	36	128	90	38	137	53	109	141	70	45	389	43	1279
1730-1745	31	117	107	41	124	51	112	118	55	47	443	35	1281
1745-1800	30	121	107	35	123	51	114	136	51	39	405	53	1265
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	131	475	225	117	531	196	330	593	257	180	1462	208	4705
1615-1715	130	473	279	129	559	180	361	566	277	179	1562	203	4898
1630-1730	133	485	308	132	554	189	395	585	284	178	1569	201	5013
1645-1745	132	493	343	150	549	201	421	539	274	174	1635	192	5103
1700-1800	131	492	395	149	522	191	446	539	265	179	1655	185	5149



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	3	0	2	7	12
1615-1630	1	1	2	6	10
1630-1645	1	3	1	5	10
1645-1700	4	3	1	5	13
1700-1715	3	2	2	8	15
1715-1730	3	3	4	3	13
1730-1745	0	1	0	5	6
1745-1800	2	5	5	4	16
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	9	7	6	23	45
1615-1715	9	9	6	24	48
1630-1730	11	11	8	21	51
1645-1745	10	9	7	21	47
1700-1800	8	11	11	20	50



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	1	0	0	0	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	1	0	1
1630-1645	0	1	0	0	0	0	0	1	0	0	0	1	3
1645-1700	0	0	0	0	0	0	0	1	0	0	1	0	2
1700-1715	0	1	0	0	0	0	0	1	0	0	1	0	3
1715-1730	0	0	0	0	0	0	0	0	0	1	0	0	1
1730-1745	0	1	1	0	0	1	0	2	0	0	0	0	5
1745-1800	0	0	0	0	0	0	0	1	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	1	0	0	0	0	0	3	0	0	2	1	7
1615-1715	0	2	0	0	0	0	0	3	0	0	3	1	9
1630-1730	0	2	0	0	0	0	0	3	0	1	2	1	9
1645-1745	0	2	1	0	0	1	0	4	0	1	2	0	11
1700-1800	0	2	1	0	0	1	0	4	0	1	1	0	10

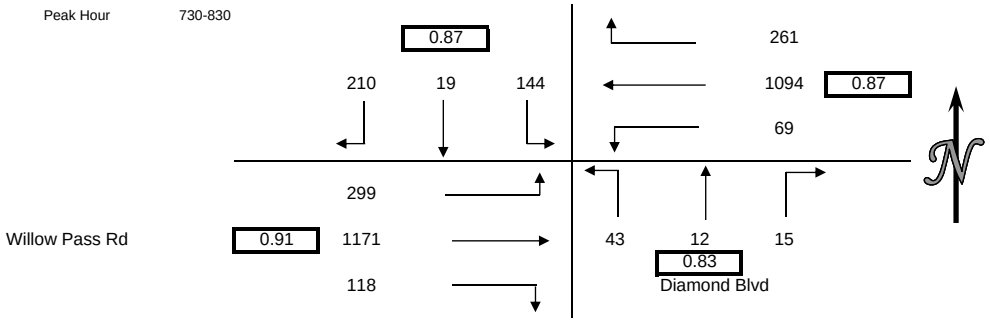
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-046
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Diamond Blvd
	E/W	Willow Pass Rd
CITY:		Concord

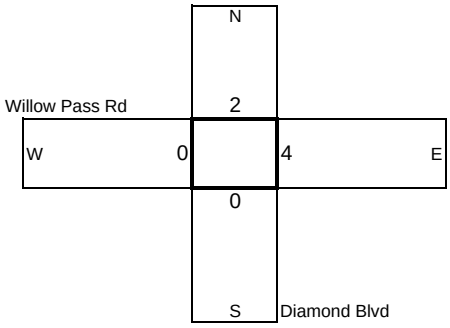
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	37	2	28	40	234	8	8	1	13	25	176	37	609
715-730	56	9	26	50	315	12	1	0	5	22	231	44	771
730-745	57	8	42	63	331	17	3	3	11	24	278	55	892
745-800	49	3	31	72	282	18	3	2	8	31	330	73	902
800-815	51	3	34	58	242	19	5	4	12	30	284	79	821
815-830	53	5	37	68	239	15	4	3	12	33	279	92	840
830-845	52	7	38	68	221	15	6	1	3	23	248	64	746
845-900	60	6	39	70	171	15	4	4	10	34	270	83	766
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	199	22	127	225	1162	55	15	6	37	102	1015	209	3174
715-815	213	23	133	243	1170	66	12	9	36	107	1123	251	3386
730-830	210	19	144	261	1094	69	15	12	43	118	1171	299	3455
745-845	205	18	140	266	984	67	18	10	35	117	1141	308	3309
800-900	216	21	148	264	873	64	19	12	37	120	1081	318	3173



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	1	0	1
715-730	0	1	0	0	1
730-745	2	0	0	0	2
745-800	0	2	0	0	2
800-815	0	0	0	0	0
815-830	0	2	0	0	2
830-845	1	0	2	0	3
845-900	0	2	0	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	2	3	1	0	6
715-815	2	3	0	0	5
730-830	2	4	0	0	6
745-845	1	4	2	0	7
800-900	1	4	2	0	7



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	2	0	0	0	0	0	0	0	2
715-730	0	0	0	0	0	0	0	0	0	0	0	1	1
730-745	0	0	0	1	3	0	0	0	0	0	0	0	4
745-800	0	0	0	0	1	0	0	1	0	0	0	0	2
800-815	0	0	0	0	1	0	0	0	0	0	0	0	1
815-830	0	0	0	0	3	0	0	0	0	0	1	0	4
830-845	0	0	0	0	1	0	0	0	0	0	0	0	1
845-900	0	0	0	0	1	0	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	1	6	0	0	1	0	0	0	1	9
715-815	0	0	0	1	5	0	0	1	0	0	0	1	8
730-830	0	0	0	1	8	0	0	1	0	0	1	0	11
745-845	0	0	0	0	6	0	0	1	0	0	1	0	8
800-900	0	0	0	0	6	0	0	0	0	0	1	0	7

National Data and Surveying Services

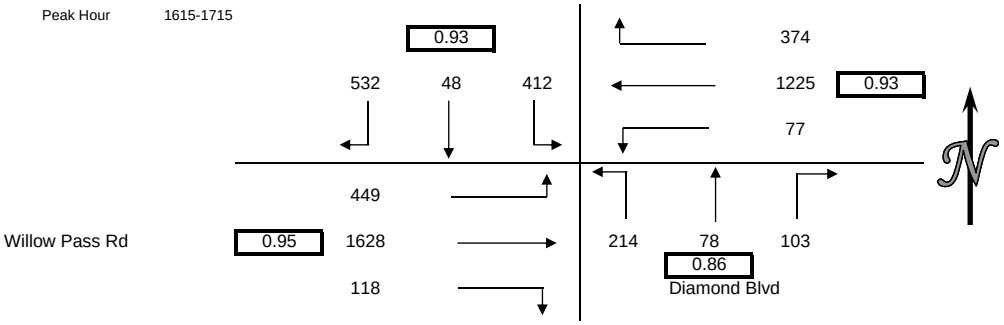
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-046
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Diamond Blvd
	E/W	Willow Pass Rd
CITY:		Concord

VEHICLE COUNTS

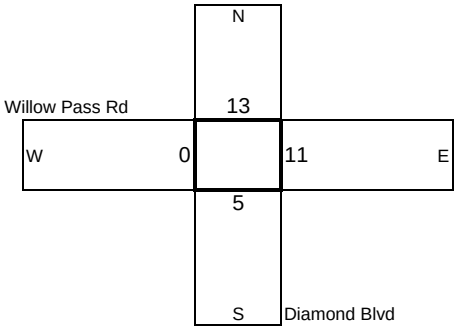
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	113	13	100	85	308	14	35	16	61	29	402	117	1293
1615-1630	130	14	101	95	282	24	28	20	56	31	374	122	1277
1630-1645	113	9	103	96	304	20	24	11	60	33	431	116	1320
1645-1700	140	20	106	92	300	12	24	17	40	38	383	113	1285
1700-1715	149	5	102	91	339	21	27	30	58	16	440	98	1376
1715-1730	116	12	101	93	269	17	36	8	51	22	411	86	1222
1730-1745	107	12	89	78	298	9	30	17	33	23	450	145	1291
1745-1800	98	10	82	107	260	10	21	7	37	34	412	116	1194
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	496	56	410	368	1194	70	111	64	217	131	1590	468	5175
1615-1715	532	48	412	374	1225	77	103	78	214	118	1628	449	5258
1630-1730	518	46	412	372	1212	70	111	66	209	109	1665	413	5203
1645-1745	512	49	398	354	1206	59	117	72	182	99	1684	442	5174
1700-1800	470	39	374	369	1166	57	114	62	179	95	1713	445	5083

Peak Hour 1615-1715



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	6	3	0	0	9
1615-1630	1	4	2	0	7
1630-1645	5	4	1	0	10
1645-1700	5	3	1	0	9
1700-1715	2	0	1	0	3
1715-1730	0	1	0	0	1
1730-1745	2	0	0	0	2
1745-1800	0	1	1	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	17	14	4	0	35
1615-1715	13	11	5	0	29
1630-1730	12	8	3	0	23
1645-1745	9	4	2	0	15
1700-1800	4	2	2	0	8



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	1	0	0	0	0	0	1	0	2
1645-1700	0	0	0	0	0	0	0	0	0	0	2	0	2
1700-1715	0	0	0	0	0	0	0	0	0	0	3	0	3
1715-1730	0	0	1	0	0	0	0	0	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	0	0	5	0	5
1745-1800	0	0	0	0	1	0	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	1	0	0	0	0	0	3	0	4
1615-1715	0	0	0	0	1	0	0	0	0	0	6	0	7
1630-1730	0	0	1	0	1	0	0	0	0	0	6	0	8
1645-1745	0	0	1	0	0	0	0	0	0	0	10	0	11
1700-1800	0	0	1	0	1	0	0	0	0	0	8	0	10

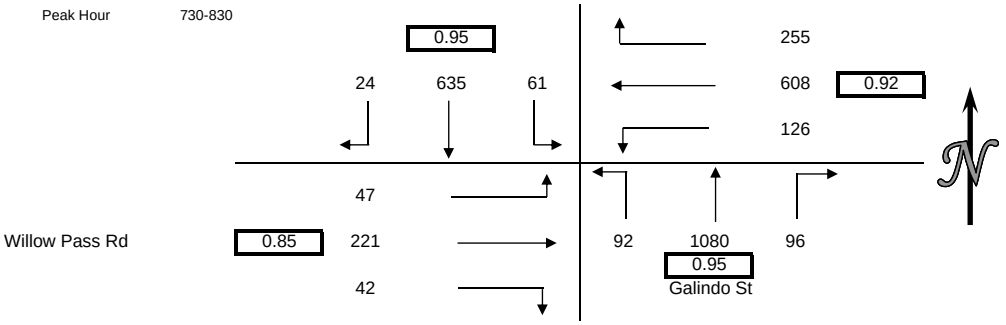
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-047
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Galindo St
	E/W	Willow Pass Rd
CITY:		Concord

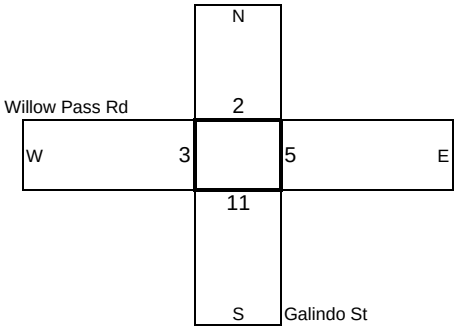
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	3	107	12	56	134	25	20	251	17	4	25	4	658
715-730	4	140	11	67	170	40	15	231	16	13	34	3	744
730-745	3	157	18	55	187	28	25	259	17	4	47	9	809
745-800	9	159	17	69	141	36	27	279	21	18	59	14	849
800-815	7	166	17	72	140	32	20	287	25	10	55	16	847
815-830	5	153	9	59	140	30	24	255	29	10	60	8	782
830-845	12	141	20	53	114	33	36	214	24	14	39	10	710
845-900	4	116	22	46	119	22	38	222	28	9	53	10	689
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	19	563	58	247	632	129	87	1020	71	39	165	30	3060
715-815	23	622	63	263	638	136	87	1056	79	45	195	42	3249
730-830	24	635	61	255	608	126	96	1080	92	42	221	47	3287
745-845	33	619	63	253	535	131	107	1035	99	52	213	48	3188
800-900	28	576	68	230	513	117	118	978	106	43	207	44	3028



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	4	0	4
715-730	2	1	1	0	4
730-745	1	1	1	1	4
745-800	0	1	4	0	5
800-815	1	2	2	1	6
815-830	0	1	4	1	6
830-845	1	1	3	2	7
845-900	0	0	6	2	8
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	3	3	10	1	17
715-815	4	5	8	2	19
730-830	2	5	11	3	21
745-845	2	5	13	4	24
800-900	2	4	15	6	27



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	1	0	0	0	0	0	0	0	0	0	0	1
730-745	0	0	0	0	0	0	0	1	0	0	0	0	1
745-800	0	1	0	0	0	0	0	0	1	0	0	0	2
800-815	0	0	0	0	2	0	0	0	0	0	0	0	2
815-830	0	0	0	0	1	0	0	0	1	0	0	0	2
830-845	0	0	0	0	1	0	0	0	0	0	2	0	3
845-900	0	0	0	0	0	1	0	0	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	2	0	0	1	0	0	1	1	0	0	0	5
715-815	0	2	0	0	2	0	0	1	1	0	0	0	6
730-830	0	1	0	0	3	0	0	1	2	0	0	0	7
745-845	0	1	0	0	4	0	0	0	2	0	2	0	9
800-900	0	0	0	0	4	1	0	0	1	0	2	0	8

National Data and Surveying Services

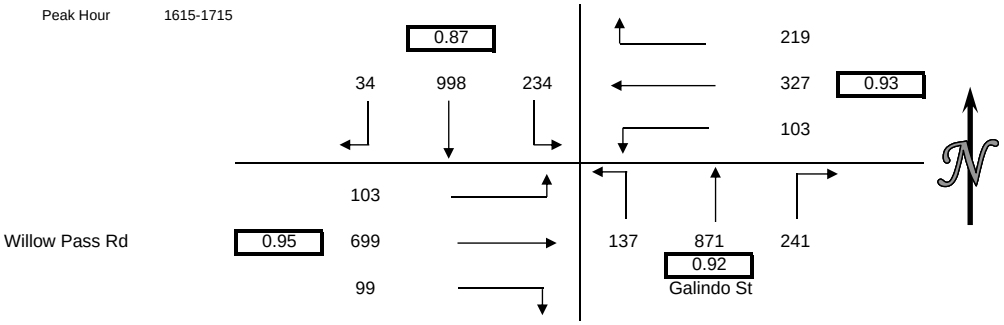
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-047
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Galindo St
	E/W	Willow Pass Rd
CITY:		Concord

VEHICLE COUNTS

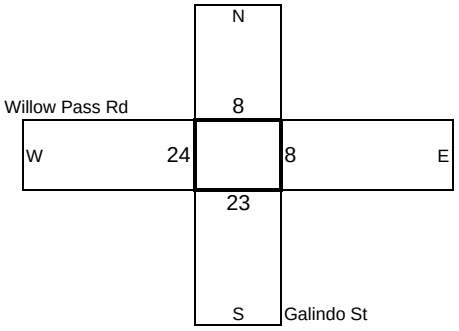
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	9	205	53	50	91	20	55	227	39	32	182	21	984
1615-1630	11	255	63	55	82	35	77	229	32	25	176	31	1071
1630-1645	6	223	53	59	74	19	50	214	35	23	182	33	971
1645-1700	11	286	65	45	85	20	55	237	28	31	156	19	1038
1700-1715	6	234	53	60	86	29	59	191	42	20	185	20	985
1715-1730	3	270	60	63	74	22	60	239	29	19	166	22	1027
1730-1745	12	211	60	67	85	28	64	184	24	34	184	24	977
1745-1800	8	287	64	53	83	13	70	240	25	26	169	28	1066
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	37	969	234	209	332	94	237	907	134	111	696	104	4064
1615-1715	34	998	234	219	327	103	241	871	137	99	699	103	4065
1630-1730	26	1013	231	227	319	90	224	881	134	93	689	94	4021
1645-1745	32	1001	238	235	330	99	238	851	123	104	691	85	4027
1700-1800	29	1002	237	243	328	92	253	854	120	99	704	94	4055

Peak Hour 1615-1715



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	1	1	9	6	17
1615-1630	1	1	5	0	7
1630-1645	4	4	10	7	25
1645-1700	2	1	5	9	17
1700-1715	1	2	3	8	14
1715-1730	8	5	6	7	26
1730-1745	10	1	13	3	27
1745-1800	8	0	3	2	13
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	8	7	29	22	66
1615-1715	8	8	23	24	63
1630-1730	15	12	24	31	82
1645-1745	21	9	27	27	84
1700-1800	27	8	25	20	80



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	1	0	0	0	0	1	0	0	2
1615-1630	0	0	0	0	0	0	0	1	0	0	2	0	3
1630-1645	0	0	0	0	0	0	0	0	0	1	0	0	1
1645-1700	0	0	0	0	0	0	0	1	0	0	2	0	3
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	1	0	0	0	1	0	2	0	4
1730-1745	0	0	0	1	0	0	0	0	0	0	1	1	3
1745-1800	0	0	0	0	2	0	0	0	0	0	5	0	7
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	1	0	0	2	0	2	4	0	9
1615-1715	0	0	0	0	0	0	0	2	0	1	4	0	7
1630-1730	0	0	0	0	1	0	0	1	1	1	4	0	8
1645-1745	0	0	0	1	1	0	0	1	1	0	5	1	10
1700-1800	0	0	0	1	3	0	0	0	1	0	8	1	14

National Data and Surveying Services

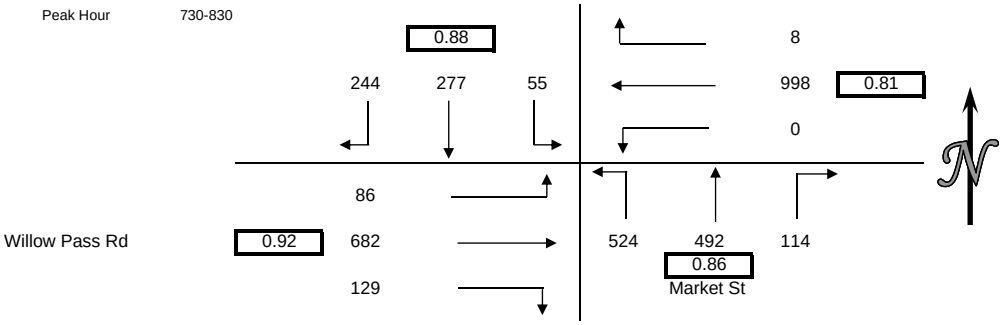
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-048
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Market St
	E/W	Willow Pass Rd
CITY:		Concord

VEHICLE COUNTS

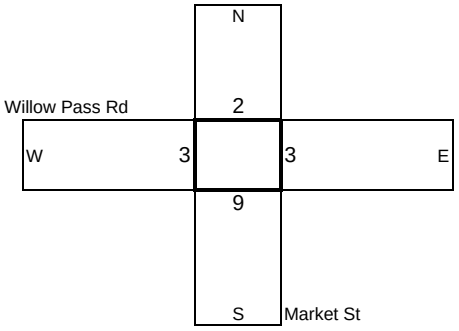
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	33	70	8	2	186	0	21	98	97	20	108	9	652
715-730	56	75	11	4	264	0	21	78	115	31	131	6	792
730-745	50	77	14	1	308	0	27	96	132	36	177	19	937
745-800	76	77	10	3	279	0	33	153	144	30	184	31	1020
800-815	63	64	20	1	206	0	29	118	116	30	150	16	813
815-830	55	59	11	3	205	0	25	125	132	33	171	20	839
830-845	70	57	11	1	196	0	20	122	105	30	131	25	768
845-900	44	54	11	5	174	0	38	131	103	34	149	26	769
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	215	299	43	10	1037	0	102	425	488	117	600	65	3401
715-815	245	293	55	9	1057	0	110	445	507	127	642	72	3562
730-830	244	277	55	8	998	0	114	492	524	129	682	86	3609
745-845	264	257	52	8	886	0	107	518	497	123	636	92	3440
800-900	232	234	53	10	781	0	112	496	456	127	601	87	3189

Peak Hour 730-830



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	0	4	2	7
715-730	0	0	2	0	2
730-745	1	0	4	1	6
745-800	1	0	2	1	4
800-815	0	2	1	0	3
815-830	0	1	2	1	4
830-845	2	0	0	0	2
845-900	4	0	4	1	9
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	3	0	12	4	19
715-815	2	2	9	2	15
730-830	2	3	9	3	17
745-845	3	3	5	2	13
800-900	6	3	7	2	18



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	1	0	0	1	0	0	0	0	2
745-800	1	0	0	0	2	0	0	0	0	0	0	0	3
800-815	1	0	0	0	4	0	0	0	0	0	0	0	5
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	1	0	0	0	0	0	0	1	2
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	1	0	0	0	4	0	0	1	0	0	0	0	6
715-815	2	0	0	0	7	0	0	1	0	0	0	0	10
730-830	2	0	0	0	7	0	0	1	0	0	0	0	10
745-845	2	0	0	0	7	0	0	0	0	0	0	1	10
800-900	1	0	0	0	5	0	0	0	0	0	0	1	7

National Data and Surveying Services

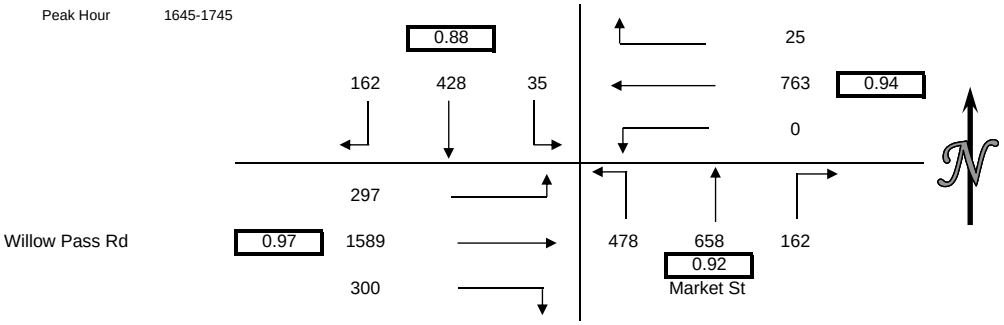
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-048
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Market St
	E/W	Willow Pass Rd
CITY:		Concord

VEHICLE COUNTS

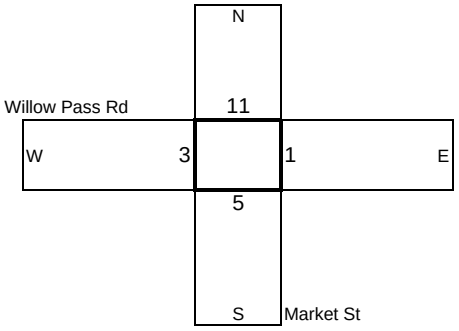
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	40	79	11	3	189	0	37	132	126	101	351	76	1145
1615-1630	37	122	7	5	217	0	34	153	119	74	368	53	1189
1630-1645	36	91	8	2	205	0	45	140	129	94	381	89	1220
1645-1700	54	110	13	4	203	0	34	174	118	73	394	62	1239
1700-1715	37	98	9	12	197	0	36	136	121	76	395	90	1207
1715-1730	37	107	9	4	163	0	39	180	108	87	404	69	1207
1730-1745	34	113	4	5	200	0	53	168	131	64	396	76	1244
1745-1800	42	93	11	3	195	0	49	147	95	80	374	60	1149
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	167	402	39	14	814	0	150	599	492	342	1494	280	4793
1615-1715	164	421	37	23	822	0	149	603	487	317	1538	294	4855
1630-1730	164	406	39	22	768	0	154	630	476	330	1574	310	4873
1645-1745	162	428	35	25	763	0	162	658	478	300	1589	297	4897
1700-1800	150	411	33	24	755	0	177	631	455	307	1569	295	4807

Peak Hour 1645-1745



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	1	0	3	3	7
1615-1630	6	0	3	2	11
1630-1645	2	0	1	1	4
1645-1700	9	0	0	1	10
1700-1715	1	1	2	0	4
1715-1730	0	0	1	2	3
1730-1745	1	0	2	0	3
1745-1800	0	0	2	0	2
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	18	0	7	7	32
1615-1715	18	1	6	4	29
1630-1730	12	1	4	4	21
1645-1745	11	1	5	3	20
1700-1800	2	1	7	2	12



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	2	1	3
1615-1630	0	0	0	0	0	0	0	0	0	0	1	0	1
1630-1645	0	0	0	0	2	0	0	0	0	0	2	1	5
1645-1700	0	0	0	0	0	0	0	0	0	0	1	0	1
1700-1715	0	0	2	0	1	1	0	0	0	0	0	0	4
1715-1730	0	1	1	0	0	0	1	0	0	0	4	0	7
1730-1745	0	0	0	0	0	0	0	0	0	0	4	0	4
1745-1800	1	0	0	0	0	0	1	0	0	1	0	0	3
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	2	0	0	0	0	0	6	2	10
1615-1715	0	0	2	0	3	1	0	0	0	0	4	1	11
1630-1730	0	1	3	0	3	1	1	0	0	0	7	1	17
1645-1745	0	1	3	0	1	1	1	0	0	0	9	0	16
1700-1800	1	1	3	0	1	1	2	0	0	1	8	0	18

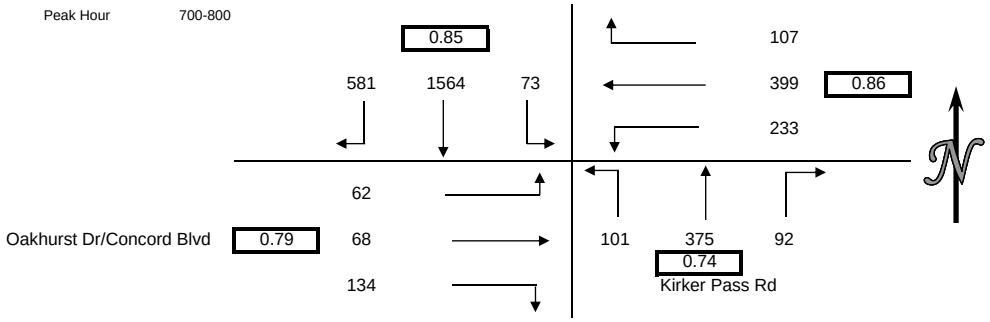
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-049
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Kirker Pass Rd
	E/W	Oakhurst Dr/Concord Blvd
CITY:		Concord

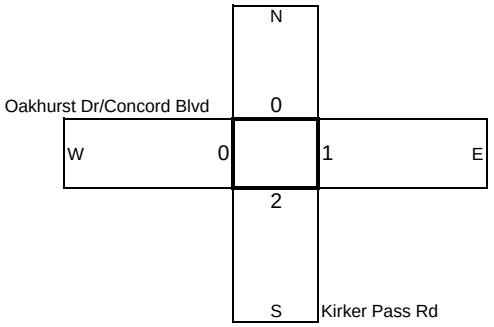
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	175	456	15	15	96	63	14	80	21	21	21	9	986
715-730	177	462	16	32	118	61	20	80	21	35	9	12	1043
730-745	143	334	20	38	122	54	18	100	21	45	17	22	934
745-800	86	312	22	22	63	55	40	115	38	33	21	19	826
800-815	91	287	33	30	68	49	32	96	31	30	31	18	796
815-830	76	282	20	30	83	82	27	111	32	29	31	25	828
830-845	54	298	16	18	73	66	31	85	19	29	17	19	725
845-900	46	243	6	8	50	62	32	65	15	30	30	14	601
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	581	1564	73	107	399	233	92	375	101	134	68	62	3789
715-815	497	1395	91	122	371	219	110	391	111	143	78	71	3599
730-830	396	1215	95	120	336	240	117	422	122	137	100	84	3384
745-845	307	1179	91	100	287	252	130	407	120	121	100	81	3175
800-900	267	1110	75	86	274	259	122	357	97	118	109	76	2950



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	1	0	0	1
730-745	0	0	1	0	1
745-800	0	0	1	0	1
800-815	0	0	0	0	0
815-830	1	0	1	0	2
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	1	2	0	3
715-815	0	1	2	0	3
730-830	1	0	3	0	4
745-845	1	0	2	0	3
800-900	1	0	1	0	2



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	1	1	0	0	0	0	1	0	3
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	1	0	0	0	0	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	1	0	0	0	1	0	0	0	0	0	2
830-845	0	0	0	0	0	0	0	0	0	0	1	0	1
845-900	0	0	0	0	1	0	1	0	0	0	0	0	2
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	1	1	0	0	0	1	0	4
715-815	0	0	0	0	1	1	1	0	0	0	1	0	4
730-830	0	0	1	0	0	0	2	0	0	0	0	0	3
745-845	0	0	1	0	0	0	2	0	0	0	1	0	4
800-900	0	0	1	0	1	0	2	0	0	0	1	0	5

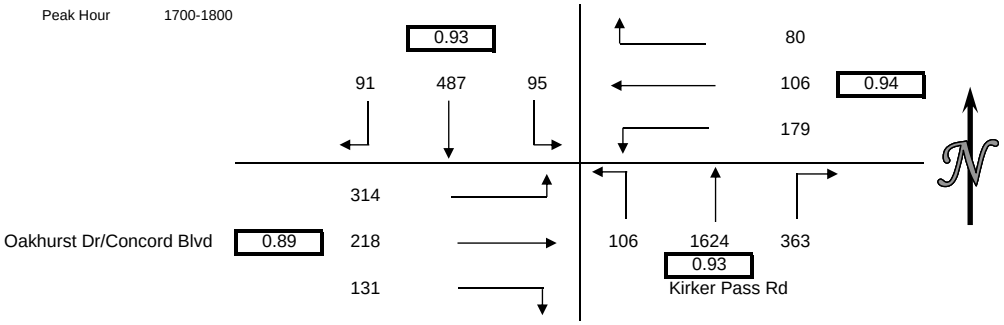
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-049
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Kirker Pass Rd
	E/W	Oakhurst Dr/Concord Blvd
CITY:		Concord

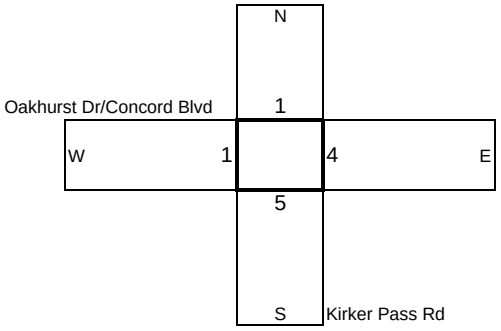
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	12	92	8	19	27	39	79	333	40	31	35	59	774
1615-1630	23	82	18	19	20	46	86	351	30	44	51	74	844
1630-1645	17	112	17	25	41	47	78	343	40	32	42	68	862
1645-1700	15	120	11	20	30	30	85	368	33	33	60	80	885
1700-1715	22	122	27	17	22	40	87	350	32	29	49	60	857
1715-1730	26	134	21	14	32	51	93	434	28	34	67	74	1008
1730-1745	21	113	25	26	34	33	81	408	18	35	57	95	946
1745-1800	22	118	22	23	18	55	102	432	28	33	45	85	983
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	67	406	54	83	118	162	328	1395	143	140	188	281	3365
1615-1715	77	436	73	81	113	163	336	1412	135	138	202	282	3448
1630-1730	80	488	76	76	125	168	343	1495	133	128	218	282	3612
1645-1745	84	489	84	77	118	154	346	1560	111	131	233	309	3696
1700-1800	91	487	95	80	106	179	363	1624	106	131	218	314	3794



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	1	0	1	2
1630-1645	0	0	0	0	0
1645-1700	0	0	2	0	2
1700-1715	0	2	0	0	2
1715-1730	0	0	4	1	5
1730-1745	0	1	0	0	1
1745-1800	1	1	1	0	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	1	2	1	4
1615-1715	0	3	2	1	6
1630-1730	0	2	6	1	9
1645-1745	0	3	6	1	10
1700-1800	1	4	5	1	11



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	1	0	0	0	0	0	0	0	0	0	0	0	1
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	2	0	0	0	0	0	2
1700-1715	0	0	0	0	0	2	0	0	0	0	0	0	2
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	1	0	0	0	0	0	2	0	0	0	0	0	3
1615-1715	0	0	0	0	0	2	2	0	0	0	0	0	4
1630-1730	0	0	0	0	0	2	2	0	0	0	0	0	4
1645-1745	0	0	0	0	0	2	2	0	0	0	0	0	4
1700-1800	0	0	0	0	0	2	0	0	0	0	0	0	2

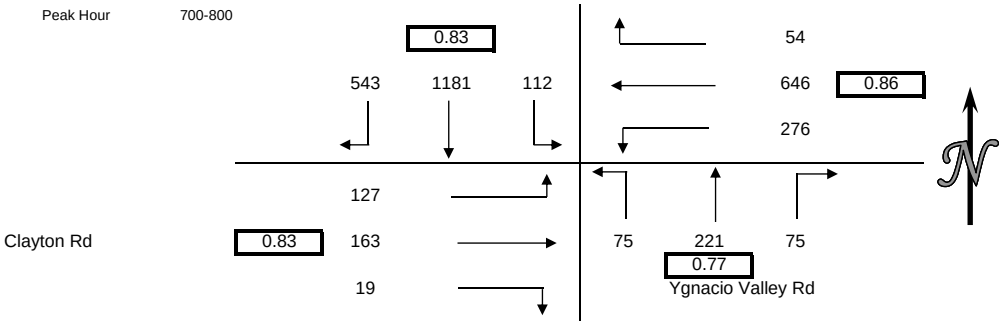
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-050
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Ygnacio Valley Rd
	E/W	Clayton Rd
CITY:		Concord

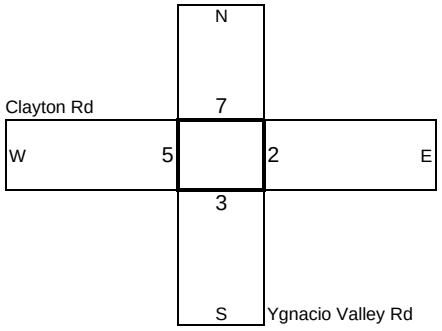
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	145	381	24	13	161	73	23	40	11	7	37	27	942
715-730	129	338	22	18	193	73	13	47	20	3	33	30	919
730-745	175	263	25	13	159	56	19	56	22	6	41	32	867
745-800	94	199	41	10	133	74	20	78	22	3	52	38	764
800-815	90	244	30	23	106	96	15	80	31	13	52	40	820
815-830	73	239	29	19	123	92	34	86	19	11	47	36	808
830-845	74	268	36	20	129	87	25	83	25	7	46	49	849
845-900	67	185	44	14	109	58	23	66	28	15	81	44	734
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	543	1181	112	54	646	276	75	221	75	19	163	127	3492
715-815	488	1044	118	64	591	299	67	261	95	25	178	140	3370
730-830	432	945	125	65	521	318	88	300	94	33	192	146	3259
745-845	331	950	136	72	491	349	94	327	97	34	197	163	3241
800-900	304	936	139	76	467	333	97	315	103	46	226	169	3211



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	2	1	1	2	6
715-730	4	0	2	1	7
730-745	1	1	0	2	4
745-800	0	0	0	0	0
800-815	2	0	1	1	4
815-830	1	0	2	1	4
830-845	0	0	1	0	1
845-900	1	0	0	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	7	2	3	5	17
715-815	7	1	3	4	15
730-830	4	1	3	4	12
745-845	3	0	4	2	9
800-900	4	0	4	2	10



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	1	0	0	0	0	0	0	0	1
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	1	0	0	0	0	1
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	1	0	0	1
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	1	0	0	1	0	0	0	0	2
715-815	0	0	0	0	0	0	0	1	0	0	0	0	1
730-830	0	0	0	0	0	0	0	1	0	1	0	0	2
745-845	0	0	0	0	0	0	0	1	0	1	0	0	2
800-900	0	0	0	0	0	0	0	0	0	1	0	0	1

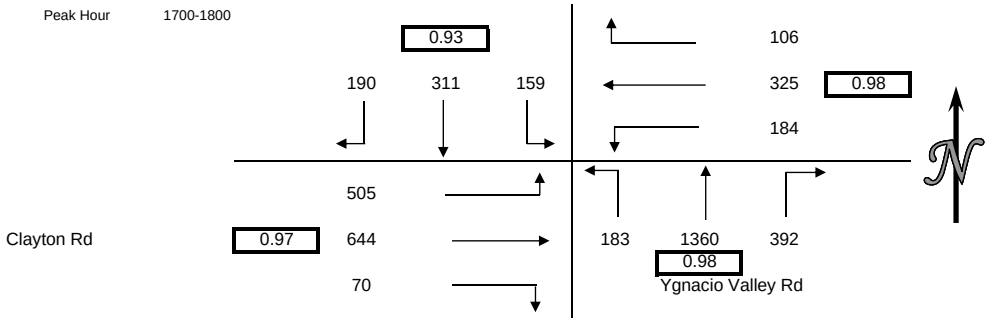
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-050
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Ygnacio Valley Rd
	E/W	Clayton Rd
CITY:		Concord

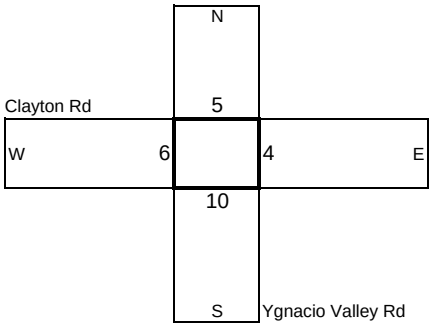
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	47	84	39	41	116	48	102	284	56	32	124	75	1048
1615-1630	38	65	34	23	82	47	65	330	60	22	174	103	1043
1630-1645	33	72	27	31	78	52	91	287	33	20	137	103	964
1645-1700	38	81	36	25	95	40	88	292	42	17	182	110	1046
1700-1715	51	81	33	28	72	54	106	343	44	25	142	133	1112
1715-1730	55	84	38	27	81	49	92	352	46	20	178	115	1137
1730-1745	42	77	54	28	83	41	84	331	45	11	153	135	1084
1745-1800	42	69	34	23	89	40	110	334	48	14	171	122	1096
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	156	302	136	120	371	187	346	1193	191	91	617	391	4101
1615-1715	160	299	130	107	327	193	350	1252	179	84	635	449	4165
1630-1730	177	318	134	111	326	195	377	1274	165	82	639	461	4259
1645-1745	186	323	161	108	331	184	370	1318	177	73	655	493	4379
1700-1800	190	311	159	106	325	184	392	1360	183	70	644	505	4429



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	3	2	2	1	8
1615-1630	2	0	1	1	4
1630-1645	0	1	4	2	7
1645-1700	2	2	2	2	8
1700-1715	2	3	6	1	12
1715-1730	1	1	0	0	2
1730-1745	1	0	3	4	8
1745-1800	1	0	1	1	3
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	7	5	9	6	27
1615-1715	6	6	13	6	31
1630-1730	5	7	12	5	29
1645-1745	6	6	11	7	30
1700-1800	5	4	10	6	25



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	1	0	0	0	1
1630-1645	0	0	0	0	0	0	0	1	0	0	0	0	1
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	1	0	1
1715-1730	0	0	0	0	0	0	1	0	0	0	0	0	1
1730-1745	0	0	0	0	0	0	0	0	2	0	1	0	3
1745-1800	0	0	0	0	0	0	0	2	1	0	0	1	4
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	1	1	0	0	0	2
1615-1715	0	0	0	0	0	0	0	1	1	0	1	0	3
1630-1730	0	0	0	0	0	0	1	1	0	0	1	0	3
1645-1745	0	0	0	0	0	0	1	0	2	0	2	0	5
1700-1800	0	0	0	0	0	0	1	2	3	0	2	1	9

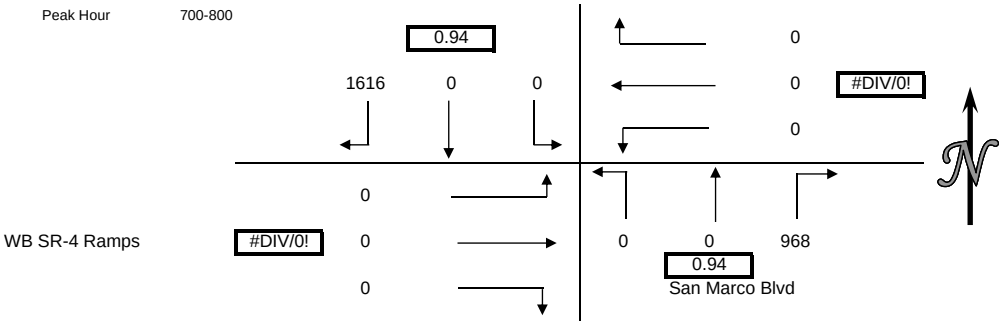
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-108
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	WB SR-4 Ramps
CITY:		Bay Point

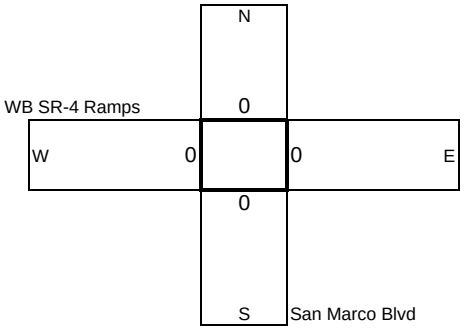
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	429	0	0	0	0	0	257	0	0	0	0	0	686
715-730	415	0	0	0	0	0	258	0	0	0	0	0	673
730-745	408	0	0	0	0	0	235	0	0	0	0	0	643
745-800	364	0	0	0	0	0	218	0	0	0	0	0	582
800-815	264	0	0	0	0	0	172	0	0	0	0	0	436
815-830	241	0	0	0	0	0	148	0	0	0	0	0	389
830-845	191	0	0	0	0	0	207	0	0	0	0	0	398
845-900	147	0	0	0	0	0	108	0	0	0	0	0	255
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	1616	0	0	0	0	0	968	0	0	0	0	0	2584
715-815	1451	0	0	0	0	0	883	0	0	0	0	0	2334
730-830	1277	0	0	0	0	0	773	0	0	0	0	0	2050
745-845	1060	0	0	0	0	0	745	0	0	0	0	0	1805
800-900	843	0	0	0	0	0	635	0	0	0	0	0	1478



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	0	0	0	0	0
730-830	0	0	0	0	0
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

National Data and Surveying Services

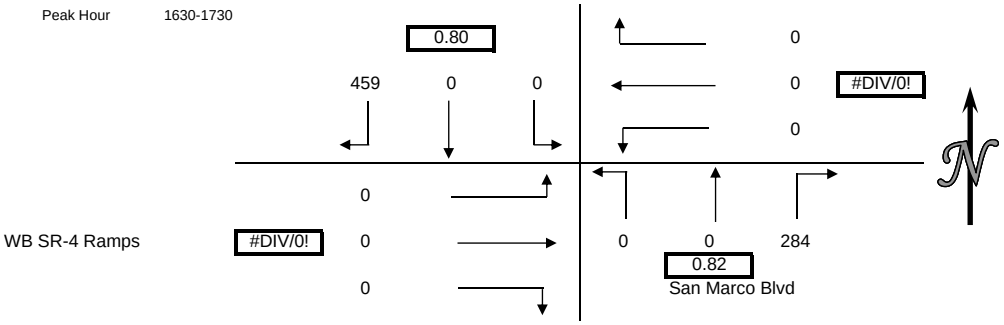
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-108
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	San Marco Blvd
	E/W	WB SR-4 Ramps
CITY:		Bay Point

VEHICLE COUNTS

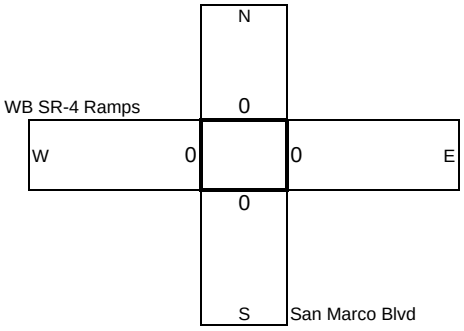
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	98	0	0	0	0	0	70	0	0	0	0	0	168
1615-1630	99	0	0	0	0	0	63	0	0	0	0	0	162
1630-1645	109	0	0	0	0	0	87	0	0	0	0	0	196
1645-1700	144	0	0	0	0	0	50	0	0	0	0	0	194
1700-1715	105	0	0	0	0	0	77	0	0	0	0	0	182
1715-1730	101	0	0	0	0	0	70	0	0	0	0	0	171
1730-1745	98	0	0	0	0	0	90	0	0	0	0	0	188
1745-1800	102	0	0	0	0	0	82	0	0	0	0	0	184
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	450	0	0	0	0	0	270	0	0	0	0	0	720
1615-1715	457	0	0	0	0	0	277	0	0	0	0	0	734
1630-1730	459	0	0	0	0	0	284	0	0	0	0	0	743
1645-1745	448	0	0	0	0	0	287	0	0	0	0	0	735
1700-1800	406	0	0	0	0	0	319	0	0	0	0	0	725

Peak Hour 1630-1730



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0

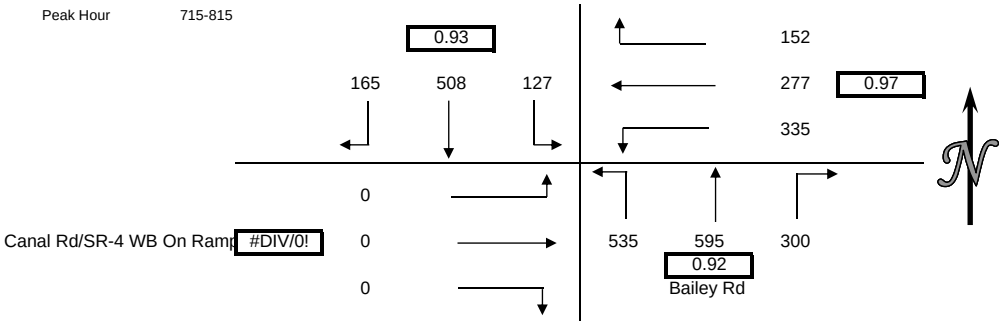
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-121
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Canal Rd/SR-4 WB On Ramp
CITY:		Bay Point

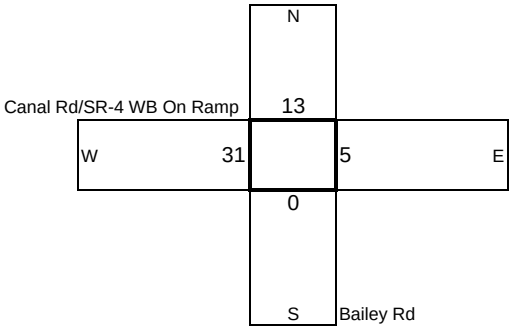
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	51	92	11	11	87	65	55	125	139	0	0	0	636
715-730	63	99	21	27	85	84	57	143	170	0	0	0	749
730-745	41	139	36	20	81	87	74	149	166	0	0	0	793
745-800	28	130	53	50	64	81	97	147	114	0	0	0	764
800-815	33	140	17	55	47	83	72	156	85	0	0	0	688
815-830	29	95	13	17	43	44	72	162	78	0	0	0	553
830-845	36	110	6	6	47	49	53	129	67	0	0	0	503
845-900	33	90	11	8	55	44	48	104	83	0	0	0	476
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	183	460	121	108	317	317	283	564	589	0	0	0	2942
715-815	165	508	127	152	277	335	300	595	535	0	0	0	2994
730-830	131	504	119	142	235	295	315	614	443	0	0	0	2798
745-845	126	475	89	128	201	257	294	594	344	0	0	0	2508
800-900	131	435	47	86	192	220	245	551	313	0	0	0	2220



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	1	0	8	10
715-730	2	0	0	8	10
730-745	3	1	0	10	14
745-800	2	3	0	2	7
800-815	6	1	0	11	18
815-830	2	0	0	7	9
830-845	1	1	0	10	12
845-900	2	0	0	3	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	8	5	0	28	41
715-815	13	5	0	31	49
730-830	13	5	0	30	48
745-845	11	5	0	30	46
800-900	11	2	0	31	44



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	2	1	0	0	0	0	0	3
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	1	0	0	0	0	0	1	0	0	0	0	2
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	1	0	0	0	0	1
830-845	0	0	0	0	0	0	1	0	0	0	0	0	1
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	1	0	0	0	2	1	1	0	0	0	0	5
715-815	0	1	0	0	0	0	0	1	0	0	0	0	2
730-830	0	1	0	0	0	0	0	2	0	0	0	0	3
745-845	0	0	0	0	0	0	1	1	0	0	0	0	2
800-900	0	0	0	0	0	0	1	1	0	0	0	0	2

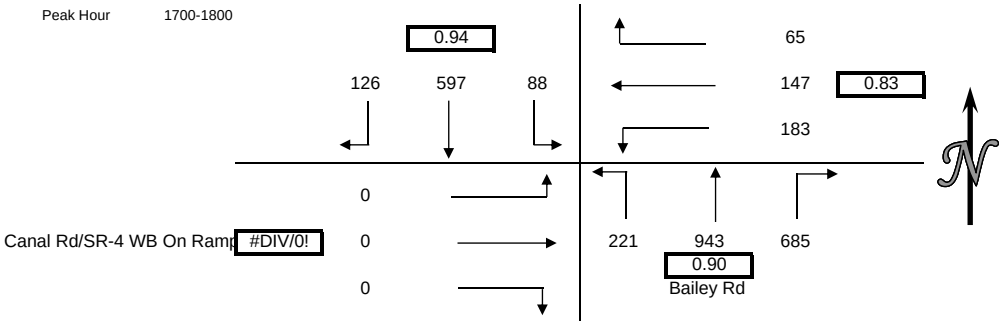
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-121
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Bailey Rd
	E/W	Canal Rd/SR-4 WB On Ramp
CITY:		Bay Point

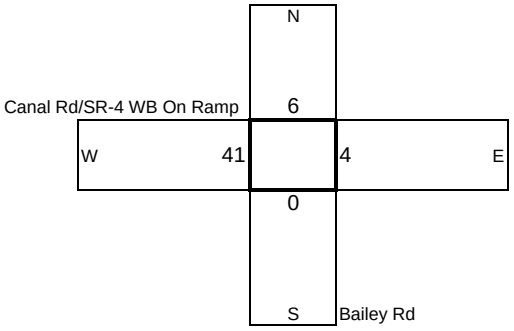
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	35	103	13	6	43	32	111	211	60	0	0	0	614
1615-1630	41	134	16	12	47	34	124	252	45	0	0	0	705
1630-1645	34	117	12	9	42	55	138	248	75	0	0	0	730
1645-1700	54	124	11	11	52	37	144	205	68	0	0	0	706
1700-1715	27	150	19	7	37	46	170	211	55	0	0	0	722
1715-1730	36	160	19	8	22	41	170	225	53	0	0	0	734
1730-1745	26	152	27	18	52	49	151	247	55	0	0	0	777
1745-1800	37	135	23	32	36	47	194	260	58	0	0	0	822
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	164	478	52	38	184	158	517	916	248	0	0	0	2755
1615-1715	156	525	58	39	178	172	576	916	243	0	0	0	2863
1630-1730	151	551	61	35	153	179	622	889	251	0	0	0	2892
1645-1745	143	586	76	44	163	173	635	888	231	0	0	0	2939
1700-1800	126	597	88	65	147	183	685	943	221	0	0	0	3055



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	2	3	0	9	14
1615-1630	4	0	0	17	21
1630-1645	3	1	0	4	8
1645-1700	1	0	0	10	11
1700-1715	0	0	0	3	3
1715-1730	1	0	0	15	16
1730-1745	1	2	0	16	19
1745-1800	4	2	0	7	13
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	10	4	0	40	54
1615-1715	8	1	0	34	43
1630-1730	5	1	0	32	38
1645-1745	3	2	0	44	49
1700-1800	6	4	0	41	51



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	1	0	0	0	0	0	0	0	0	0	0	1
1615-1630	0	0	0	0	0	0	1	0	0	0	0	0	1
1630-1645	0	0	0	0	0	0	0	2	0	0	0	0	2
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	1	1	0	0	0	0	2
1715-1730	0	0	0	0	0	0	0	2	0	0	0	0	2
1730-1745	0	0	0	0	0	0	1	3	0	0	0	0	4
1745-1800	0	0	0	0	0	0	0	1	0	0	0	0	1
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	1	0	0	0	0	1	2	0	0	0	0	4
1615-1715	0	0	0	0	0	0	2	3	0	0	0	0	5
1630-1730	0	0	0	0	0	0	1	5	0	0	0	0	6
1645-1745	0	0	0	0	0	0	2	6	0	0	0	0	8
1700-1800	0	0	0	0	0	0	2	7	0	0	0	0	9

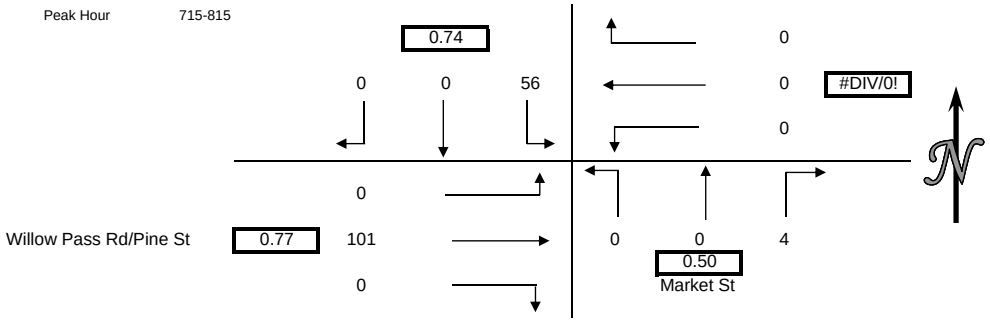
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-148
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Market St
	E/W	Willow Pass Rd/Pine St
CITY:		Concord

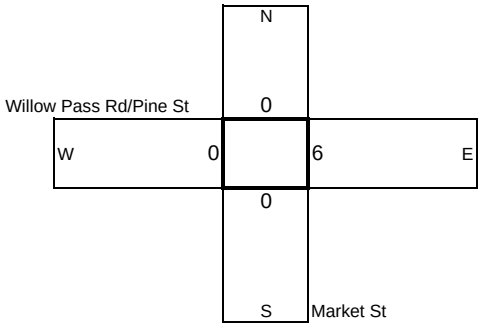
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	3	0	0	0	2	0	0	0	16	0	21
715-730	0	0	17	0	0	0	2	0	0	0	22	0	41
730-745	0	0	19	0	0	0	0	0	0	0	19	0	38
745-800	0	0	11	0	0	0	1	0	0	0	33	0	45
800-815	0	0	9	0	0	0	1	0	0	0	27	0	37
815-830	0	0	10	0	0	0	1	0	0	0	13	0	24
830-845	0	0	15	0	0	0	3	0	0	0	23	0	41
845-900	0	0	14	0	0	0	0	0	0	0	19	0	33
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	50	0	0	0	5	0	0	0	90	0	145
715-815	0	0	56	0	0	0	4	0	0	0	101	0	161
730-830	0	0	49	0	0	0	3	0	0	0	92	0	144
745-845	0	0	45	0	0	0	6	0	0	0	96	0	147
800-900	0	0	48	0	0	0	5	0	0	0	82	0	135



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	2	0	0	2
715-730	0	1	0	0	1
730-745	0	1	0	0	1
745-800	0	0	0	0	0
800-815	0	4	0	0	4
815-830	0	3	0	0	3
830-845	0	1	0	0	1
845-900	0	5	0	0	5
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	4	0	0	4
715-815	0	6	0	0	6
730-830	0	8	0	0	8
745-845	0	8	0	0	8
800-900	0	13	0	0	13



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	1	0	1	0	0	0	0	0	0	2
715-730	0	0	0	0	1	0	0	0	0	0	0	0	1
730-745	0	0	0	0	2	0	0	0	0	0	0	0	2
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	1	0	1
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	1	3	1	0	0	0	0	0	0	5
715-815	0	0	0	0	3	0	0	0	0	0	0	0	3
730-830	0	0	0	0	2	0	0	0	0	0	1	0	3
745-845	0	0	0	0	0	0	0	0	0	0	1	0	1
800-900	0	0	0	0	0	0	0	0	0	0	1	0	1

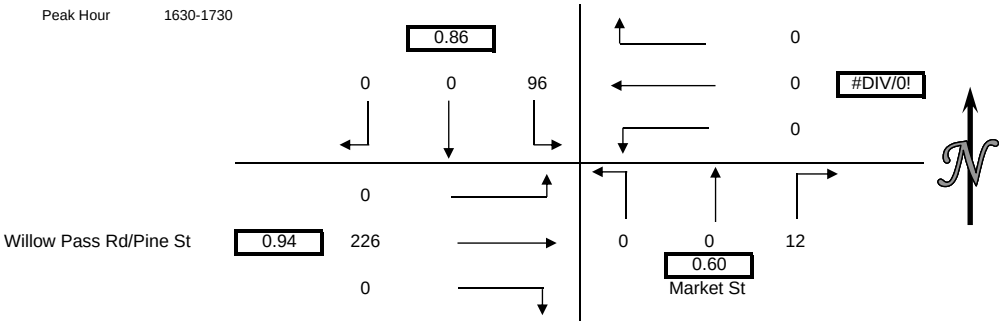
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-148
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Market St
	E/W	Willow Pass Rd/Pine St
CITY:		Concord

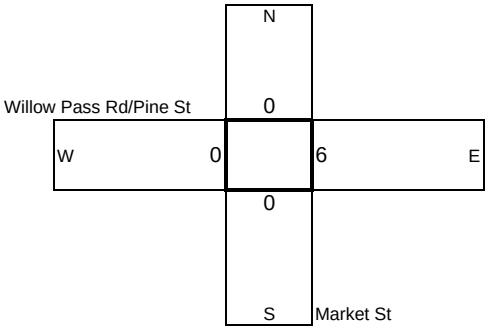
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	11	0	0	0	1	0	0	0	51	0	63
1615-1630	0	0	25	0	0	0	2	0	0	0	47	0	74
1630-1645	0	0	26	0	0	0	4	0	0	0	56	0	86
1645-1700	0	0	25	0	0	0	5	0	0	0	53	0	83
1700-1715	0	0	28	0	0	0	1	0	0	0	60	0	89
1715-1730	0	0	17	0	0	0	2	0	0	0	57	0	76
1730-1745	0	0	21	0	0	0	1	0	0	0	50	0	72
1745-1800	0	0	23	0	0	0	1	0	0	0	44	0	68
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	87	0	0	0	12	0	0	0	207	0	306
1615-1715	0	0	104	0	0	0	12	0	0	0	216	0	332
1630-1730	0	0	96	0	0	0	12	0	0	0	226	0	334
1645-1745	0	0	91	0	0	0	9	0	0	0	220	0	320
1700-1800	0	0	89	0	0	0	5	0	0	0	211	0	305



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	4	0	0	4
1615-1630	0	1	0	0	1
1630-1645	0	1	0	0	1
1645-1700	0	0	0	0	0
1700-1715	0	5	0	0	5
1715-1730	0	0	0	0	0
1730-1745	0	4	0	0	4
1745-1800	0	1	0	0	1
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	6	0	0	6
1615-1715	0	7	0	0	7
1630-1730	0	6	0	0	6
1645-1745	0	9	0	0	9
1700-1800	0	10	0	0	10



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	1	0	0	0	0	0	0	1
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	1	0	0	0	0	0	0	1
1630-1730	0	0	0	0	0	1	0	0	0	0	0	0	1
1645-1745	0	0	0	0	0	1	0	0	0	0	0	0	1
1700-1800	0	0	0	0	0	1	0	0	0	0	0	0	1

National Data and Surveying Services

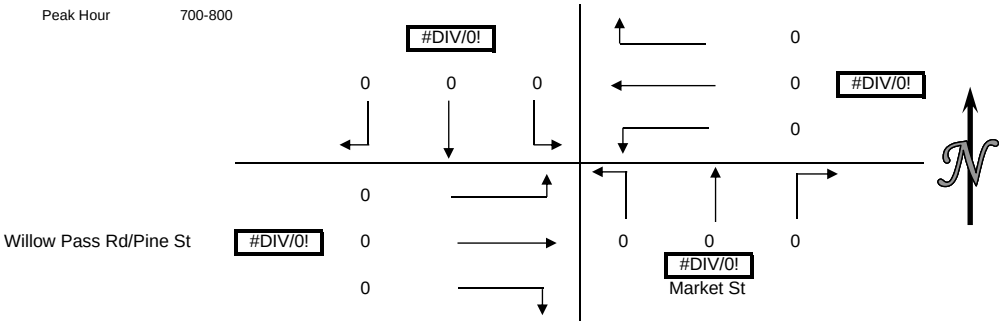
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-248
DATE:		6/7/2017
PERIOD:		700-900
		Weekday
INTERSECTION:	N/S	Market St
	E/W	Willow Pass Rd/Pine St
CITY:		Concord

VEHICLE COUNTS

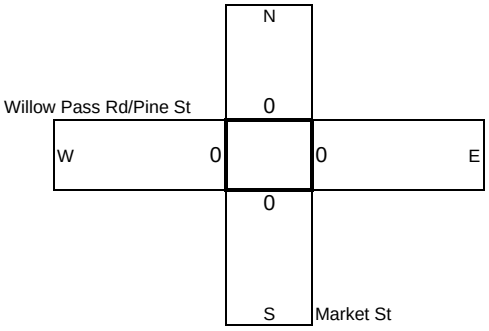
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	0	0	0	0	0	0	0	0
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	0	0	0	0	0	0	0	0
745-845	0	0	0	0	0	0	0	0	0	0	0	0	0
800-900	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour 700-800



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	0	0	0	0
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	0	0	0	0
830-845	0	0	0	0	0
845-900	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	0	0	0	0
715-815	0	0	0	0	0
730-830	0	0	0	0	0
745-845	0	0	0	0	0
800-900	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	0	0	0	0	0	0	0	0	0
715-730	0	0	0	0	0	0	0	0	0	0	0	0	0
730-745	0	0	0	0	0	0	0	0	0	0	0	0	0
745-800	0	0	0	0	0	0	0	0	0	0	0	0	0
800-815	0	0	0	0	0	0	0	0	0	0	0	0	0
815-830	0	0	0	0	0	1	0	0	0	0	0	0	1
830-845	0	0	0	0	0	0	0	0	0	0	0	0	0
845-900	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	0	0	0	0	0	0	0	0	0
715-815	0	0	0	0	0	0	0	0	0	0	0	0	0
730-830	0	0	0	0	0	1	0	0	0	0	0	0	1
745-845	0	0	0	0	0	1	0	0	0	0	0	0	1
800-900	0	0	0	0	0	1	0	0	0	0	0	0	1

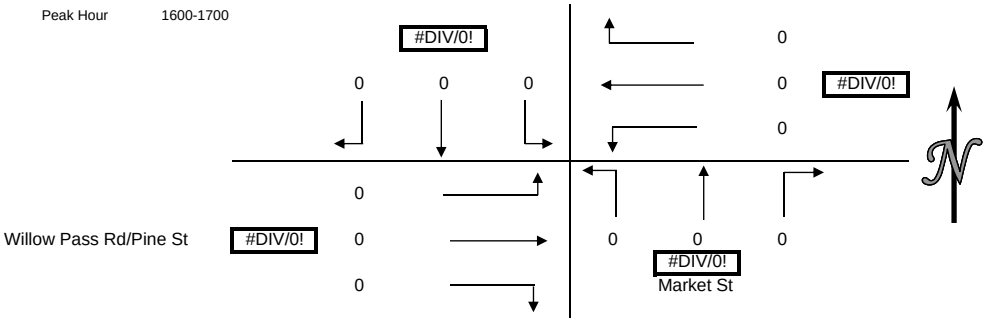
National Data and Surveying Services

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		KIMLEY-HORN
PROJECT:		17-7510-248
DATE:		6/7/2017
PERIOD:		1600-1800
		Weekday
INTERSECTION:	N/S	Market St
	E/W	Willow Pass Rd/Pine St
CITY:		Concord

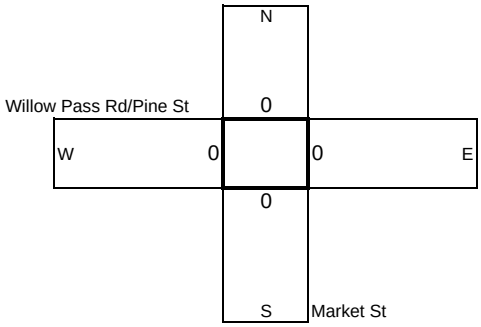
VEHICLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1615	0	0	0	0	0
1615-1630	0	0	0	0	0
1630-1645	0	0	0	0	0
1645-1700	0	0	0	0	0
1700-1715	0	0	0	0	0
1715-1730	0	0	0	0	0
1730-1745	0	0	0	0	0
1745-1800	0	0	0	0	0
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
1600-1700	0	0	0	0	0
1615-1715	0	0	0	0	0
1630-1730	0	0	0	0	0
1645-1745	0	0	0	0	0
1700-1800	0	0	0	0	0



BICYCLE COUNTS

15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1615	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1630	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1715-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1745-1800	0	0	0	0	0	0	0	0	0	0	0	0	0
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0
1615-1715	0	0	0	0	0	0	0	0	0	0	0	0	0
1630-1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1645-1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0

Existing Traffic Conditions

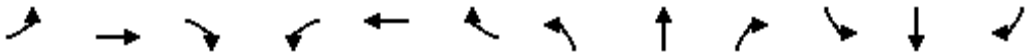
Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	16	616	1	3	1189
Future Vol, veh/h	0	16	616	1	3	1189
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	655	1	3	1265

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1295	328	0	0	656	0
Stage 1	656	-	-	-	-	-
Stage 2	639	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	154	668	-	-	927	-
Stage 1	478	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	152	668	-	-	927	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	483	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	668	927	-
HCM Lane V/C Ratio	-	-	0.025	0.003	-
HCM Control Delay (s)	-	-	10.5	8.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	183	2	226	0	0	0	0	295	337	32	966	0
Future Volume (vph)	183	2	226	0	0	0	0	295	337	32	966	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	201	2	248	0	0	0	0	324	370	35	1062	0

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total (vph)	203	248	162	162	370	389	708
Volume Left (vph)	201	0	0	0	0	35	0
Volume Right (vph)	0	248	0	0	370	0	0
Hadj (s)	0.23	-0.57	0.03	0.03	-0.67	0.08	0.03
Departure Headway (s)	6.6	3.2	6.5	6.5	3.2	5.8	5.7
Degree Utilization, x	0.37	0.22	0.29	0.29	0.33	0.63	1.13
Capacity (veh/h)	536	1122	539	538	1113	616	632
Control Delay (s)	13.4	7.1	11.0	11.0	6.6	16.7	97.9
Approach Delay (s)	9.9		8.6			69.1	
Approach LOS	A		A			F	

Intersection Summary				
Delay	38.5			
Level of Service	E			
Intersection Capacity Utilization	72.0%	ICU Level of Service	C	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	143.6
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	0	0	0	0	721	108	108	0	230	248	0	0	0	277	833
Future Vol, veh/h	0	0	0	0	0	721	108	108	0	230	248	0	0	0	277	833
Peak Hour Factor	0.92	0.98	0.98	0.98	0.92	0.98	0.98	0.98	0.92	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	736	110	110	0	235	253	0	0	0	283	850
Number of Lanes	0	0	0	0	0	1	1	1	0	0	2	0	0	0	2	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	3	3	0
HCM Control Delay	69.2	51.5	246
HCM LOS	F	F	F

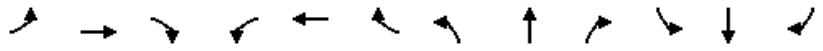
Lane	NBLn1	NBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	74%	0%	100%	74%	0%	0%	0%	0%
Vol Thru, %	26%	100%	0%	26%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	313	165	411	418	108	139	139	833
LT Vol	230	0	411	310	0	0	0	0
Through Vol	83	165	0	108	0	139	139	0
RT Vol	0	0	0	0	108	0	0	833
Lane Flow Rate	319	169	419	427	110	141	141	850
Geometry Grp	8	8	7	7	7	8	8	8
Degree of Util (X)	0.915	0.467	0.993	1.007	0.224	0.374	0.374	1.656
Departure Headway (Hd)	11.511	11.128	9.328	9.194	8.086	9.528	9.528	7.012
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	319	326	394	397	446	379	379	527
Service Time	9.211	8.828	7.028	6.894	5.786	7.268	7.268	4.751
HCM Lane V/C Ratio	1	0.518	1.063	1.076	0.247	0.372	0.372	1.613
HCM Control Delay	66.5	23.2	75	78	13.1	17.9	17.9	321.8
HCM Lane LOS	F	C	F	F	B	C	C	F
HCM 95th-tile Q	8.8	2.4	11.8	12.3	0.8	1.7	1.7	48.4

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	163	21	2	0	2	35	41	0	4	16	0	0	12	8	286
Future Vol, veh/h	0	163	21	2	0	2	35	41	0	4	16	0	0	12	8	286
Peak Hour Factor	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	251	32	3	0	3	54	63	0	6	25	0	0	18	12	440
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	15.4	10	10.1	10.4
HCM LOS	C	A	B	B

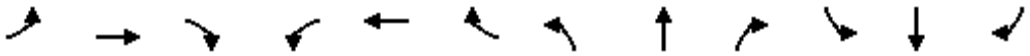
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	88%	3%	100%	0%	0%
Vol Thru, %	0%	100%	11%	45%	0%	5%	0%
Vol Right, %	0%	0%	1%	53%	0%	95%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	16	186	78	12	148	146
LT Vol	4	0	163	2	12	0	0
Through Vol	0	16	21	35	0	8	0
RT Vol	0	0	2	41	0	140	146
Lane Flow Rate	6	25	286	120	18	228	224
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.013	0.048	0.505	0.195	0.033	0.332	0.325
Departure Headway (Hd)	7.479	6.967	6.355	5.859	6.427	5.248	5.21
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	478	513	567	612	560	688	693
Service Time	5.235	4.723	4.091	3.602	4.127	2.948	2.91
HCM Lane V/C Ratio	0.013	0.049	0.504	0.196	0.032	0.331	0.323
HCM Control Delay	10.3	10.1	15.4	10	9.3	10.5	10.4
HCM Lane LOS	B	B	C	A	A	B	B
HCM 95th-tile Q	0	0.2	2.8	0.7	0.1	1.5	1.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	378	4	4	6	2	34	2	215	3	8	296	140
Future Volume (veh/h)	378	4	4	6	2	34	2	215	3	8	296	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	525	6	6	8	3	47	3	299	4	11	411	194
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	561	270	270	13	5	76	7	928	12	11	614	286
Arrive On Green	0.33	0.33	0.33	0.06	0.06	0.06	0.00	0.27	0.27	0.01	0.28	0.28
Sat Flow, veh/h	1681	810	810	211	79	1240	1681	3387	45	1681	2219	1035
Grp Volume(v), veh/h	525	0	12	58	0	0	3	148	155	11	309	296
Grp Sat Flow(s),veh/h/ln	1681	0	1621	1530	0	0	1681	1676	1755	1681	1676	1578
Q Serve(g_s), s	20.6	0.0	0.3	2.5	0.0	0.0	0.1	4.8	4.8	0.4	11.2	11.4
Cycle Q Clear(g_c), s	20.6	0.0	0.3	2.5	0.0	0.0	0.1	4.8	4.8	0.4	11.2	11.4
Prop In Lane	1.00		0.50	0.14		0.81	1.00		0.03	1.00		0.66
Lane Grp Cap(c), veh/h	561	0	541	94	0	0	7	459	481	11	464	436
V/C Ratio(X)	0.94	0.00	0.02	0.62	0.00	0.00	0.44	0.32	0.32	0.97	0.67	0.68
Avail Cap(c_a), veh/h	739	0	713	561	0	0	246	861	901	246	861	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.0	0.0	15.2	31.2	0.0	0.0	33.9	19.7	19.7	33.9	21.9	22.0
Incr Delay (d2), s/veh	14.5	0.0	0.0	2.4	0.0	0.0	15.7	0.4	0.4	68.0	1.7	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	11.7	0.0	0.2	1.1	0.0	0.0	0.1	2.3	2.4	0.4	5.4	5.2
LnGrp Delay(d),s/veh	36.5	0.0	15.3	33.6	0.0	0.0	49.6	20.1	20.1	101.8	23.5	23.8
LnGrp LOS	D		B	C			D	C	C	F	C	C
Approach Vol, veh/h		537			58			306			616	
Approach Delay, s/veh		36.1			33.6			20.4			25.1	
Approach LOS		D			C			C			C	

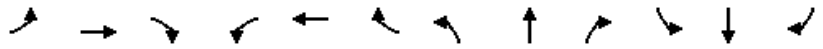
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	25.1		28.4	4.8	25.3		9.8
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	10.0	35.0		30.0	10.0	35.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	6.8		22.6	2.1	13.4		4.5
Green Ext Time (p_c), s	0.0	5.7		0.1	0.0	5.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	28.3
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	54	39	274	130	710	42	490	177	269	198	20
Future Volume (vph)	229	54	39	274	130	710	42	490	177	269	198	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	3143		1676	3353	833	1676	3208		3252	3303	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	3143		1676	3353	833	1676	3208		3252	3303	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	266	63	45	319	151	826	49	570	206	313	230	23
RTOR Reduction (vph)	0	30	0	0	0	208	0	26	0	0	5	0
Lane Group Flow (vph)	266	78	0	319	151	618	49	750	0	313	248	0
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	18.0	46.0		18.0	46.0	46.0	8.1	28.2		18.0	38.1	
Effective Green, g (s)	18.0	46.0		18.0	46.0	46.0	8.1	28.2		18.0	38.1	
Actuated g/C Ratio	0.13	0.34		0.13	0.34	0.34	0.06	0.21		0.13	0.28	
Clearance Time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	224	1077		224	1149	285	101	674		436	937	
v/s Ratio Prot	0.16	0.02		c0.19	0.05		0.03	c0.23		c0.10	0.08	
v/s Ratio Perm						c0.74						
v/c Ratio	1.19	0.07		1.42	0.13	2.17	0.49	1.11		0.72	0.26	
Uniform Delay, d1	58.1	29.7		58.1	30.4	44.1	61.0	53.0		55.7	37.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	120.1	0.0		214.8	0.1	537.8	3.6	69.8		5.6	0.2	
Delay (s)	178.2	29.8		272.9	30.4	581.9	64.7	122.8		61.2	37.4	
Level of Service	F	C		F	C	F	E	F		E	D	
Approach Delay (s)		135.4			441.6			119.4			50.6	
Approach LOS		F			F			F			D	

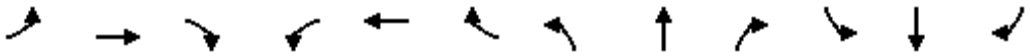
Intersection Summary			
HCM 2000 Control Delay	245.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.54		
Actuated Cycle Length (s)	134.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	132.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	0	226	0	0	0	0	1303	126	0	261	273
Future Volume (veh/h)	278	0	226	0	0	0	0	1303	126	0	261	273
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	305	0	248				0	1432	138	0	287	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	803	0	369				0	2244	216	0	1683	753
Arrive On Green	0.25	0.00	0.25				0.00	0.50	0.50	0.00	0.50	0.00
Sat Flow, veh/h	3261	0	1500				0	4628	431	0	3441	1500
Grp Volume(v), veh/h	305	0	248				0	1029	541	0	287	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1688	0	1676	1500
Q Serve(g_s), s	3.2	0.0	6.2				0.0	9.8	9.8	0.0	1.9	0.0
Cycle Q Clear(g_c), s	3.2	0.0	6.2				0.0	9.8	9.8	0.0	1.9	0.0
Prop In Lane	1.00		1.00				0.00		0.26	0.00		1.00
Lane Grp Cap(c), veh/h	803	0	369				0	1613	848	0	1683	753
V/C Ratio(X)	0.38	0.00	0.67				0.00	0.64	0.64	0.00	0.17	0.00
Avail Cap(c_a), veh/h	4300	0	1978				0	1925	1012	0	2010	899
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	13.1	0.0	14.2				0.0	7.6	7.6	0.0	5.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	2.1				0.0	0.5	1.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	2.8				0.0	4.4	4.7	0.0	0.9	0.0
LnGrp Delay(d),s/veh	13.4	0.0	16.3				0.0	8.1	8.6	0.0	5.7	0.0
LnGrp LOS	B		B					A	A		A	
Approach Vol, veh/h		553						1570			287	
Approach Delay, s/veh		14.7						8.3			5.7	
Approach LOS		B						A			A	

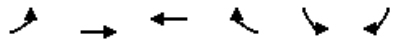
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		26.9		14.8		26.9		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		25.0		55.0		25.0		
Max Q Clear Time (g_c+I1), s		11.8		8.2		3.9		
Green Ext Time (p_c), s		9.1		2.1		12.7		

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)	24	0	308	15	20	16	345	333	0	0	1698	157
Future Volume (vph)	24	0	308	15	20	16	345	333	0	0	1698	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			*0.50	
Frpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.99	
Flt Protected	0.95		1.00		0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3252		1500		1728	1500	1676	4818			3478	
Flt Permitted	0.73		1.00		0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	2507		1500		1728	1500	1676	4818			3478	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	26	0	331	16	22	17	371	358	0	0	1826	169
RTOR Reduction (vph)	0	0	299	0	0	16	0	0	0	0	5	0
Lane Group Flow (vph)	26	0	32	0	38	1	371	358	0	0	1990	0
Confl. Bikes (#/hr)												1
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	7.6		7.6		4.0	4.0	20.2	54.7			30.5	
Effective Green, g (s)	7.6		7.6		4.0	4.0	20.2	54.7			30.5	
Actuated g/C Ratio	0.10		0.10		0.05	0.05	0.25	0.69			0.38	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	240		143		87	75	426	3323			1337	
v/s Ratio Prot					c0.02		c0.22	0.07			c0.57	
v/s Ratio Perm	0.01		c0.02			0.00						
v/c Ratio	0.11		0.22		0.44	0.01	0.87	0.11			1.49	
Uniform Delay, d1	32.8		33.1		36.6	35.8	28.3	4.1			24.4	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.1		0.6		1.3	0.0	16.9	0.0			223.8	
Delay (s)	32.9		33.7		37.8	35.8	45.2	4.1			248.2	
Level of Service	C		C		D	D	D	A			F	
Approach Delay (s)		33.6			37.2			25.0			248.2	
Approach LOS		C			D			C			F	

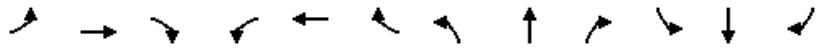
Intersection Summary			
HCM 2000 Control Delay	168.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	201	179	1185	413	241	601
Future Volume (veh/h)	201	179	1185	413	241	601
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	218	195	1288	449	262	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	348	2078	1431	934	678	312
Arrive On Green	0.11	0.62	0.43	0.43	0.21	0.00
Sat Flow, veh/h	3261	3441	3441	1458	3261	1500
Grp Volume(v), veh/h	218	195	1288	449	262	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1458	1630	1500
Q Serve(g_s), s	3.0	1.1	16.6	7.5	3.2	0.0
Cycle Q Clear(g_c), s	3.0	1.1	16.6	7.5	3.2	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	348	2078	1431	934	678	312
V/C Ratio(X)	0.63	0.09	0.90	0.48	0.39	0.00
Avail Cap(c_a), veh/h	702	2455	1444	940	1264	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.9	3.6	12.4	4.5	15.8	0.0
Incr Delay (d2), s/veh	1.8	0.0	8.0	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	1.4	0.5	9.1	4.8	1.5	0.0
LnGrp Delay(d),s/veh	21.7	3.6	20.4	4.9	16.2	0.0
LnGrp LOS	C	A	C	A	B	
Approach Vol, veh/h		413	1737		262	
Approach Delay, s/veh		13.1	16.4		16.2	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				32.8		13.7	9.0	23.8
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				34.0		18.0	10.0	20.0
Max Q Clear Time (g_c+I1), s				3.1		5.2	5.0	18.6
Green Ext Time (p_c), s				16.2		0.7	0.3	1.2

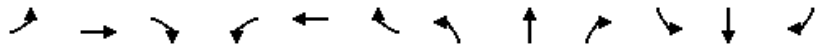
Intersection Summary	
HCM 2010 Ctrl Delay	15.8
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	219	160	251	947	5	298	15	177	9	17	9
Future Volume (veh/h)	5	219	160	251	947	5	298	15	177	9	17	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	5	233	170	267	1007	5	317	16	188	10	18	10
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	11	439	305	314	1418	7	358	529	447	21	105	58
Arrive On Green	0.01	0.23	0.23	0.19	0.41	0.41	0.21	0.30	0.30	0.01	0.10	0.10
Sat Flow, veh/h	1681	1874	1305	1681	3421	17	1681	1765	1490	1681	1058	588
Grp Volume(v), veh/h	5	207	196	267	494	518	317	16	188	10	0	28
Grp Sat Flow(s),veh/h/ln	1681	1676	1502	1681	1676	1761	1681	1765	1490	1681	0	1646
Q Serve(g_s), s	0.2	8.6	9.1	12.2	19.4	19.4	14.6	0.5	8.0	0.5	0.0	1.2
Cycle Q Clear(g_c), s	0.2	8.6	9.1	12.2	19.4	19.4	14.6	0.5	8.0	0.5	0.0	1.2
Prop In Lane	1.00		0.87	1.00		0.01	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	11	392	352	314	695	730	358	529	447	21	0	163
V/C Ratio(X)	0.45	0.53	0.56	0.85	0.71	0.71	0.88	0.03	0.42	0.48	0.00	0.17
Avail Cap(c_a), veh/h	370	611	548	676	927	974	450	643	543	697	0	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.4	26.6	26.8	31.3	19.3	19.3	30.4	19.7	22.3	39.0	0.0	32.8
Incr Delay (d2), s/veh	26.3	0.6	0.7	6.4	1.1	1.0	15.8	0.0	0.3	15.9	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.0	3.8	6.2	9.1	9.6	8.3	0.3	3.3	0.3	0.0	0.6
LnGrp Delay(d),s/veh	65.7	27.2	27.6	37.6	20.4	20.4	46.2	19.7	22.6	54.9	0.0	33.1
LnGrp LOS	E	C	C	D	C	C	D	B	C	D		C
Approach Vol, veh/h		408			1279			521			38	
Approach Delay, s/veh		27.9			24.0			36.9			38.8	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	29.4	20.0	24.1	22.1	13.4	5.6	38.5
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	33.0	29.0	32.0	29.0	21.3	41.0	17.5	44.0
Max Q Clear Time (g_c+I1), s	2.2	10.0	14.2	11.1	16.6	3.2	2.2	21.4
Green Ext Time (p_c), s	0.0	0.5	0.7	6.3	0.4	0.5	0.0	6.8

Intersection Summary	
HCM 2010 Ctrl Delay	27.9
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	267	46	18	821	4	61	11	102	38	24	31
Future Volume (veh/h)	4	267	46	18	821	4	61	11	102	38	24	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	272	47	18	838	4	62	11	104	39	24	32
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	518	89	19	638	3	103	18	173	101	62	83
Arrive On Green	0.00	0.35	0.35	0.01	0.36	0.36	0.19	0.19	0.19	0.15	0.15	0.15
Sat Flow, veh/h	1681	1458	252	1681	1755	8	541	96	908	663	408	544
Grp Volume(v), veh/h	4	0	319	18	0	842	177	0	0	95	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1711	1681	0	1763	1546	0	0	1616	0	0
Q Serve(g_s), s	0.1	0.0	8.1	0.6	0.0	20.0	5.8	0.0	0.0	2.9	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	8.1	0.6	0.0	20.0	5.8	0.0	0.0	2.9	0.0	0.0
Prop In Lane	1.00		0.15	1.00		0.00	0.35		0.59	0.41		0.34
Lane Grp Cap(c), veh/h	4	0	607	19	0	642	295	0	0	245	0	0
V/C Ratio(X)	1.04	0.00	0.53	0.94	0.00	1.31	0.60	0.00	0.00	0.39	0.00	0.00
Avail Cap(c_a), veh/h	336	0	622	336	0	642	450	0	0	470	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.4	0.0	14.1	27.1	0.0	17.5	20.3	0.0	0.0	21.0	0.0	0.0
Incr Delay (d2), s/veh	226.0	0.0	0.8	81.2	0.0	151.5	2.0	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.6	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	3.9	0.7	0.0	36.6	2.6	0.0	0.0	1.4	0.0	0.0
LnGrp Delay(d),s/veh	254.0	0.0	14.8	108.3	0.0	169.0	22.3	0.0	0.0	22.0	0.0	0.0
LnGrp LOS	F		B	F		F	C			C		
Approach Vol, veh/h		323			860			177			95	
Approach Delay, s/veh		17.8			167.8			22.3			22.0	
Approach LOS		B			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		14.5	4.6	23.5		12.3	4.1	24.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	20.0		16.0	11.0	20.0
Max Q Clear Time (g_c+I1), s		7.8	2.6	10.1		4.9	2.1	22.0
Green Ext Time (p_c), s		0.6	0.0	5.3		0.3	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		107.2
HCM 2010 LOS		F

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	129	1	41	0	0	0	0	61	14	5	102	0
Future Vol, veh/h	129	1	41	0	0	0	0	61	14	5	102	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	159	1	51	0	0	0	0	75	17	6	126	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	213	213	126	-	0	0	75	0	0
Stage 1	138	138	-	-	-	-	-	-	-
Stage 2	75	75	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	775	684	924	0	-	-	1524	-	0
Stage 1	889	782	-	0	-	-	-	-	0
Stage 2	948	833	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	772	0	924	-	-	-	1524	-	-
Mov Cap-2 Maneuver	772	0	-	-	-	-	-	-	-
Stage 1	885	0	-	-	-	-	-	-	-
Stage 2	948	0	-	-	-	-	-	-	-

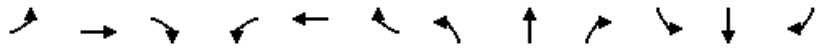
Approach	EB	NB	SB
HCM Control Delay, s	11.1	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	804	1524	-
HCM Lane V/C Ratio	-	-	0.263	0.004	-
HCM Control Delay (s)	-	-	11.1	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	20	170	107	337
Future Volume (Veh/h)	0	0	20	170	107	337
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	22	191	120	379
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	355	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	355	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	633	931	1468			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	22	191	120	379
Volume Left	22	0	0	0
Volume Right	0	0	0	379
cSH	1468	1700	1700	1700
Volume to Capacity	0.01	0.11	0.07	0.22
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.8		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		



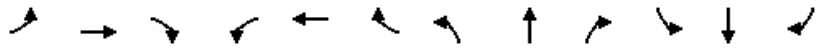
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	152	149	65	294	66	140	136	54	136	159	81
Future Volume (veh/h)	10	152	149	65	294	66	140	136	54	136	159	81
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		0.95	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	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	12	177	0	76	342	77	163	158	63	158	185	94
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	52	456	388	158	435	98	222	433	349	216	415	334
Arrive On Green	0.03	0.26	0.00	0.09	0.31	0.30	0.13	0.25	0.25	0.13	0.24	0.24
Sat Flow, veh/h	1681	1765	1500	1681	1383	311	1648	1731	1398	1648	1731	1394
Grp Volume(v), veh/h	12	177	0	76	0	419	163	158	63	158	185	94
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1695	1648	1731	1398	1648	1731	1394
Q Serve(g_s), s	0.4	5.0	0.0	2.6	0.0	13.5	5.7	4.5	2.1	5.5	5.5	3.3
Cycle Q Clear(g_c), s	0.4	5.0	0.0	2.6	0.0	13.5	5.7	4.5	2.1	5.5	5.5	3.3
Prop In Lane	1.00		1.00	1.00		0.18	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	52	456	388	158	0	533	222	433	349	216	415	334
V/C Ratio(X)	0.23	0.39	0.00	0.48	0.00	0.79	0.74	0.37	0.18	0.73	0.45	0.28
Avail Cap(c_a), veh/h	437	735	625	437	0	695	429	894	722	429	894	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	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	18.3	0.0	25.8	0.0	18.8	24.9	18.6	17.7	25.1	19.4	18.6
Incr Delay (d2), s/veh	2.2	0.5	0.0	2.3	0.0	4.5	4.7	0.5	0.2	4.7	0.8	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	0.2	2.5	0.0	1.3	0.0	7.0	2.9	2.2	0.8	2.8	2.7	1.3
LnGrp Delay(d),s/veh	30.6	18.9	0.0	28.1	0.0	23.3	29.6	19.1	17.9	29.8	20.2	19.0
LnGrp LOS	C	B		C		C	C	B	B	C	C	B
Approach Vol, veh/h		189			495			384			437	
Approach Delay, s/veh		19.6			24.0			23.4			23.4	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	18.8	5.9	23.3	11.9	19.0	9.6	19.5
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	15.0	* 30	15.0	* 24	15.0	30.0	15.0	24.0
Max Q Clear Time (g_c+I1), s	7.7	7.5	2.4	15.5	7.5	6.5	4.6	7.0
Green Ext Time (p_c), s	0.3	2.0	0.0	1.7	0.3	2.0	0.1	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	23.1
HCM 2010 LOS	C

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	400	31	40	1053	3	120	0	85	0	0	0
Future Volume (veh/h)	4	400	31	40	1053	3	120	0	85	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765			
Adj Flow Rate, veh/h	5	465	36	47	1224	3	140	0	99			
Adj No. of Lanes	1	2	1	1	2	0	1	1	1			
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	16	1380	599	117	1619	4	255	268	228			
Arrive On Green	0.01	0.41	0.41	0.07	0.47	0.47	0.15	0.00	0.15			
Sat Flow, veh/h	1681	3353	1455	1681	3431	8	1681	1765	1500			
Grp Volume(v), veh/h	5	465	36	47	598	629	140	0	99			
Grp Sat Flow(s),veh/h/ln	1681	1676	1455	1681	1676	1763	1681	1765	1500			
Q Serve(g_s), s	0.1	4.1	0.7	1.2	12.8	12.8	3.4	0.0	2.6			
Cycle Q Clear(g_c), s	0.1	4.1	0.7	1.2	12.8	12.8	3.4	0.0	2.6			
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	16	1380	599	117	791	832	255	268	228			
V/C Ratio(X)	0.32	0.34	0.06	0.40	0.76	0.76	0.55	0.00	0.44			
Avail Cap(c_a), veh/h	578	2000	868	578	1000	1052	578	607	516			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.5	8.8	7.7	19.4	9.5	9.5	17.1	0.0	16.8			
Incr Delay (d2), s/veh	10.9	0.1	0.0	2.2	1.8	1.7	1.8	0.0	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	0.1	1.9	0.3	0.6	6.2	6.5	1.7	0.0	1.2			
LnGrp Delay(d),s/veh	32.4	8.8	7.8	21.6	11.3	11.2	19.0	0.0	18.1			
LnGrp LOS	C	A	A	C	B	B	B		B			
Approach Vol, veh/h		506			1274			239				
Approach Delay, s/veh		9.0			11.6			18.6				
Approach LOS		A			B			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	8.0	23.9			5.4	26.6		11.6
Change Period (Y+Rc), s	5.0	6.0			5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	26.0			15.0	26.0		15.0
Max Q Clear Time (g_c+I1), s	3.2	6.1			2.1	14.8		5.4
Green Ext Time (p_c), s	0.0	6.9			0.0	5.3		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	442	44	13	930	166	48
Future Volume (veh/h)	442	44	13	930	166	48
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	475	47	14	1000	178	52
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1304	128	42	1918	267	238
Arrive On Green	0.42	0.42	0.03	0.57	0.16	0.16
Sat Flow, veh/h	3160	303	1681	3441	1681	1500
Grp Volume(v), veh/h	258	264	14	1000	178	52
Grp Sat Flow(s),veh/h/ln	1676	1697	1681	1676	1681	1500
Q Serve(g_s), s	4.3	4.3	0.3	7.4	4.1	1.2
Cycle Q Clear(g_c), s	4.3	4.3	0.3	7.4	4.1	1.2
Prop In Lane		0.18	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	712	721	42	1918	267	238
V/C Ratio(X)	0.36	0.37	0.33	0.52	0.67	0.22
Avail Cap(c_a), veh/h	1026	1039	576	3611	658	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.0	8.0	19.6	5.3	16.2	15.0
Incr Delay (d2), s/veh	0.3	0.3	4.5	0.2	2.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.0	0.2	3.4	2.1	0.5
LnGrp Delay(d),s/veh	8.3	8.3	24.1	5.6	19.0	15.4
LnGrp LOS	A	A	C	A	B	B
Approach Vol, veh/h	522			1014	230	
Approach Delay, s/veh	8.3			5.8	18.2	
Approach LOS	A			A	B	

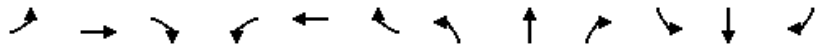
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.0	23.3				29.4		11.5
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	14.0	25.0				44.0		16.0
Max Q Clear Time (g_c+I1), s	2.3	6.3				9.4		6.1
Green Ext Time (p_c), s	0.0	10.1				13.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	436	54	48	796	147	100
Future Volume (vph)	436	54	48	796	147	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.99		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.95	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3276		1676	3353	1611	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3276		1676	3353	1611	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	501	62	55	915	169	115
RTOR Reduction (vph)	8	0	0	0	22	0
Lane Group Flow (vph)	555	0	55	915	262	0
Confl. Peds. (#/hr)		14	14		1	1
Confl. Bikes (#/hr)		2				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	22.1		6.5	61.4	21.5	
Effective Green, g (s)	23.1		7.1	62.0	22.1	
Actuated g/C Ratio	0.25		0.08	0.67	0.24	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	814		128	2237	383	
v/s Ratio Prot	c0.17		0.03	c0.27	c0.16	
v/s Ratio Perm						
v/c Ratio	0.68		0.43	0.41	0.68	
Uniform Delay, d1	31.6		41.0	7.1	32.2	
Progression Factor	1.00		1.44	0.09	1.00	
Incremental Delay, d2	1.9		2.0	0.1	5.0	
Delay (s)	33.5		61.2	0.7	37.2	
Level of Service	C		E	A	D	
Approach Delay (s)	33.5			4.1	37.2	
Approach LOS	C			A	D	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	92.9	Sum of lost time (s)	17.2
Intersection Capacity Utilization	46.3%	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 (veh/h)	218	136	355	264	863	671	51	187	23	161	440	135
Future Volume (veh/h)	218	136	355	264	863	671	51	187	23	161	440	135
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1731	1731	1800	1731	1731	1731
Adj Flow Rate, veh/h	242	151	394	293	959	746	57	208	26	179	489	150
Adj No. of Lanes	1	2	0	1	2	1	1	2	0	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	220	480	418	333	1186	509	85	815	101	256	529	444
Arrive On Green	0.13	0.29	0.27	0.20	0.35	0.35	0.05	0.28	0.27	0.08	0.31	0.31
Sat Flow, veh/h	1681	1676	1459	1681	3353	1437	1648	2942	363	3198	1731	1454
Grp Volume(v), veh/h	242	151	394	293	959	746	57	115	119	179	489	150
Grp Sat Flow(s),veh/h/ln	1681	1676	1459	1681	1676	1437	1648	1644	1661	1599	1731	1454
Q Serve(g_s), s	17.0	9.2	34.4	22.0	33.6	46.0	4.4	7.1	7.3	7.1	35.6	10.4
Cycle Q Clear(g_c), s	17.0	9.2	34.4	22.0	33.6	46.0	4.4	7.1	7.3	7.1	35.6	10.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	220	480	418	333	1186	509	85	455	460	256	529	444
V/C Ratio(X)	1.10	0.31	0.94	0.88	0.81	1.47	0.67	0.25	0.26	0.70	0.93	0.34
Avail Cap(c_a), veh/h	220	480	418	427	1186	509	127	468	473	344	546	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.51	0.51	0.51	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	56.5	36.4	46.1	50.6	38.0	42.0	60.5	36.5	36.7	58.3	43.7	35.0
Incr Delay (d2), s/veh	90.0	0.2	29.5	8.7	3.1	215.6	8.7	0.2	0.2	3.8	20.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	4.3	17.2	11.1	16.1	48.7	2.2	3.2	3.4	3.3	20.0	4.2
LnGrp Delay(d),s/veh	146.5	36.6	75.6	59.3	41.1	257.6	69.3	36.7	36.9	62.0	64.3	35.2
LnGrp LOS	F	D	E	E	D	F	E	D	D	E	E	D
Approach Vol, veh/h		787			1998			291			818	
Approach Delay, s/veh		89.9			124.6			43.2			58.5	
Approach LOS		F			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.4	40.0	29.8	41.2	10.7	43.7	21.0	50.0
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	12.9	35.5	31.9	28.5	8.9	39.5	15.9	44.5
Max Q Clear Time (g_c+I1), s	9.1	9.3	24.0	36.4	6.4	37.6	19.0	48.0
Green Ext Time (p_c), s	0.2	2.4	0.7	0.0	0.0	0.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	97.6
HCM 2010 LOS	F

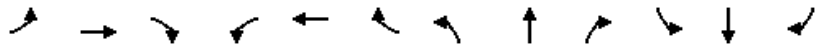
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	3	26	3	0	27	13	1061	2	12	707	108
Future Volume (vph)	134	3	26	3	0	27	13	1061	2	12	707	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1600	1474	1676	1500		1644	3287		1644	4307	
Flt Permitted	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1600	1474	1676	1500		1644	3287		1644	4307	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	143	3	28	3	0	29	14	1129	2	13	752	115
RTOR Reduction (vph)	0	0	24	0	28	0	0	0	0	0	12	0
Lane Group Flow (vph)	73	73	4	3	1	0	14	1131	0	13	855	0
Confl. Peds. (#/hr)			7	7			7		6	6		7
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	7.6	7.6	7.6	1.6	1.6		0.8	33.0		0.8	33.0	
Effective Green, g (s)	8.7	8.7	8.7	2.7	2.7		1.9	34.1		1.9	34.1	
Actuated g/C Ratio	0.14	0.14	0.14	0.04	0.04		0.03	0.54		0.03	0.54	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	218	219	202	71	63		49	1767		49	2316	
v/s Ratio Prot	c0.05	0.05		c0.00	0.00		c0.01	c0.34		0.01	0.20	
v/s Ratio Perm			0.00									
v/c Ratio	0.33	0.33	0.02	0.04	0.02		0.29	0.64		0.27	0.37	
Uniform Delay, d1	24.7	24.7	23.7	29.1	29.1		30.1	10.3		30.1	8.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	0.1	0.0		1.2	0.6		1.1	0.1	
Delay (s)	25.1	25.1	23.7	29.2	29.1		31.3	11.0		31.1	8.5	
Level of Service	C	C	C	C	C		C	B		C	A	
Approach Delay (s)		24.8			29.1			11.2			8.8	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	63.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.5%	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)	89	197	157	0	0	228	0	943	279	230	712	288
Future Volume (vph)	89	197	157	0	0	228	0	943	279	230	712	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			1.00		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.98			1.00		1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3485	1550			1611		3471	1523	3367	3471	1505
Flt Permitted		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3485	1550			1611		3471	1523	3367	3471	1505
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	91	201	160	0	0	233	0	962	285	235	727	294
RTOR Reduction (vph)	0	0	107	0	0	193	0	0	65	0	0	0
Lane Group Flow (vph)	0	292	53	0	0	40	0	962	220	235	727	294
Confl. Peds. (#/hr)			10	10			22		4	4		22
Confl. Bikes (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		22.8	28.8			22.8		79.8	79.8	13.4	86.2	130.0
Effective Green, g (s)		22.4	28.0			22.3		79.3	79.3	12.4	85.7	130.0
Actuated g/C Ratio		0.17	0.22			0.17		0.61	0.61	0.10	0.66	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		600	398			276		2117	929	321	2288	1505
v/s Ratio Prot			0.01					c0.28		c0.07	0.21	
v/s Ratio Perm		0.08	0.03			0.02			0.14			0.20
v/c Ratio		0.49	0.13			0.14		0.45	0.24	0.73	0.32	0.20
Uniform Delay, d1		48.6	41.2			45.7		13.7	11.6	57.2	9.5	0.0
Progression Factor		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1			0.1		0.7	0.6	7.2	0.4	0.3
Delay (s)		48.8	41.3			45.8		14.4	12.2	64.4	9.9	0.3
Level of Service		D	D			D		B	B	E	A	A
Approach Delay (s)		46.2			45.8			13.9			17.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	69.2%	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)	0	0	0	335	277	152	535	595	300	127	508	165
Future Volume (veh/h)	0	0	0	335	277	152	535	595	300	127	508	165
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		0.96	1.00		0.96
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1765	1800	1731	1731	1800	1731	1731	1800
Adj Flow Rate, veh/h				356	295	162	569	633	319	135	540	176
Adj No. of Lanes				0	2	0	2	3	0	1	2	0
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	2	0	4	4	4	4	4	4
Cap, veh/h				417	371	208	671	1343	605	169	771	250
Arrive On Green				0.30	0.30	0.30	0.21	0.43	0.42	0.10	0.32	0.32
Sat Flow, veh/h				1397	1241	698	3198	3150	1419	1648	2415	783
Grp Volume(v), veh/h				432	0	381	569	633	319	135	367	349
Grp Sat Flow(s),veh/h/ln				1695	0	1641	1599	1575	1419	1648	1644	1554
Q Serve(g_s), s				17.8	0.0	15.8	12.7	10.7	12.4	5.9	14.5	14.7
Cycle Q Clear(g_c), s				17.8	0.0	15.8	12.7	10.7	12.4	5.9	14.5	14.7
Prop In Lane				0.82		0.43	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h				506	0	490	671	1343	605	169	525	496
V/C Ratio(X)				0.85	0.00	0.78	0.85	0.47	0.53	0.80	0.70	0.70
Avail Cap(c_a), veh/h				753	0	729	861	1343	605	444	669	632
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh				24.5	0.0	23.8	28.2	15.3	15.9	32.6	22.2	22.3
Incr Delay (d2), s/veh				5.5	0.0	2.5	5.2	0.4	1.1	3.2	2.9	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
%ile BackOfQ(50%),veh/ln				9.0	0.0	7.4	6.1	4.7	5.0	2.9	6.9	6.7
LnGrp Delay(d),s/veh				30.0	0.0	26.3	33.4	15.7	17.0	35.8	25.1	25.5
LnGrp LOS				C		C	C	B	B	D	C	C
Approach Vol, veh/h					813			1521			851	
Approach Delay, s/veh					28.2			22.6			26.9	
Approach LOS					C			C			C	

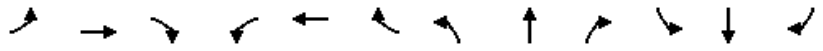
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	11.6	36.5			19.6	28.5		26.2
Change Period (Y+Rc), s	4.0	5.0			4.0	5.0		4.0
Max Green Setting (Gmax), s	20.0	30.0			20.0	30.0		33.0
Max Q Clear Time (g_c+I1), s	7.9	14.4			14.7	16.7		19.8
Green Ext Time (p_c), s	0.2	9.8			0.9	6.8		2.4

Intersection Summary		
HCM 2010 Ctrl Delay		25.2
HCM 2010 LOS		C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	231	274	492	459	40
Future Volume (veh/h)	32	231	274	492	459	40
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	33	241	285	512	478	42
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	331	296	343	2061	1028	90
Arrive On Green	0.20	0.20	0.20	0.61	0.33	0.33
Sat Flow, veh/h	1681	1500	1681	3441	3192	272
Grp Volume(v), veh/h	33	241	285	512	257	263
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1699
Q Serve(g_s), s	0.8	7.8	8.2	3.5	6.1	6.2
Cycle Q Clear(g_c), s	0.8	7.8	8.2	3.5	6.1	6.2
Prop In Lane	1.00	1.00	1.00			0.16
Lane Grp Cap(c), veh/h	331	296	343	2061	555	563
V/C Ratio(X)	0.10	0.82	0.83	0.25	0.46	0.47
Avail Cap(c_a), veh/h	833	743	666	2061	997	1010
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	19.4	19.2	4.4	13.3	13.4
Incr Delay (d2), s/veh	0.0	2.1	2.0	0.1	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	6.2	4.0	1.6	2.9	3.0
LnGrp Delay(d),s/veh	16.6	21.5	21.2	4.5	14.2	14.2
LnGrp LOS	B	C	C	A	B	B
Approach Vol, veh/h	274			797	520	
Approach Delay, s/veh	20.9			10.5	14.2	
Approach LOS	C			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		36.5		13.9	14.3	22.2		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		30.0		25.0	20.0	30.0		
Max Q Clear Time (g_c+I1), s		5.5		9.8	10.2	8.2		
Green Ext Time (p_c), s		9.9		0.4	0.3	8.3		

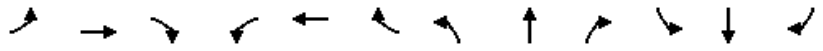
Intersection Summary	
HCM 2010 Ctrl Delay	13.5
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	288	3	4	1701	2	62	0	4	2	0	9
Future Volume (veh/h)	3	288	3	4	1701	2	62	0	4	2	0	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	356	4	5	2100	2	77	0	5	2	0	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	1618	18	11	1642	2	180	0	126	50	12	90
Arrive On Green	0.01	0.48	0.47	0.01	0.96	0.93	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1681	3396	38	1681	3437	3	1178	0	1484	49	144	1063
Grp Volume(v), veh/h	4	176	184	5	1024	1078	77	0	5	13	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1758	1681	1676	1764	1178	0	1484	1256	0	0
Q Serve(g_s), s	0.2	5.5	5.5	0.3	43.0	43.0	0.1	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.5	5.5	0.3	43.0	43.0	6.1	0.0	0.3	6.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.15		0.85
Lane Grp Cap(c), veh/h	9	799	838	11	801	843	180	0	126	153	0	0
V/C Ratio(X)	0.45	0.22	0.22	0.46	1.28	1.28	0.43	0.00	0.04	0.08	0.00	0.00
Avail Cap(c_a), veh/h	187	801	840	187	801	843	448	0	412	436	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.62	0.62	0.62	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.6	13.8	13.8	44.3	2.0	2.0	40.5	0.0	37.8	38.0	0.0	0.0
Incr Delay (d2), s/veh	10.7	0.1	0.1	6.7	131.5	131.4	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.6	2.7	0.1	39.5	41.5	1.9	0.0	0.1	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.4	13.9	13.9	50.9	133.5	133.4	41.0	0.0	37.8	38.1	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D		D	D		
Approach Vol, veh/h		364			2107			82			13	
Approach Delay, s/veh		14.3			133.2			40.8			38.1	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.6	46.9		11.7	4.5	47.0		11.7
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	42.0		25.0	10.0	42.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	7.5		8.0	2.2	45.0		8.1
Green Ext Time (p_c), s	0.0	13.7		0.1	0.0	0.0		0.1

Intersection Summary		
HCM 2010 Ctrl Delay	112.9	
HCM 2010 LOS	F	



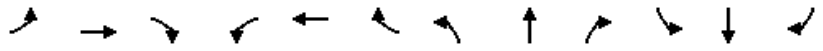
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	259	17	3	1563	12	73	1	16	23	0	16
Future Volume (veh/h)	3	259	17	3	1563	12	73	1	16	23	0	16
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	308	20	4	1861	14	87	1	19	27	0	19
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1492	96	12	1592	12	183	2	24	135	15	61
Arrive On Green	0.01	0.47	0.46	0.01	0.93	0.91	0.09	0.09	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1681	3198	207	1681	3410	26	1202	21	264	780	159	661
Grp Volume(v), veh/h	4	161	167	4	914	961	107	0	0	46	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1728	1681	1676	1760	1486	0	0	1601	0	0
Q Serve(g_s), s	0.2	5.1	5.2	0.2	42.0	42.0	3.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.1	5.2	0.2	42.0	42.0	6.2	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.12	1.00		0.01	0.81		0.18	0.59		0.41
Lane Grp Cap(c), veh/h	12	782	807	12	782	821	209	0	0	211	0	0
V/C Ratio(X)	0.32	0.21	0.21	0.32	1.17	1.17	0.51	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	187	782	807	187	782	821	486	0	0	492	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.70	0.70	0.70	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	14.2	14.2	44.1	3.0	3.0	39.8	0.0	0.0	38.2	0.0	0.0
Incr Delay (d2), s/veh	14.1	0.1	0.1	10.0	85.4	86.2	1.9	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.3	2.5	0.1	31.6	33.8	2.7	0.0	0.0	1.1	0.0	0.0
LnGrp Delay(d),s/veh	58.5	14.3	14.3	54.1	88.4	89.2	41.7	0.0	0.0	38.7	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D			D		
Approach Vol, veh/h		332			1879			107			46	
Approach Delay, s/veh		14.8			88.7			41.7			38.7	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	46.0		12.3	4.7	46.0		12.3
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	41.0		26.0	10.0	41.0		26.0
Max Q Clear Time (g_c+I1), s	2.2	7.2		4.3	2.2	44.0		8.2
Green Ext Time (p_c), s	0.0	15.0		0.5	0.0	0.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	75.2
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	330	4	11	1546	25	28
Future Volume (vph)	330	4	11	1546	25	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3346		1676	3353	1589	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3346		1676	3353	1589	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	398	5	13	1863	30	34
RTOR Reduction (vph)	0	0	0	0	30	0
Lane Group Flow (vph)	403	0	13	1863	34	0
Confl. Peds. (#/hr)		2	2			1
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	63.5		1.5	70.0	9.0	
Effective Green, g (s)	65.5		2.5	72.0	10.0	
Actuated g/C Ratio	0.73		0.03	0.80	0.11	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2435		46	2682	176	
v/s Ratio Prot	0.12		0.01	c0.56	c0.02	
v/s Ratio Perm						
v/c Ratio	0.17		0.28	0.69	0.19	
Uniform Delay, d1	3.8		42.9	4.1	36.3	
Progression Factor	1.88		1.25	0.90	1.00	
Incremental Delay, d2	0.1		2.7	1.2	0.5	
Delay (s)	7.2		56.3	4.9	36.9	
Level of Service	A		E	A	D	
Approach Delay (s)	7.2			5.2	36.9	
Approach LOS	A			A	D	

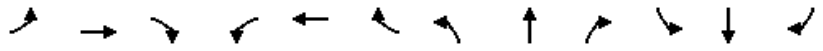
Intersection Summary			
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	256	11	10	1178	74	4	1	9	281	3	201
Future Volume (veh/h)	127	256	11	10	1178	74	4	1	9	281	3	201
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	137	275	12	11	1267	80	4	1	10	302	3	216
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	166	1618	70	22	1308	82	364	439	369	439	459	369
Arrive On Green	0.10	0.49	0.48	0.03	0.82	0.80	0.25	0.25	0.25	0.26	0.26	0.25
Sat Flow, veh/h	1681	3272	142	1681	3201	202	1148	1765	1484	1384	1765	1484
Grp Volume(v), veh/h	137	140	147	11	662	685	4	1	10	302	3	216
Grp Sat Flow(s),veh/h/ln	1681	1676	1738	1681	1676	1727	1148	1765	1484	1384	1765	1484
Q Serve(g_s), s	7.2	4.2	4.2	0.6	31.0	31.5	0.2	0.0	0.5	18.6	0.1	11.5
Cycle Q Clear(g_c), s	7.2	4.2	4.2	0.6	31.0	31.5	0.4	0.0	0.5	18.6	0.1	11.5
Prop In Lane	1.00		0.08	1.00		0.12	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	166	829	859	22	685	706	364	439	369	439	459	369
V/C Ratio(X)	0.82	0.17	0.17	0.49	0.97	0.97	0.01	0.00	0.03	0.69	0.01	0.59
Avail Cap(c_a), veh/h	187	829	859	187	745	767	436	549	462	525	569	462
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.8	12.6	12.6	43.5	7.7	7.9	25.6	25.4	25.6	31.6	24.7	29.7
Incr Delay (d2), s/veh	20.3	0.0	0.0	5.1	24.6	24.8	0.0	0.0	0.0	3.0	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	1.9	2.0	0.3	17.5	18.5	0.1	0.0	0.2	7.5	0.1	4.9
LnGrp Delay(d),s/veh	60.1	12.6	12.6	48.6	32.3	32.6	25.6	25.4	25.6	34.5	24.7	31.2
LnGrp LOS	E	B	B	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		424			1358			15			521	
Approach Delay, s/veh		27.9			32.6			25.6			33.1	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	48.5		26.4	12.9	40.8		26.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	39.0		28.0	10.0	39.0		28.0
Max Q Clear Time (g_c+I1), s	2.6	6.2		20.6	9.2	33.5		2.5
Green Ext Time (p_c), s	0.0	4.1		1.4	0.0	2.3		2.3

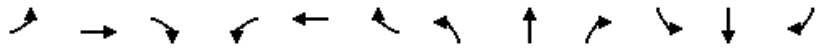
Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	497	40	2	1292	10	116	0	9	12	1	31
Future Volume (veh/h)	7	497	40	2	1292	10	116	0	9	12	1	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	7	502	40	2	1305	10	117	0	9	12	1	31
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	15	1266	101	5	1352	10	222	0	11	78	24	122
Arrive On Green	0.01	0.40	0.39	0.01	0.79	0.77	0.11	0.00	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1681	3143	250	1681	3410	26	1343	0	103	253	220	1129
Grp Volume(v), veh/h	7	267	275	2	641	674	126	0	0	44	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1716	1681	1676	1760	1446	0	0	1602	0	0
Q Serve(g_s), s	0.4	10.2	10.3	0.1	30.4	30.4	5.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	10.2	10.3	0.1	30.4	30.4	7.5	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.15	1.00		0.01	0.93		0.07	0.27		0.70
Lane Grp Cap(c), veh/h	15	675	691	5	665	698	234	0	0	224	0	0
V/C Ratio(X)	0.47	0.40	0.40	0.44	0.96	0.97	0.54	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	243	689	705	243	689	723	512	0	0	522	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	0.75	0.75	0.75	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	19.1	19.2	44.7	8.8	8.8	39.0	0.0	0.0	36.8	0.0	0.0
Incr Delay (d2), s/veh	7.1	0.2	0.2	17.5	22.9	22.3	0.7	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.7	4.9	0.1	17.0	17.8	3.1	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	51.5	19.3	19.4	62.2	31.7	31.1	39.7	0.0	0.0	37.0	0.0	0.0
LnGrp LOS	D	B	B	E	C	C	D			D		
Approach Vol, veh/h		549			1317			126			44	
Approach Delay, s/veh		19.8			31.4			39.7			37.0	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	40.2		13.7	4.8	39.7		13.7
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	13.0	36.0		28.0	13.0	36.0		28.0
Max Q Clear Time (g_c+I1), s	2.1	12.3		4.3	2.4	32.4		9.5
Green Ext Time (p_c), s	0.0	6.9		0.3	0.0	2.3		0.2

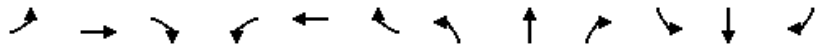
Intersection Summary		
HCM 2010 Ctrl Delay	28.9	
HCM 2010 LOS	C	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	438	56	1	1177	131	45	60	1	84	23	51
Future Volume (veh/h)	45	438	56	1	1177	131	45	60	1	84	23	51
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.97		0.96	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	47	456	58	1	1226	136	47	62	1	88	24	53
Adj No. of Lanes	0	2	0	0	2	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	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	900	130	40	1364	151	159	186	3	192	57	89
Arrive On Green	0.46	0.46	0.44	0.92	0.92	0.87	0.19	0.19	0.18	0.19	0.19	0.18
Sat Flow, veh/h	83	1966	284	0	2978	329	546	995	14	698	306	475
Grp Volume(v), veh/h	245	0	316	725	0	638	110	0	0	165	0	0
Grp Sat Flow(s),veh/h/ln	781	0	1552	1764	0	1543	1555	0	0	1480	0	0
Q Serve(g_s), s	4.9	0.0	12.6	0.0	0.0	19.1	0.0	0.0	0.0	3.4	0.0	0.0
Cycle Q Clear(g_c), s	29.4	0.0	12.6	17.4	0.0	19.1	5.3	0.0	0.0	8.7	0.0	0.0
Prop In Lane	0.19		0.18	0.00		0.21	0.43		0.01	0.53		0.32
Lane Grp Cap(c), veh/h	406	0	711	848	0	707	348	0	0	338	0	0
V/C Ratio(X)	0.60	0.00	0.45	0.85	0.00	0.90	0.32	0.00	0.00	0.49	0.00	0.00
Avail Cap(c_a), veh/h	426	0	741	883	0	737	722	0	0	681	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.00	0.99	0.71	0.00	0.71	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.3	0.0	16.7	2.8	0.0	3.2	31.8	0.0	0.0	33.2	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.2	7.9	0.0	13.0	0.5	0.0	0.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	5.4	8.3	0.0	9.0	2.4	0.0	0.0	3.8	0.0	0.0
LnGrp Delay(d),s/veh	18.7	0.0	16.9	10.7	0.0	16.1	32.3	0.0	0.0	34.3	0.0	0.0
LnGrp LOS	B		B	B		B	C			C		
Approach Vol, veh/h		561			1363			110			165	
Approach Delay, s/veh		17.7			13.2			32.3			34.3	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		43.4		20.8		43.4		20.8
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		41.0		38.0		41.0		38.0
Max Q Clear Time (g_c+I1), s		31.4		10.7		21.1		7.3
Green Ext Time (p_c), s		4.2		1.2		5.6		1.2

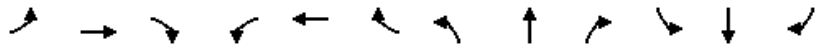
Intersection Summary		
HCM 2010 Ctrl Delay		16.9
HCM 2010 LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	482	54	38	1260	43	140	6	97	88	20	46
Future Volume (veh/h)	9	482	54	38	1260	43	140	6	97	88	20	46
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		0.99	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	9	507	57	40	1326	45	147	6	102	93	21	48
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	19	872	98	59	1028	35	177	193	154	117	35	79
Arrive On Green	0.01	0.29	0.28	0.04	0.31	0.30	0.11	0.11	0.10	0.07	0.07	0.07
Sat Flow, veh/h	1681	3037	340	1681	3305	112	1681	1765	1478	1681	471	1076
Grp Volume(v), veh/h	9	279	285	40	672	699	147	6	102	93	0	69
Grp Sat Flow(s),veh/h/ln	1681	1676	1701	1681	1676	1741	1681	1765	1478	1681	0	1546
Q Serve(g_s), s	0.5	12.8	12.9	2.1	28.0	28.0	7.7	0.3	6.0	4.9	0.0	3.9
Cycle Q Clear(g_c), s	0.5	12.8	12.9	2.1	28.0	28.0	7.7	0.3	6.0	4.9	0.0	3.9
Prop In Lane	1.00		0.20	1.00		0.06	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	19	481	489	59	522	542	177	193	154	117	0	114
V/C Ratio(X)	0.48	0.58	0.58	0.68	1.29	1.29	0.83	0.03	0.66	0.80	0.00	0.61
Avail Cap(c_a), veh/h	205	522	529	205	522	542	205	471	386	205	0	412
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	0.42	0.42	0.42	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.2	27.4	27.6	42.9	31.0	31.0	39.5	35.8	38.8	41.2	0.0	40.6
Incr Delay (d2), s/veh	6.5	1.7	1.8	2.1	135.9	136.9	18.8	0.0	1.8	4.6	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	0.3	6.1	6.3	1.0	32.6	34.0	4.5	0.1	2.5	2.4	0.0	1.7
LnGrp Delay(d),s/veh	50.8	29.2	29.3	45.1	166.9	167.9	58.3	35.8	40.6	45.8	0.0	42.5
LnGrp LOS	D	C	C	D	F	F	E	D	D	D		D
Approach Vol, veh/h		573			1411			255			162	
Approach Delay, s/veh		29.6			163.9			50.7			44.4	
Approach LOS		C			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	29.8	10.3	13.8	5.0	32.0	13.5	10.6
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	11.0	27.0	11.0	23.5	11.0	27.0	11.0	23.5
Max Q Clear Time (g_c+I1), s	14.1	14.9	6.9	8.0	2.5	30.0	9.7	5.9
Green Ext Time (p_c), s	0.0	9.0	0.0	0.3	0.0	0.0	0.0	0.3

Intersection Summary		
HCM 2010 Ctrl Delay		111.8
HCM 2010 LOS		F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	386	94	83	731	126	170	585	88	132	652	417
Future Volume (veh/h)	240	386	94	83	731	126	170	585	88	132	652	417
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	264	424	103	91	803	138	187	643	97	145	716	458
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	261	943	227	125	909	404	192	1046	457	182	1026	455
Arrive On Green	0.16	0.36	0.35	0.08	0.28	0.28	0.12	0.32	0.32	0.11	0.31	0.31
Sat Flow, veh/h	1648	2627	632	1648	3288	1460	1648	3288	1436	1648	3288	1458
Grp Volume(v), veh/h	264	264	263	91	803	138	187	643	97	145	716	458
Grp Sat Flow(s),veh/h/ln	1648	1644	1615	1648	1644	1460	1648	1644	1436	1648	1644	1458
Q Serve(g_s), s	19.0	14.7	15.0	6.5	28.1	9.1	13.6	19.9	5.9	10.3	23.0	37.4
Cycle Q Clear(g_c), s	19.0	14.7	15.0	6.5	28.1	9.1	13.6	19.9	5.9	10.3	23.0	37.4
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	590	580	125	909	404	192	1046	457	182	1026	455
V/C Ratio(X)	1.01	0.45	0.45	0.73	0.88	0.34	0.97	0.61	0.21	0.80	0.70	1.01
Avail Cap(c_a), veh/h	261	590	580	151	956	425	192	1046	457	206	1026	455
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.34	0.34	0.34	0.92	0.92	0.92	0.85	0.85	0.85
Uniform Delay (d), s/veh	50.5	29.4	29.6	54.2	41.6	34.7	52.8	34.7	29.9	52.0	36.3	41.3
Incr Delay (d2), s/veh	57.3	0.5	0.5	4.7	3.5	0.2	54.2	1.0	0.2	15.0	3.3	40.5
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	6.8	6.8	3.1	13.2	3.7	9.1	9.2	2.4	5.5	10.9	20.1
LnGrp Delay(d),s/veh	107.9	29.9	30.2	58.9	45.1	34.9	107.0	35.7	30.1	67.0	39.7	81.8
LnGrp LOS	F	C	C	E	D	C	F	D	C	E	D	F
Approach Vol, veh/h		791			1032			927			1319	
Approach Delay, s/veh		56.0			44.9			49.5			57.3	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	41.4	13.1	47.5	17.3	42.2	23.0	37.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	35.0	10.0	41.6	14.0	34.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	15.6	39.4	8.5	17.0	12.3	21.9	21.0	30.1
Green Ext Time (p_c), s	0.0	0.0	0.0	7.4	0.1	7.2	0.0	2.1

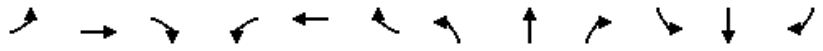
Intersection Summary	
HCM 2010 Ctrl Delay	52.1
HCM 2010 LOS	D

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	1	422	0	0	0	0	701	324	247	813	0
Future Volume (vph)	260	1	422	0	0	0	0	701	324	247	813	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.98					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.87	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1444	1482					4714		1736	3471	
Flt Permitted	0.95	0.99	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1444	1482					4714		1736	3471	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	289	1	469	0	0	0	0	779	360	274	903	0
RTOR Reduction (vph)	0	133	133	0	0	0	0	59	0	0	0	0
Lane Group Flow (vph)	260	117	116	0	0	0	0	1080	0	274	903	0
Confl. Peds. (#/hr)			3	3			9		1	1		9
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	23.0	23.0	23.0					58.3		21.7	84.0	
Effective Green, g (s)	23.1	23.1	23.1					58.4		20.7	84.1	
Actuated g/C Ratio	0.20	0.20	0.20					0.50		0.18	0.72	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	334	287	295					2373		309	2516	
v/s Ratio Prot	c0.15	0.08						c0.23		c0.16	0.26	
v/s Ratio Perm			0.08									
v/c Ratio	0.78	0.41	0.39					0.46		0.89	0.36	
Uniform Delay, d1	44.0	40.5	40.4					18.6		46.5	5.9	
Progression Factor	1.00	1.00	1.00					0.88		1.01	1.01	
Incremental Delay, d2	10.0	0.3	0.3					0.5		22.0	0.4	
Delay (s)	54.0	40.8	40.7					16.7		68.7	6.4	
Level of Service	D	D	D					B		E	A	
Approach Delay (s)		45.3			0.0			16.7			20.9	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



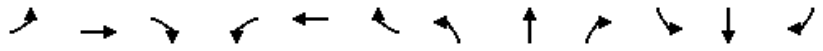
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	273	127	371	192	648	121	98	787	158
Future Volume (veh/h)	0	0	0	273	127	371	192	648	121	98	787	158
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		0.93	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1827	1900	1827	1827	1900	1827	1827	1827
Adj Flow Rate, veh/h				290	135	395	204	689	129	104	837	0
Adj No. of Lanes				0	2	0	2	2	0	1	2	1
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	4	0	4	4	4	4	4	4
Cap, veh/h				331	154	423	1195	1587	297	112	905	404
Arrive On Green				0.46	0.46	0.46	0.12	0.18	0.18	0.13	0.52	0.00
Sat Flow, veh/h				1205	561	1541	3375	2883	539	1740	3471	1553
Grp Volume(v), veh/h				425	0	395	204	414	404	104	837	0
Grp Sat Flow(s),veh/h/ln				1767	0	1541	1688	1736	1686	1740	1736	1553
Q Serve(g_s), s				25.3	0.0	28.2	6.3	24.6	24.7	6.9	25.8	0.0
Cycle Q Clear(g_c), s				25.3	0.0	28.2	6.3	24.6	24.7	6.9	25.8	0.0
Prop In Lane				0.68		1.00	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h				485	0	423	1195	955	928	112	905	404
V/C Ratio(X)				0.88	0.00	0.93	0.17	0.43	0.43	0.92	0.92	0.00
Avail Cap(c_a), veh/h				535	0	466	1195	955	928	112	1035	462
HCM Platoon Ratio				1.67	1.67	1.67	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)				0.67	0.00	0.67	0.84	0.84	0.84	0.81	0.81	0.00
Uniform Delay (d), s/veh				29.6	0.0	30.5	35.9	31.4	31.4	50.2	26.7	0.0
Incr Delay (d2), s/veh				9.8	0.0	18.5	0.0	1.2	1.2	53.4	14.0	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				13.4	0.0	14.0	3.0	12.2	11.9	5.0	13.8	0.0
LnGrp Delay(d),s/veh				39.4	0.0	48.9	35.9	32.6	32.7	103.6	40.7	0.0
LnGrp LOS				D		D	D	C	C	F	D	
Approach Vol, veh/h					820			1022			941	
Approach Delay, s/veh					44.0			33.3			47.7	
Approach LOS					D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	12.0	68.2			45.6	34.7		35.8
Change Period (Y+Rc), s	4.0	4.5			4.5	* 4.5		4.0
Max Green Setting (Gmax), s	8.0	60.5			34.0	* 35		35.0
Max Q Clear Time (g_c+I1), s	8.9	26.7			8.3	27.8		30.2
Green Ext Time (p_c), s	0.0	4.4			4.3	2.3		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	41.3
HCM 2010 LOS	D

Notes

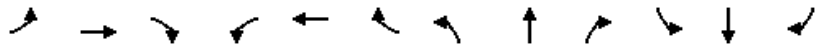
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	185	19	58	835	105	88	205	59	54	133	27
Future Volume (veh/h)	13	185	19	58	835	105	88	205	59	54	133	27
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	14	197	20	62	888	112	94	218	63	57	141	0
Adj No. of Lanes	1	2	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	1139	114	111	1396	620	138	315	267	106	281	239
Arrive On Green	0.02	0.37	0.37	0.07	0.42	0.42	0.08	0.18	0.18	0.06	0.16	0.00
Sat Flow, veh/h	1681	3068	308	1681	3353	1489	1681	1765	1497	1681	1765	1500
Grp Volume(v), veh/h	14	107	110	62	888	112	94	218	63	57	141	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1700	1681	1676	1489	1681	1765	1497	1681	1765	1500
Q Serve(g_s), s	0.5	2.4	2.4	2.0	11.8	2.7	3.0	6.5	2.0	1.8	4.1	0.0
Cycle Q Clear(g_c), s	0.5	2.4	2.4	2.0	11.8	2.7	3.0	6.5	2.0	1.8	4.1	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	35	622	631	111	1396	620	138	315	267	106	281	239
V/C Ratio(X)	0.40	0.17	0.18	0.56	0.64	0.18	0.68	0.69	0.24	0.54	0.50	0.00
Avail Cap(c_a), veh/h	600	1496	1517	600	2992	1329	600	1260	1069	750	1260	1071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.1	11.8	11.9	25.4	13.0	10.3	25.0	21.6	19.7	25.5	21.5	0.0
Incr Delay (d2), s/veh	2.7	0.1	0.1	1.6	0.5	0.1	2.2	1.0	0.2	1.6	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.1	1.2	1.0	5.5	1.1	1.5	3.2	0.8	0.9	2.0	0.0
LnGrp Delay(d),s/veh	29.8	12.0	12.0	27.0	13.5	10.5	27.2	22.6	19.9	27.0	22.0	0.0
LnGrp LOS	C	B	B	C	B	B	C	C	B	C	C	
Approach Vol, veh/h		231			1062			375			198	
Approach Delay, s/veh		13.1			13.9			23.3			23.5	
Approach LOS		B			B			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	7.7	25.8	8.6	13.9	5.2	28.3	7.5	15.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	50.0	20.0	40.0	20.0	50.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	4.0	4.4	5.0	6.1	2.5	13.8	3.8	8.5
Green Ext Time (p_c), s	0.0	9.9	0.1	1.4	0.0	9.5	0.1	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	16.7
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	369	45	29	932	165	98	251	50	159	186	55
Future Volume (veh/h)	21	369	45	29	932	165	98	251	50	159	186	55
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	22	393	48	31	991	176	104	267	53	169	198	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	2	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	1532	186	60	1469	261	130	319	268	238	312	265
Arrive On Green	0.03	0.51	0.51	0.04	0.52	0.52	0.08	0.18	0.18	0.07	0.18	0.00
Sat Flow, veh/h	1681	3003	364	1681	2836	503	1681	1765	1480	3261	1765	1500
Grp Volume(v), veh/h	22	218	223	31	585	582	104	267	53	169	198	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1691	1681	1676	1662	1681	1765	1480	1630	1765	1500
Q Serve(g_s), s	1.2	6.6	6.7	1.6	23.3	23.4	5.5	13.1	2.7	4.6	9.4	0.0
Cycle Q Clear(g_c), s	1.2	6.6	6.7	1.6	23.3	23.4	5.5	13.1	2.7	4.6	9.4	0.0
Prop In Lane	1.00		0.22	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	47	855	863	60	868	861	130	319	268	238	312	265
V/C Ratio(X)	0.46	0.26	0.26	0.51	0.67	0.68	0.80	0.84	0.20	0.71	0.64	0.00
Avail Cap(c_a), veh/h	149	855	863	149	868	861	187	431	362	362	431	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.1	12.4	12.4	42.6	16.1	16.1	40.8	35.6	31.3	40.8	34.4	0.0
Incr Delay (d2), s/veh	2.6	0.7	0.7	2.5	2.3	2.4	9.4	7.8	0.1	1.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.2	3.3	0.8	11.3	11.2	2.9	7.1	1.1	2.1	4.6	0.0
LnGrp Delay(d),s/veh	45.7	13.1	13.2	45.1	18.4	18.4	50.2	43.3	31.4	42.3	35.2	0.0
LnGrp LOS	D	B	B	D	B	B	D	D	C	D	D	
Approach Vol, veh/h		463			1198			424			367	
Approach Delay, s/veh		14.7			19.1			43.5			38.4	
Approach LOS		B			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	50.9	10.9	20.9	6.5	51.6	10.6	21.3
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	3.6	8.7	7.5	11.4	3.2	25.4	6.6	15.1
Green Ext Time (p_c), s	0.0	15.1	0.0	1.5	0.0	5.4	0.1	1.1

Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	209	25	118	1111	36	33	113	12	86	296	585
Future Volume (vph)	115	209	25	118	1111	36	33	113	12	86	296	585
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.98		1.00	1.00			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1676	3292		1676	3334			1729			1745	1477
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (perm)	1676	3292		1676	3334			1729			1745	1477
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	126	230	27	130	1221	40	36	124	13	95	325	643
RTOR Reduction (vph)	0	4	0	0	1	0	0	2	0	0	0	497
Lane Group Flow (vph)	126	253	0	130	1260	0	0	171	0	0	420	146
Confl. Peds. (#/hr)	1					1	2					2
Confl. Bikes (#/hr)			2			2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	14.6	49.9		14.9	50.2			17.6			30.1	30.1
Effective Green, g (s)	14.6	49.9		14.9	50.2			17.6			30.1	30.1
Actuated g/C Ratio	0.11	0.38		0.11	0.38			0.13			0.23	0.23
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	184	1239		188	1263			229			396	335
v/s Ratio Prot	0.08	0.08		c0.08	c0.38			c0.10			c0.24	
v/s Ratio Perm												0.10
v/c Ratio	0.68	0.20		0.69	1.00			0.75			1.06	0.44
Uniform Delay, d1	56.7	27.9		56.6	41.1			55.3			51.2	43.9
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	8.1	0.1		8.5	24.5			11.0			62.2	0.3
Delay (s)	64.9	28.0		65.1	65.6			66.4			113.4	44.3
Level of Service	E	C		E	E			E			F	D
Approach Delay (s)		40.1			65.6			66.4			71.6	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	64.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	132.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	43	201	64	115	902
Future Vol, veh/h	52	43	201	64	115	902
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	48	226	72	129	1013

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1534	262	0	0	298	0
Stage 1	262	-	-	-	-	-
Stage 2	1272	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	128	777	-	-	1263	-
Stage 1	782	-	-	-	-	-
Stage 2	263	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	98	777	-	-	1263	-
Mov Cap-2 Maneuver	98	-	-	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	201	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	62.2	0	0.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	162	1263	-
HCM Lane V/C Ratio	-	-	0.659	0.102	-
HCM Control Delay (s)	-	-	62.2	8.2	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	3.8	0.3	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	602	116	184	1848	109	163
Future Volume (veh/h)	602	116	184	1848	109	163
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	647	125	198	1987	117	175
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	845	362	838	2649	221	197
Arrive On Green	0.25	0.25	0.50	0.79	0.13	0.13
Sat Flow, veh/h	3441	1437	1681	3441	1681	1500
Grp Volume(v), veh/h	647	125	198	1987	117	175
Grp Sat Flow(s),veh/h/ln	1676	1437	1681	1676	1681	1500
Q Serve(g_s), s	25.0	10.0	9.4	42.8	9.1	16.1
Cycle Q Clear(g_c), s	25.0	10.0	9.4	42.8	9.1	16.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	845	362	838	2649	221	197
V/C Ratio(X)	0.77	0.34	0.24	0.75	0.53	0.89
Avail Cap(c_a), veh/h	1832	785	838	2649	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	42.9	19.9	7.6	56.8	59.8
Incr Delay (d2), s/veh	6.5	2.6	0.1	1.3	0.7	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	12.4	4.2	4.4	19.8	4.3	7.4
LnGrp Delay(d),s/veh	55.1	45.5	20.0	8.9	57.5	74.1
LnGrp LOS	E	D	B	A	E	E
Approach Vol, veh/h	772			2185	292	
Approach Delay, s/veh	53.5			9.9	67.4	
Approach LOS	D			A	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	75.3	40.8		23.9		116.1		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	21.0	* 77		27.5		101.5		
Max Q Clear Time (g_c+I1), s	11.4	27.0		18.1		44.8		
Green Ext Time (p_c), s	8.8	8.3		0.3		37.9		

Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	680	23	9	1840	192	13	9	8	140	5	142
Future Volume (vph)	94	680	23	9	1840	192	13	9	8	140	5	142
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.99			0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (prot)	1676	4787		1676	4733			1665			1684	1474
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (perm)	1676	4787		1676	4733			1665			1684	1474
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	107	773	26	10	2091	218	15	10	9	159	6	161
RTOR Reduction (vph)	0	1	0	0	6	0	0	8	0	0	0	152
Lane Group Flow (vph)	107	798	0	10	2303	0	0	26	0	0	165	9
Confl. Peds. (#/hr)	5		6	6		5	1					1
Confl. Bikes (#/hr)			2			4						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	custom
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												3
Actuated Green, G (s)	12.7	92.4		1.2	80.9			7.9			18.5	7.9
Effective Green, g (s)	12.7	92.4		1.2	80.9			7.9			18.5	7.9
Actuated g/C Ratio	0.09	0.66		0.01	0.58			0.06			0.13	0.06
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	152	3159		14	2734			93			222	83
v/s Ratio Prot	c0.06	0.17		0.01	c0.49			c0.02			c0.10	
v/s Ratio Perm												0.01
v/c Ratio	0.70	0.25		0.71	0.84			0.27			0.74	0.11
Uniform Delay, d1	61.8	9.7		69.2	24.3			63.3			58.5	62.7
Progression Factor	1.32	0.30		1.39	0.80			1.00			1.00	1.00
Incremental Delay, d2	11.0	0.2		76.3	2.1			0.6			11.1	0.2
Delay (s)	92.8	3.1		172.5	21.5			63.9			69.6	62.9
Level of Service	F	A		F	C			E			E	E
Approach Delay (s)		13.7			22.1			63.9			66.3	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.5%	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 (vph)	85	578	215	554	1385	30	249	170	197	69	490	58
Future Volume (vph)	85	578	215	554	1385	30	249	170	197	69	490	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4589		3252	4801		1526	3149	1491	1676	3295	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4589		3252	4801		1526	3149	1491	1676	3295	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	93	635	236	609	1522	33	274	187	216	76	538	64
RTOR Reduction (vph)	0	41	0	0	1	0	0	0	140	0	6	0
Lane Group Flow (vph)	93	830	0	609	1554	0	151	310	76	76	596	0
Confl. Peds. (#/hr)	2		7	7		2	1		2	2		1
Confl. Bikes (#/hr)			2									
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	11.6	41.0		30.1	59.5		19.4	19.4	49.5	29.5	29.5	
Effective Green, g (s)	11.6	41.0		30.1	59.5		19.4	19.4	49.5	29.5	29.5	
Actuated g/C Ratio	0.08	0.29		0.22	0.42		0.14	0.14	0.35	0.21	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	138	1343		699	2040		211	436	527	353	694	
v/s Ratio Prot	0.06	0.18		c0.19	c0.32		c0.10	0.10	0.03	0.05	c0.18	
v/s Ratio Perm									0.02			
v/c Ratio	0.67	0.62		0.87	0.76		0.72	0.71	0.14	0.22	0.86	
Uniform Delay, d1	62.4	42.7		53.1	34.2		57.7	57.6	30.8	45.7	53.2	
Progression Factor	1.21	0.68		1.46	0.76		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.5	2.1		7.0	1.1		9.2	4.5	0.0	0.1	9.9	
Delay (s)	85.2	31.2		84.6	27.1		66.9	62.1	30.9	45.8	63.2	
Level of Service	F	C		F	C		E	E	C	D	E	
Approach Delay (s)		36.4			43.3			53.2			61.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	46.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.5%	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 (vph)	126	514	0	13	1795	47	3	0	0	125	1	373
Future Volume (vph)	126	514	0	13	1795	47	3	0	0	125	1	373
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00			0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (prot)	1676	4818		1676	4796		1676			1593	1598	1445
Flt Permitted	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (perm)	1676	4818		1676	4796		1676			1593	1598	1445
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	148	605	0	15	2112	55	4	0	0	147	1	439
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	269
Lane Group Flow (vph)	148	605	0	15	2166	0	4	0	0	73	75	170
Confl. Peds. (#/hr)	3		9	9		3	17					17
Confl. Bikes (#/hr)						4						
Turn Type	Prot	NA		Prot	NA		Split			Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	14.7	91.3		2.9	80.0		6.0			19.8	19.8	19.8
Effective Green, g (s)	14.7	91.3		2.9	80.0		6.0			19.8	19.8	19.8
Actuated g/C Ratio	0.10	0.65		0.02	0.57		0.04			0.14	0.14	0.14
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	175	3142		34	2740		71			225	226	204
v/s Ratio Prot	c0.09	0.13		0.01	c0.45		c0.00			0.05	0.05	
v/s Ratio Perm												c0.12
v/c Ratio	0.85	0.19		0.44	0.79		0.06			0.32	0.33	0.83
Uniform Delay, d1	61.5	9.7		67.7	23.4		64.3			54.1	54.1	58.5
Progression Factor	0.74	0.62		1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	25.5	0.1		3.3	1.7		0.1			0.3	0.3	23.5
Delay (s)	70.9	6.2		71.0	25.2		64.4			54.4	54.5	82.0
Level of Service	E	A		E	C		E			D	D	F
Approach Delay (s)		18.9			25.5			64.4			75.0	
Approach LOS		B			C			E			E	

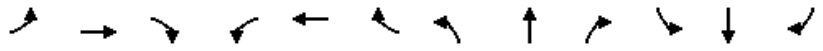
Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	242	336	603	483	59	80	350	148	43	1368	118
Future Volume (veh/h)	110	242	336	603	483	59	80	350	148	43	1368	118
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	116	255	354	635	508	62	84	368	156	45	1440	124
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	715	319	630	1077	131	102	1462	653	57	1371	605
Arrive On Green	0.05	0.21	0.21	0.19	0.36	0.36	0.06	0.44	0.44	0.03	0.41	0.41
Sat Flow, veh/h	3261	3353	1496	3261	3010	366	1681	3353	1498	1681	3353	1479
Grp Volume(v), veh/h	116	255	354	635	282	288	84	368	156	45	1440	124
Grp Sat Flow(s),veh/h/ln	1630	1676	1496	1630	1676	1699	1681	1676	1498	1681	1676	1479
Q Serve(g_s), s	5.3	9.7	32.0	29.0	19.5	19.6	7.4	10.4	9.8	4.0	61.4	8.1
Cycle Q Clear(g_c), s	5.3	9.7	32.0	29.0	19.5	19.6	7.4	10.4	9.8	4.0	61.4	8.1
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	159	715	319	630	600	608	102	1462	653	57	1371	605
V/C Ratio(X)	0.73	0.36	1.11	1.01	0.47	0.47	0.82	0.25	0.24	0.79	1.05	0.20
Avail Cap(c_a), veh/h	348	715	319	630	600	608	134	1462	653	134	1371	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	50.2	59.0	60.5	37.2	37.2	69.6	26.8	26.6	71.9	44.3	28.6
Incr Delay (d2), s/veh	2.4	0.1	83.1	37.7	0.2	0.2	19.9	0.4	0.9	8.8	38.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	4.5	20.6	16.3	9.0	9.2	4.0	4.9	4.2	2.0	35.7	3.4
LnGrp Delay(d),s/veh	72.8	50.3	142.1	98.2	37.4	37.4	89.5	27.2	27.5	80.7	82.9	28.8
LnGrp LOS	E	D	F	F	D	D	F	C	C	F	F	C
Approach Vol, veh/h		725			1205			608			1609	
Approach Delay, s/veh		98.7			69.4			35.9			78.7	
Approach LOS		F			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	70.9	11.3	58.7	13.1	66.9	33.0	37.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	12.0	58.5	16.0	45.0	12.0	58.5	29.0	32.0
Max Q Clear Time (g_c+I1), s	11.3	12.4	7.3	21.6	9.4	63.4	31.0	34.0
Green Ext Time (p_c), s	0.0	30.6	0.1	4.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	73.2
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	684	92	308	611	140	115	302	322	422	1648	136
Future Volume (veh/h)	109	684	92	308	611	140	115	302	322	422	1648	136
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		0.91	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	116	728	98	328	650	149	122	321	343	449	1753	145
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	738	289	369	953	387	143	849	386	469	2077	171
Arrive On Green	0.05	0.22	0.22	0.11	0.28	0.28	0.09	0.26	0.26	0.28	0.46	0.46
Sat Flow, veh/h	3261	3353	1313	3261	3353	1361	1681	3212	1461	1681	4530	374
Grp Volume(v), veh/h	116	728	98	328	650	149	122	321	343	449	1242	656
Grp Sat Flow(s),veh/h/ln	1630	1676	1313	1630	1676	1361	1681	1606	1461	1681	1606	1692
Q Serve(g_s), s	5.3	32.4	9.4	14.9	25.8	13.2	10.7	12.3	33.9	39.4	51.2	51.5
Cycle Q Clear(g_c), s	5.3	32.4	9.4	14.9	25.8	13.2	10.7	12.3	33.9	39.4	51.2	51.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	159	738	289	369	953	387	143	849	386	469	1472	776
V/C Ratio(X)	0.73	0.99	0.34	0.89	0.68	0.39	0.85	0.38	0.89	0.96	0.84	0.85
Avail Cap(c_a), veh/h	391	738	289	391	953	387	269	849	386	560	1472	776
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	58.3	49.3	65.6	47.7	43.1	67.7	45.1	53.1	53.2	35.9	35.9
Incr Delay (d2), s/veh	2.4	29.7	0.3	19.7	1.7	0.2	5.4	0.4	21.9	24.0	6.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	18.1	3.5	7.7	12.1	5.0	5.2	5.5	16.0	21.5	23.8	26.4
LnGrp Delay(d),s/veh	72.7	88.0	49.6	85.3	49.3	43.4	73.1	45.5	74.9	77.2	41.9	47.0
LnGrp LOS	E	F	D	F	D	D	E	D	E	E	D	D
Approach Vol, veh/h		942			1127			786			2347	
Approach Delay, s/veh		82.1			59.0			62.6			50.1	
Approach LOS		F			E			E			D	

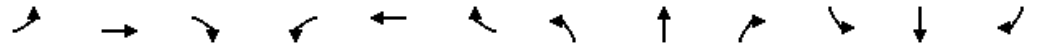
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.8	74.3	21.0	38.0	45.9	45.1	11.3	47.6
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	24.0	56.5	18.0	33.0	50.0	30.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	12.7	53.5	16.9	34.4	41.4	35.9	7.3	27.8
Green Ext Time (p_c), s	0.1	2.9	0.1	0.0	0.5	0.0	0.1	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	59.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	1171	118	69	1094	261	43	12	15	144	19	210
Future Volume (vph)	299	1171	118	69	1094	261	43	12	15	144	19	210
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	318	1246	126	73	1164	278	46	13	16	153	20	223
RTOR Reduction (vph)	0	0	49	0	0	92	0	0	15	0	0	176
Lane Group Flow (vph)	318	1246	77	73	1164	186	46	13	1	153	20	47
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1			8			1			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	15.1	67.4	67.4	8.0	60.3	60.3	8.5	7.5	7.5	9.6	8.1	23.2
Effective Green, g (s)	15.1	67.4	67.4	8.0	60.3	60.3	8.5	7.5	7.5	9.6	8.1	23.2
Actuated g/C Ratio	0.14	0.61	0.61	0.07	0.55	0.55	0.08	0.07	0.07	0.09	0.07	0.21
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	446	2952	907	236	2641	808	251	228	100	283	129	556
v/s Ratio Prot	c0.10	0.26		0.02	c0.24		0.01	0.00		c0.05	c0.01	0.01
v/s Ratio Perm			0.05			0.13			0.00			0.01
v/c Ratio	0.71	0.42	0.09	0.31	0.44	0.23	0.18	0.06	0.01	0.54	0.16	0.08
Uniform Delay, d1	45.4	11.1	8.7	48.4	14.8	12.9	47.5	47.9	47.8	48.1	47.7	34.9
Progression Factor	1.00	1.00	1.00	1.33	0.36	0.25	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.4	0.2	0.2	0.0	0.0	0.1	0.0	0.0	1.1	0.2	0.0
Delay (s)	49.8	11.6	8.9	64.4	5.3	3.3	47.6	48.0	47.8	49.2	47.9	34.9
Level of Service	D	B	A	E	A	A	D	D	D	D	D	C
Approach Delay (s)		18.6			7.8			47.7			41.1	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

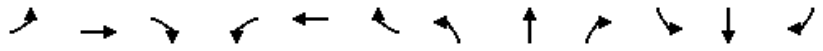
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	783	129	0	998	8	524	492	118	111	277	244
Future Volume (vph)	86	783	129	0	998	8	524	492	118	111	277	244
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.0	5.0		5.0		4.5	5.0		4.5	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00		0.91		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1463		4811		3252	3244		1676	3353	1476
Flt Permitted	0.95	1.00	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1463		4811		3252	3244		1676	3353	1476
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	99	900	148	0	1147	9	602	566	136	128	318	280
RTOR Reduction (vph)	0	0	79	0	1	0	0	20	0	0	0	149
Lane Group Flow (vph)	99	900	69	0	1155	0	602	682	0	128	318	131
Confl. Peds. (#/hr)	2		9	9		2	3		3	3		3
Confl. Bikes (#/hr)						7			1			
Turn Type	Prot	NA	Perm		NA		Prot	NA		Prot	NA	custom
Protected Phases	1	6			2		3	8		7	4	
Permitted Phases			6									6
Actuated Green, G (s)	8.3	51.4	51.4		38.6		20.5	30.5		13.6	23.6	51.4
Effective Green, g (s)	8.3	51.4	51.4		38.6		20.5	30.5		13.6	23.6	51.4
Actuated g/C Ratio	0.08	0.47	0.47		0.35		0.19	0.28		0.12	0.21	0.47
Clearance Time (s)	4.5	5.0	5.0		5.0		4.5	5.0		4.5	5.0	5.0
Vehicle Extension (s)	3.0	4.0	4.0		4.0		3.0	4.0		3.0	4.0	4.0
Lane Grp Cap (vph)	245	2251	683		1688		606	899		207	719	689
v/s Ratio Prot	0.03	c0.19			c0.24		c0.19	c0.21		0.08	0.09	
v/s Ratio Perm			0.05									0.09
v/c Ratio	0.40	0.40	0.10		0.68		0.99	0.76		0.62	0.44	0.19
Uniform Delay, d1	48.5	19.2	16.4		30.5		44.7	36.4		45.7	37.5	17.1
Progression Factor	0.98	0.67	0.81		1.11		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	0.1	0.1		2.2		34.7	3.9		5.4	0.6	0.2
Delay (s)	48.8	13.0	13.4		36.0		79.4	40.3		51.1	38.1	17.3
Level of Service	D	B	B		D		E	D		D	D	B
Approach Delay (s)		16.1			36.0			58.3			32.4	
Approach LOS		B			D			E			C	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	67.4%	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)	47	221	42	126	608	255	92	1080	96	61	635	24
Future Volume (veh/h)	47	221	42	126	608	255	92	1080	96	61	635	24
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	49	230	44	131	633	266	96	1125	100	64	661	25
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	1154	217	157	1566	686	120	1279	114	81	877	385
Arrive On Green	0.04	0.41	0.41	0.09	0.47	0.47	0.07	0.28	0.28	0.05	0.26	0.26
Sat Flow, veh/h	1681	2814	529	1681	3353	1469	1681	4498	399	1681	3353	1472
Grp Volume(v), veh/h	49	135	139	131	633	266	96	803	422	64	661	25
Grp Sat Flow(s),veh/h/ln	1681	1676	1666	1681	1676	1469	1681	1606	1686	1681	1676	1472
Q Serve(g_s), s	3.2	5.7	5.9	8.4	13.6	13.0	6.2	26.2	26.3	4.1	19.9	1.4
Cycle Q Clear(g_c), s	3.2	5.7	5.9	8.4	13.6	13.0	6.2	26.2	26.3	4.1	19.9	1.4
Prop In Lane	1.00		0.32	1.00		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	62	687	683	157	1566	686	120	913	479	81	877	385
V/C Ratio(X)	0.79	0.20	0.20	0.83	0.40	0.39	0.80	0.88	0.88	0.79	0.75	0.06
Avail Cap(c_a), veh/h	183	687	683	244	1566	686	290	964	506	214	877	385
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	20.8	20.9	49.0	19.3	19.1	50.3	37.6	37.6	51.8	37.4	30.5
Incr Delay (d2), s/veh	8.3	0.6	0.7	6.1	0.1	0.3	4.7	8.6	15.0	6.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.8	2.8	4.2	6.4	5.3	3.0	12.7	14.2	2.1	9.7	0.6
LnGrp Delay(d),s/veh	60.9	21.5	21.5	55.1	19.4	19.4	55.0	46.1	52.6	58.1	40.7	30.5
LnGrp LOS	E	C	C	E	B	B	E	D	D	E	D	C
Approach Vol, veh/h		323			1030			1321			750	
Approach Delay, s/veh		27.5			23.9			48.8			41.8	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.3	50.1	11.8	33.8	8.0	56.4	9.3	36.3
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.3	29.0	19.0	28.0	12.0	33.0	14.0	33.0
Max Q Clear Time (g_c+I1), s	10.4	7.9	8.2	21.9	5.2	15.6	6.1	28.3
Green Ext Time (p_c), s	0.1	7.0	0.1	4.2	0.0	6.4	0.0	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	79	0	0	1070	177	679	838	6	0	0	0
Future Volume (vph)	3	79	0	0	1070	177	679	838	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.98		1.00	1.00				
Flt Protected	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (prot)	1676	1765			3273		1442	4489				
Flt Permitted	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (perm)	1676	1765			3273		1442	4489				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	81	0	0	1103	182	700	864	6	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	1	0	0	0	0
Lane Group Flow (vph)	3	81	0	0	1270	0	385	1184	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			16	16		
Confl. Bikes (#/hr)						1						1
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.2	34.7			29.5		44.8	44.8				
Effective Green, g (s)	1.2	34.7			29.5		44.8	44.8				
Actuated g/C Ratio	0.01	0.39			0.33		0.50	0.50				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	22	680			1072		717	2234				
v/s Ratio Prot	0.00	c0.05			c0.39		c0.27	0.26				
v/s Ratio Perm												
v/c Ratio	0.14	0.12			1.18		0.54	0.53				
Uniform Delay, d1	43.9	17.8			30.2		15.5	15.4				
Progression Factor	1.00	1.00			0.91		1.00	1.00				
Incremental Delay, d2	1.0	0.0			91.2		2.9	0.9				
Delay (s)	44.9	17.8			118.8		18.4	16.3				
Level of Service	D	B			F		B	B				
Approach Delay (s)		18.8			118.8			16.8			0.0	
Approach LOS		B			F			B			A	

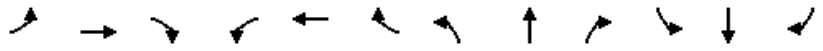
Intersection Summary			
HCM 2000 Control Delay	61.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	68	134	233	399	107	101	375	92	73	1564	581
Future Volume (vph)	62	68	134	233	399	107	101	375	92	73	1564	581
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	2989		1676	3353	1481	1676	4663		1676	4622	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	2989		1676	3353	1481	1676	4663		1676	4622	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	72	79	156	271	464	124	117	436	107	85	1819	676
RTOR Reduction (vph)	0	73	0	0	0	58	0	37	0	0	44	0
Lane Group Flow (vph)	72	162	0	271	464	66	117	506	0	85	2451	0
Confl. Peds. (#/hr)			2	2					1	1		
Confl. Bikes (#/hr)			1			1						
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	10.8	80.0		11.0	80.2	80.2	15.0	28.2		11.3	24.5	
Effective Green, g (s)	10.8	80.0		11.0	80.2	80.2	15.0	28.2		11.3	24.5	
Actuated g/C Ratio	0.07	0.53		0.07	0.53	0.53	0.10	0.19		0.08	0.16	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	120	1594		122	1792	791	167	876		126	754	
v/s Ratio Prot	0.04	0.05		c0.16	c0.14		c0.07	c0.11		0.05	c0.53	
v/s Ratio Perm						0.04						
v/c Ratio	0.60	0.10		2.22	0.26	0.08	0.70	0.58		0.67	3.25	
Uniform Delay, d1	67.5	17.3		69.5	18.8	17.0	65.3	55.5		67.6	62.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.25	0.91		1.00	1.00	
Incremental Delay, d2	5.3	0.1		575.2	0.1	0.1	10.3	0.6		10.7	1016.0	
Delay (s)	72.8	17.4		644.7	19.0	17.1	91.7	51.3		78.2	1078.8	
Level of Service	E	B		F	B	B	F	D		E	F	
Approach Delay (s)		30.4			216.1			58.4			1045.8	
Approach LOS		C			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	665.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	108.0%	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)	127	163	19	276	646	54	75	221	75	112	1181	543
Future Volume (veh/h)	127	163	19	276	646	54	75	221	75	112	1181	543
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	138	177	0	300	702	0	82	240	82	122	1284	590
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	184	724	225	345	962	0	126	2584	792	166	2643	821
Arrive On Green	0.06	0.15	0.00	0.11	0.20	0.00	0.04	0.54	0.54	0.05	0.55	0.55
Sat Flow, veh/h	3261	4818	1500	3261	4976	0	3261	4818	1477	3261	4818	1496
Grp Volume(v), veh/h	138	177	0	300	702	0	82	240	82	122	1284	590
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	0	1630	1606	1477	1630	1606	1496
Q Serve(g_s), s	6.3	4.9	0.0	13.6	20.5	0.0	3.7	3.6	4.1	5.5	24.6	44.1
Cycle Q Clear(g_c), s	6.3	4.9	0.0	13.6	20.5	0.0	3.7	3.6	4.1	5.5	24.6	44.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	184	724	225	345	962	0	126	2584	792	166	2643	821
V/C Ratio(X)	0.75	0.24	0.00	0.87	0.73	0.00	0.65	0.09	0.10	0.74	0.49	0.72
Avail Cap(c_a), veh/h	761	1718	535	456	1269	0	304	2584	792	456	2643	821
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	69.7	56.2	0.0	66.0	56.2	0.0	71.1	17.0	17.1	70.2	20.8	25.2
Incr Delay (d2), s/veh	2.3	0.2	0.0	10.8	1.9	0.0	2.1	0.0	0.1	0.2	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.2	0.0	6.6	9.3	0.0	1.7	1.6	1.7	2.5	11.0	18.3
LnGrp Delay(d),s/veh	72.1	56.5	0.0	76.9	58.1	0.0	73.2	17.0	17.1	70.4	20.9	25.7
LnGrp LOS	E	E		E	E		E	B	B	E	C	C
Approach Vol, veh/h		315			1002			404			1996	
Approach Delay, s/veh		63.3			63.7			28.4			25.4	
Approach LOS		E			E			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	10.8	89.3	13.4	36.5	12.6	87.5	20.9	29.0
Change Period (Y+Rc), s	5.0	7.0	5.0	6.5	5.0	7.0	5.0	6.5
Max Green Setting (Gmax), s	14.0	38.0	35.0	39.5	21.0	31.0	21.0	53.5
Max Q Clear Time (g_c+I1), s	5.7	46.1	8.3	22.5	7.5	6.1	15.6	6.9
Green Ext Time (p_c), s	0.1	0.0	0.2	7.0	0.1	18.8	0.3	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	39.3
HCM 2010 LOS	D

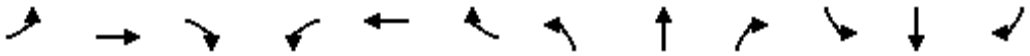
Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	25	1552	5	17	398
Future Vol, veh/h	3	25	1552	5	17	398
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	26	1617	5	18	415

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1862	811	0	0	1622	0
Stage 1	1619	-	-	-	-	-
Stage 2	243	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	65	322	-	-	397	-
Stage 1	147	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	61	322	-	-	397	-
Mov Cap-2 Maneuver	61	-	-	-	-	-
Stage 1	147	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.8	0	1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	221	397	-
HCM Lane V/C Ratio	-	-	0.132	0.045	-
HCM Control Delay (s)	-	-	23.8	14.5	0.4
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	307	5	31	0	0	0	0	356	1221	88	384	0
Future Volume (vph)	307	5	31	0	0	0	0	356	1221	88	384	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	310	5	31	0	0	0	0	360	1233	89	388	0

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total (vph)	315	31	180	180	1233	218	259
Volume Left (vph)	310	0	0	0	0	89	0
Volume Right (vph)	0	31	0	0	1233	0	0
Hadj (s)	0.23	-0.57	0.03	0.03	-0.67	0.24	0.03
Departure Headway (s)	6.1	3.2	6.3	6.3	3.2	6.4	6.1
Degree Utilization, x	0.53	0.03	0.32	0.32	1.10	0.39	0.44
Capacity (veh/h)	564	1121	547	547	1132	548	567
Control Delay (s)	15.9	6.3	11.0	11.0	71.8	12.1	12.7
Approach Delay (s)	15.0		58.1			12.4	
Approach LOS	C		F			B	

Intersection Summary				
Delay	42.9			
Level of Service	E			
Intersection Capacity Utilization	121.9%	ICU Level of Service	H	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	19.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	0	0	0	0	316	2	66	0	160	503	0	0	0	156	284
Future Vol, veh/h	0	0	0	0	0	316	2	66	0	160	503	0	0	0	156	284
Peak Hour Factor	0.92	0.94	0.94	0.94	0.92	0.94	0.94	0.94	0.92	0.94	0.94	0.94	0.92	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	336	2	70	0	170	535	0	0	0	166	302
Number of Lanes	0	0	0	0	0	1	1	1	0	0	2	0	0	0	2	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	3	3	0
HCM Control Delay	14.5	26.3	12.5
HCM LOS	B	D	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	49%	0%	100%	99%	0%	0%	0%	0%
Vol Thru, %	51%	100%	0%	1%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	328	335	158	160	66	78	78	284
LT Vol	160	0	158	158	0	0	0	0
Through Vol	168	335	0	2	0	78	78	0
RT Vol	0	0	0	0	66	0	0	284
Lane Flow Rate	349	357	168	170	70	83	83	302
Geometry Grp	8	8	7	7	7	8	8	8
Degree of Util (X)	0.718	0.711	0.371	0.375	0.132	0.182	0.182	0.452
Departure Headway (Hd)	7.42	7.172	7.945	7.939	6.758	7.879	7.879	5.389
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	488	503	454	454	534	456	456	668
Service Time	5.158	4.909	5.678	5.671	4.458	5.618	5.618	3.127
HCM Lane V/C Ratio	0.715	0.71	0.37	0.374	0.131	0.182	0.182	0.452
HCM Control Delay	26.9	25.7	15.3	15.4	10.5	12.4	12.4	12.5
HCM Lane LOS	D	D	C	C	B	B	B	B
HCM 95th-tile Q	5.7	5.6	1.7	1.7	0.5	0.7	0.7	2.4

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	74	3	0	0	0	6	22	0	2	3	2	0	44	7	83
Future Vol, veh/h	0	74	3	0	0	0	6	22	0	2	3	2	0	44	7	83
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	99	4	0	0	0	8	29	0	3	4	3	0	59	9	111
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

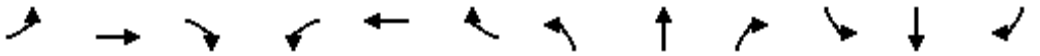
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	9.2	7.5	8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	96%	0%	100%	0%	0%
Vol Thru, %	0%	60%	4%	21%	0%	15%	0%
Vol Right, %	0%	40%	0%	79%	0%	85%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	5	77	28	44	46	44
LT Vol	2	0	74	0	44	0	0
Through Vol	0	3	3	6	0	7	0
RT Vol	0	2	0	22	0	39	44
Lane Flow Rate	3	7	103	37	59	61	59
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.004	0.009	0.156	0.047	0.089	0.074	0.069
Departure Headway (Hd)	5.795	5.011	5.465	4.509	5.431	4.333	4.226
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	618	715	658	796	662	829	850
Service Time	3.521	2.736	3.182	2.227	3.143	2.045	1.938
HCM Lane V/C Ratio	0.005	0.01	0.157	0.046	0.089	0.074	0.069
HCM Control Delay	8.5	7.8	9.2	7.5	8.7	7.4	7.3
HCM Lane LOS	A	A	A	A	A	A	A
HCM 95th-tile Q	0	0	0.6	0.1	0.3	0.2	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	4	2	1	2	25	1	97	1	20	131	182
Future Volume (veh/h)	141	4	2	1	2	25	1	97	1	20	131	182
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	152	4	2	1	2	27	1	104	1	22	141	196
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	145	72	2	5	63	4	784	8	23	407	363
Arrive On Green	0.13	0.13	0.13	0.05	0.05	0.05	0.00	0.23	0.23	0.01	0.24	0.24
Sat Flow, veh/h	1681	1110	555	51	101	1366	1681	3403	33	1681	1676	1494
Grp Volume(v), veh/h	152	0	6	30	0	0	1	51	54	22	141	196
Grp Sat Flow(s),veh/h/ln	1681	0	1665	1518	0	0	1681	1676	1759	1681	1676	1494
Q Serve(g_s), s	3.3	0.0	0.1	0.7	0.0	0.0	0.0	0.9	0.9	0.5	2.7	4.4
Cycle Q Clear(g_c), s	3.3	0.0	0.1	0.7	0.0	0.0	0.0	0.9	0.9	0.5	2.7	4.4
Prop In Lane	1.00		0.33	0.03		0.90	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	219	0	217	70	0	0	4	386	405	23	407	363
V/C Ratio(X)	0.69	0.00	0.03	0.43	0.00	0.00	0.23	0.13	0.13	0.96	0.35	0.54
Avail Cap(c_a), veh/h	1322	0	1310	995	0	0	441	1538	1614	441	1538	1371
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	14.5	17.7	0.0	0.0	19.0	11.6	11.7	18.8	11.9	12.6
Incr Delay (d2), s/veh	1.5	0.0	0.0	1.5	0.0	0.0	9.3	0.2	0.1	44.0	0.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.1	0.3	0.0	0.0	0.0	0.4	0.5	0.5	1.3	1.9
LnGrp Delay(d),s/veh	17.3	0.0	14.5	19.3	0.0	0.0	28.4	11.8	11.8	62.8	12.4	13.8
LnGrp LOS	B		B	B			C	B	B	E	B	B
Approach Vol, veh/h		158			30			106			359	
Approach Delay, s/veh		17.2			19.3			12.0			16.3	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	15.2		10.6	4.6	15.7		7.4
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	10.0	35.0		30.0	10.0	35.0		25.0
Max Q Clear Time (g_c+I1), s	2.5	2.9		5.3	2.0	6.4		2.7
Green Ext Time (p_c), s	0.0	2.6		0.0	0.0	2.6		0.0

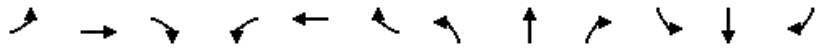
Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	90	27	126	78	315	16	186	107	581	297	95
Future Volume (vph)	134	90	27	126	78	315	16	186	107	581	297	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	3226		1676	3353	1500	1676	3154		3252	3218	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	3226		1676	3353	1500	1676	3154		3252	3218	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	143	96	29	134	83	335	17	198	114	618	316	101
RTOR Reduction (vph)	0	25	0	0	0	291	0	58	0	0	15	0
Lane Group Flow (vph)	143	100	0	134	83	44	17	254	0	618	402	0
Confl. Peds. (#/hr)			2	2			4		1	1		4
Confl. Bikes (#/hr)												1
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	12.7	12.4		12.3	12.0	12.0	1.3	18.6		24.7	42.0	
Effective Green, g (s)	12.7	12.4		12.3	12.0	12.0	1.3	18.6		24.7	42.0	
Actuated g/C Ratio	0.14	0.13		0.13	0.13	0.13	0.01	0.20		0.27	0.46	
Clearance Time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	231	434		224	437	195	23	637		873	1469	
v/s Ratio Prot	c0.09	c0.03		0.08	0.02		0.01	c0.08		c0.19	0.12	
v/s Ratio Perm						0.03						
v/c Ratio	0.62	0.23		0.60	0.19	0.22	0.74	0.40		0.71	0.27	
Uniform Delay, d1	37.4	35.5		37.5	35.7	35.8	45.2	31.8		30.4	15.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	0.5		4.3	0.4	1.0	77.7	0.4		2.6	0.1	
Delay (s)	42.2	36.0		41.8	36.0	36.8	122.8	32.3		33.0	15.6	
Level of Service	D	D		D	D	D	F	C		C	B	
Approach Delay (s)		39.3			37.9			36.9			26.0	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.4%	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 (veh/h)	784	0	680	0	0	0	0	538	97	0	293	211
Future Volume (veh/h)	784	0	680	0	0	0	0	538	97	0	293	211
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	834	0	723				0	572	103	0	312	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	1849	0	850				0	1041	184	0	848	379
Arrive On Green	0.57	0.00	0.57				0.00	0.25	0.25	0.00	0.25	0.00
Sat Flow, veh/h	3261	0	1500				0	4275	729	0	3441	1500
Grp Volume(v), veh/h	834	0	723				0	444	231	0	312	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1633	0	1676	1500
Q Serve(g_s), s	8.7	0.0	23.5				0.0	7.0	7.2	0.0	4.5	0.0
Cycle Q Clear(g_c), s	8.7	0.0	23.5				0.0	7.0	7.2	0.0	4.5	0.0
Prop In Lane	1.00		1.00				0.00		0.45	0.00		1.00
Lane Grp Cap(c), veh/h	1849	0	850				0	812	413	0	848	379
V/C Ratio(X)	0.45	0.00	0.85				0.00	0.55	0.56	0.00	0.37	0.00
Avail Cap(c_a), veh/h	3076	0	1415				0	1377	700	0	1438	643
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	7.3	0.0	10.6				0.0	18.9	18.9	0.0	17.9	0.0
Incr Delay (d2), s/veh	0.2	0.0	2.7				0.0	0.6	1.2	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	10.1				0.0	3.1	3.3	0.0	2.1	0.0
LnGrp Delay(d),s/veh	7.5	0.0	13.2				0.0	19.5	20.1	0.0	18.2	0.0
LnGrp LOS	A		B					B	C		B	
Approach Vol, veh/h		1557						675			312	
Approach Delay, s/veh		10.2						19.7			18.2	
Approach LOS		B						B			B	

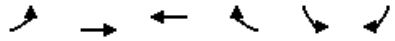
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		20.7		37.6		20.7		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		25.0		55.0		25.0		
Max Q Clear Time (g_c+I1), s		9.2		25.5		6.5		
Green Ext Time (p_c), s		5.5		7.6		5.9		

Intersection Summary	
HCM 2010 Ctrl Delay	13.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	0	127	105	83	217	138	886	0	0	724	34
Future Volume (vph)	56	0	127	105	83	217	138	886	0	0	724	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			0.86	
Frpb, ped/bikes	1.00		1.00		1.00	0.99	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.99	
Flt Protected	0.95		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3251		1500		1717	1481	1676	4818			6025	
Flt Permitted	0.64		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	2173		1500		1717	1481	1676	4818			6025	
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)	58	0	132	109	86	226	144	923	0	0	754	35
RTOR Reduction (vph)	0	0	117	0	0	178	0	0	0	0	5	0
Lane Group Flow (vph)	58	0	15	0	195	48	144	923	0	0	784	0
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	7.4		7.4		14.1	14.1	11.0	32.2			17.2	
Effective Green, g (s)	7.4		7.4		14.1	14.1	11.0	32.2			17.2	
Actuated g/C Ratio	0.11		0.11		0.21	0.21	0.16	0.48			0.26	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	241		166		362	313	276	2325			1553	
v/s Ratio Prot					c0.11		c0.09	0.19			c0.13	
v/s Ratio Perm	c0.03		0.01			0.03						
v/c Ratio	0.24		0.09		0.54	0.15	0.52	0.40			0.50	
Uniform Delay, d1	27.1		26.6		23.4	21.4	25.4	11.0			21.1	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.4		0.2		0.8	0.1	0.8	0.1			0.3	
Delay (s)	27.5		26.8		24.2	21.5	26.3	11.1			21.4	
Level of Service	C		C		C	C	C	B			C	
Approach Delay (s)		27.0			22.7			13.2			21.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	66.7	Sum of lost time (s)	17.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

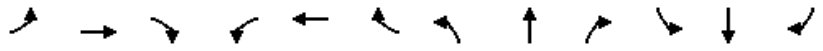
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	556	604	369	234	220	376
Future Volume (veh/h)	556	604	369	234	220	376
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	579	629	384	244	229	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	783	2012	897	713	704	324
Arrive On Green	0.24	0.60	0.27	0.27	0.22	0.00
Sat Flow, veh/h	3261	3441	3441	1456	3261	1500
Grp Volume(v), veh/h	579	629	384	244	229	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1456	1630	1500
Q Serve(g_s), s	7.1	4.0	4.1	4.5	2.6	0.0
Cycle Q Clear(g_c), s	7.1	4.0	4.1	4.5	2.6	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	783	2012	897	713	704	324
V/C Ratio(X)	0.74	0.31	0.43	0.34	0.33	0.00
Avail Cap(c_a), veh/h	1202	2780	1236	860	1202	553
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.2	4.3	13.2	7.0	14.4	0.0
Incr Delay (d2), s/veh	1.4	0.1	0.3	0.3	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	3.3	1.9	1.9	2.6	1.2	0.0
LnGrp Delay(d),s/veh	16.6	4.4	13.5	7.2	14.6	0.0
LnGrp LOS	B	A	B	A	B	
Approach Vol, veh/h		1208	628		229	
Approach Delay, s/veh		10.2	11.1		14.6	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				30.0		13.4	14.4	15.6
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				36.0		16.0	16.0	16.0
Max Q Clear Time (g_c+I1), s				6.0		4.6	9.1	6.5
Green Ext Time (p_c), s				8.9		0.6	1.3	5.0

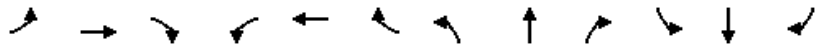
Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	472	230	220	306	19	262	31	386	29	18	29
Future Volume (veh/h)	24	472	230	220	306	19	262	31	386	29	18	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	25	487	237	227	315	20	270	32	398	30	19	30
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	596	288	267	1304	82	306	537	447	49	91	144
Arrive On Green	0.03	0.27	0.27	0.16	0.41	0.41	0.18	0.30	0.30	0.03	0.15	0.15
Sat Flow, veh/h	1681	2170	1050	1681	3195	202	1681	1765	1469	1681	601	948
Grp Volume(v), veh/h	25	375	349	227	164	171	270	32	398	30	0	49
Grp Sat Flow(s),veh/h/ln	1681	1676	1544	1681	1676	1720	1681	1765	1469	1681	0	1549
Q Serve(g_s), s	1.3	19.1	19.3	12.0	5.9	5.9	14.3	1.2	23.6	1.6	0.0	2.5
Cycle Q Clear(g_c), s	1.3	19.1	19.3	12.0	5.9	5.9	14.3	1.2	23.6	1.6	0.0	2.5
Prop In Lane	1.00		0.68	1.00		0.12	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	43	461	424	267	684	702	306	537	447	49	0	235
V/C Ratio(X)	0.58	0.82	0.82	0.85	0.24	0.24	0.88	0.06	0.89	0.61	0.00	0.21
Avail Cap(c_a), veh/h	323	533	491	590	809	830	393	561	467	608	0	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.9	30.9	31.0	37.3	17.7	17.7	36.3	22.5	30.3	43.7	0.0	33.9
Incr Delay (d2), s/veh	11.6	7.5	8.6	7.4	0.1	0.1	17.0	0.0	17.7	11.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	9.8	9.2	6.1	2.7	2.8	8.0	0.6	11.8	0.9	0.0	1.1
LnGrp Delay(d),s/veh	55.5	38.4	39.6	44.6	17.8	17.8	53.3	22.5	48.0	55.4	0.0	34.1
LnGrp LOS	E	D	D	D	B	B	D	C	D	E		C
Approach Vol, veh/h		749			562			700			79	
Approach Delay, s/veh		39.5			28.7			48.8			42.2	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	33.3	19.6	30.6	21.7	19.3	7.4	42.7
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	3.0	29.0	32.0	29.0	21.3	41.0	17.5	44.0
Max Q Clear Time (g_c+I1), s	3.6	25.6	14.0	21.3	16.3	4.5	3.3	7.9
Green Ext Time (p_c), s	0.0	0.5	0.6	3.0	0.4	1.2	0.0	5.2

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)	10	583	40	11	394	9	35	12	51	8	6	6
Future Volume (veh/h)	10	583	40	11	394	9	35	12	51	8	6	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	10	601	41	11	406	9	36	12	53	8	6	6
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	659	45	11	695	15	117	39	173	35	26	26
Arrive On Green	0.01	0.40	0.40	0.01	0.40	0.40	0.21	0.21	0.21	0.05	0.05	0.05
Sat Flow, veh/h	1681	1633	111	1681	1720	38	565	188	832	657	493	493
Grp Volume(v), veh/h	10	0	642	11	0	415	101	0	0	20	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1745	1681	0	1758	1585	0	0	1642	0	0
Q Serve(g_s), s	0.3	0.0	16.9	0.3	0.0	8.9	2.6	0.0	0.0	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.0	16.9	0.3	0.0	8.9	2.6	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.02	0.36		0.52	0.40		0.30
Lane Grp Cap(c), veh/h	10	0	704	11	0	711	329	0	0	86	0	0
V/C Ratio(X)	1.00	0.00	0.91	0.99	0.00	0.58	0.31	0.00	0.00	0.23	0.00	0.00
Avail Cap(c_a), veh/h	381	0	719	381	0	724	522	0	0	541	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	24.1	0.0	13.7	24.1	0.0	11.3	16.3	0.0	0.0	22.1	0.0	0.0
Incr Delay (d2), s/veh	131.9	0.0	15.7	123.6	0.0	1.2	0.5	0.0	0.0	1.4	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	0.5	0.0	11.1	0.5	0.0	4.5	1.2	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	156.1	0.0	29.4	147.8	0.0	12.4	16.8	0.0	0.0	23.4	0.0	0.0
LnGrp LOS	F		C	F		B	B			C		
Approach Vol, veh/h		652			426			101			20	
Approach Delay, s/veh		31.3			15.9			16.8			23.4	
Approach LOS		C			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		14.1	4.3	23.6		6.6	4.3	23.6
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	20.0		16.0	11.0	20.0
Max Q Clear Time (g_c+I1), s		4.6	2.3	18.9		2.6	2.3	10.9
Green Ext Time (p_c), s		0.3	0.0	0.7		0.0	0.0	4.4

Intersection Summary		
HCM 2010 Ctrl Delay		24.5
HCM 2010 LOS		C

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	195	0	43	0	0	0	0	113	14	5	52	0
Future Vol, veh/h	195	0	43	0	0	0	0	113	14	5	52	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	219	0	48	0	0	0	0	127	16	6	58	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	197	197	58	-	0	0	127	0	0
Stage 1	70	70	-	-	-	-	-	-	-
Stage 2	127	127	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	792	699	1008	0	-	-	1459	-	0
Stage 1	953	837	-	0	-	-	-	-	0
Stage 2	899	791	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	789	0	1008	-	-	-	1459	-	-
Mov Cap-2 Maneuver	789	0	-	-	-	-	-	-	-
Stage 1	949	0	-	-	-	-	-	-	-
Stage 2	899	0	-	-	-	-	-	-	-

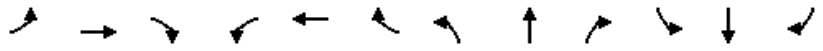
Approach	EB	NB	SB
HCM Control Delay, s	11.5	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	821	1459	-
HCM Lane V/C Ratio	-	-	0.326	0.004	-
HCM Control Delay (s)	-	-	11.5	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	34	274	57	155
Future Volume (Veh/h)	0	0	34	274	57	155
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	37	295	61	167
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	430	61	61			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	430	61	61			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	568	1004	1542			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	37	295	61	167
Volume Left	37	0	0	0
Volume Right	0	0	0	167
cSH	1542	1700	1700	1700
Volume to Capacity	0.02	0.17	0.04	0.10
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	7.4	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.8		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		



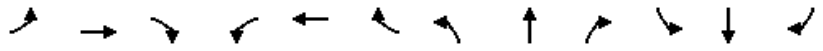
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	167	194	102	229	37	196	223	91	36	193	12
Future Volume (veh/h)	21	167	194	102	229	37	196	223	91	36	193	12
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	23	184	0	112	252	41	215	245	100	40	212	13
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	81	344	293	192	374	61	283	577	484	113	386	322
Arrive On Green	0.05	0.20	0.00	0.11	0.25	0.24	0.17	0.33	0.33	0.07	0.22	0.22
Sat Flow, veh/h	1681	1765	1500	1681	1474	240	1648	1731	1451	1648	1731	1441
Grp Volume(v), veh/h	23	184	0	112	0	293	215	245	100	40	212	13
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1713	1648	1731	1451	1648	1731	1441
Q Serve(g_s), s	0.7	5.2	0.0	3.5	0.0	8.6	6.9	6.1	2.7	1.3	6.0	0.4
Cycle Q Clear(g_c), s	0.7	5.2	0.0	3.5	0.0	8.6	6.9	6.1	2.7	1.3	6.0	0.4
Prop In Lane	1.00		1.00	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	81	344	293	192	0	435	283	577	484	113	386	322
V/C Ratio(X)	0.28	0.53	0.00	0.58	0.00	0.67	0.76	0.42	0.21	0.35	0.55	0.04
Avail Cap(c_a), veh/h	472	794	675	472	0	759	463	966	810	463	966	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	20.1	0.0	23.3	0.0	18.7	21.9	14.4	13.2	24.7	19.1	16.9
Incr Delay (d2), s/veh	1.9	1.3	0.0	2.8	0.0	1.8	4.2	0.5	0.2	1.9	1.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.6	0.0	1.8	0.0	4.2	3.4	3.0	1.1	0.6	3.0	0.2
LnGrp Delay(d),s/veh	27.4	21.4	0.0	26.1	0.0	20.5	26.1	14.9	13.5	26.5	20.3	17.0
LnGrp LOS	C	C		C		C	C	B	B	C	C	B
Approach Vol, veh/h		207			405			560			265	
Approach Delay, s/veh		22.0			22.1			18.9			21.1	
Approach LOS		C			C			B			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	13.5	16.8	6.7	18.5	7.8	22.5	10.4	14.8
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	15.0	* 30	15.0	* 24	15.0	30.0	15.0	24.0
Max Q Clear Time (g_c+I1), s	10.9	8.0	2.7	10.6	3.3	8.1	5.5	7.2
Green Ext Time (p_c), s	0.4	2.2	0.0	1.6	0.1	2.2	0.2	1.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	562	71	89	470	0	49	0	45	0	0	0
Future Volume (veh/h)	3	562	71	89	470	0	49	0	45	0	0	0
Number	5	2	12	1	6	16	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		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	1765	1765	1765	1765	1765	0	1765	1765	1765			
Adj Flow Rate, veh/h	3	579	73	92	485	0	51	0	46			
Adj No. of Lanes	1	2	1	1	2	0	1	1	1			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	2	2	2	2	2	0	2	2	2			
Cap, veh/h	10	1175	516	192	1538	0	198	208	176			
Arrive On Green	0.01	0.35	0.35	0.11	0.46	0.00	0.12	0.00	0.12			
Sat Flow, veh/h	1681	3353	1472	1681	3441	0	1681	1765	1500			
Grp Volume(v), veh/h	3	579	73	92	485	0	51	0	46			
Grp Sat Flow(s),veh/h/ln	1681	1676	1472	1681	1676	0	1681	1765	1500			
Q Serve(g_s), s	0.1	5.2	1.3	2.0	3.5	0.0	1.1	0.0	1.1			
Cycle Q Clear(g_c), s	0.1	5.2	1.3	2.0	3.5	0.0	1.1	0.0	1.1			
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	10	1175	516	192	1538	0	198	208	176			
V/C Ratio(X)	0.31	0.49	0.14	0.48	0.32	0.00	0.26	0.00	0.26			
Avail Cap(c_a), veh/h	658	2277	1000	658	2277	0	658	691	588			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	19.0	9.8	8.5	15.9	6.6	0.0	15.4	0.0	15.4			
Incr Delay (d2), s/veh	17.2	0.1	0.0	1.9	0.0	0.0	0.7	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	0.1	2.4	0.5	1.0	1.6	0.0	0.5	0.0	0.5			
LnGrp Delay(d),s/veh	36.2	9.9	8.5	17.8	6.6	0.0	16.1	0.0	16.2			
LnGrp LOS	D	A	A	B	A		B		B			
Approach Vol, veh/h		655			577			97				
Approach Delay, s/veh		9.9			8.4			16.1				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	9.4	19.4			5.2	23.6		9.5
Change Period (Y+Rc), s	5.0	6.0			5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	26.0			15.0	26.0		15.0
Max Q Clear Time (g_c+I1), s	4.0	7.2			2.1	5.5		3.1
Green Ext Time (p_c), s	0.1	4.3			0.0	4.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	510	97	49	504	55	32
Future Volume (veh/h)	510	97	49	504	55	32
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	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	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	520	99	50	514	56	33
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1132	214	126	2036	187	167
Arrive On Green	0.40	0.40	0.08	0.61	0.11	0.11
Sat Flow, veh/h	2891	531	1681	3441	1681	1500
Grp Volume(v), veh/h	310	309	50	514	56	33
Grp Sat Flow(s),veh/h/ln	1676	1658	1681	1676	1681	1500
Q Serve(g_s), s	5.3	5.3	1.1	2.8	1.2	0.8
Cycle Q Clear(g_c), s	5.3	5.3	1.1	2.8	1.2	0.8
Prop In Lane		0.32	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	677	669	126	2036	187	167
V/C Ratio(X)	0.46	0.46	0.40	0.25	0.30	0.20
Avail Cap(c_a), veh/h	1074	1062	603	3781	689	615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.5	8.5	17.2	3.6	16.0	15.8
Incr Delay (d2), s/veh	0.5	0.5	2.0	0.1	0.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.5	0.6	1.3	0.6	0.3
LnGrp Delay(d),s/veh	9.0	9.0	19.2	3.6	16.8	16.3
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	619			564	89	
Approach Delay, s/veh	9.0			5.0	16.7	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.9	21.8				29.7		9.3
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	14.0	25.0				44.0		16.0
Max Q Clear Time (g_c+I1), s	3.1	7.3				4.8		3.2
Green Ext Time (p_c), s	0.1	6.9				9.0		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	446	96	124	485	68	88
Future Volume (vph)	446	96	124	485	68	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.97		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3231		1676	3353	1595	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3231		1676	3353	1595	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	455	98	127	495	69	90
RTOR Reduction (vph)	16	0	0	0	45	0
Lane Group Flow (vph)	537	0	127	495	114	0
Confl. Peds. (#/hr)		15	15			
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	20.0		10.0	59.9	16.5	
Effective Green, g (s)	21.0		10.6	60.5	17.1	
Actuated g/C Ratio	0.24		0.12	0.70	0.20	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	785		205	2347	315	
v/s Ratio Prot	c0.17		c0.08	c0.15	c0.07	
v/s Ratio Perm						
v/c Ratio	0.68		0.62	0.21	0.36	
Uniform Delay, d1	29.7		36.0	4.6	29.9	
Progression Factor	1.00		1.04	0.19	1.00	
Incremental Delay, d2	2.0		5.4	0.0	0.7	
Delay (s)	31.7		42.9	0.9	30.7	
Level of Service	C		D	A	C	
Approach Delay (s)	31.7			9.5	30.7	
Approach LOS	C			A	C	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	17.2
Intersection Capacity Utilization	44.1%	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)	229	445	79	29	233	260	205	397	183	521	202	250
Future Volume (vph)	229	445	79	29	233	260	205	397	183	521	202	250
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	3251		1676	3326	1444	1644	3115		3190	1731	1447
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1676	3251		1676	3326	1444	1644	3115		3190	1731	1447
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	244	473	84	31	248	277	218	422	195	554	215	266
RTOR Reduction (vph)	0	10	0	0	0	197	0	42	0	0	0	188
Lane Group Flow (vph)	244	547	0	31	248	80	218	575	0	554	215	78
Confl. Peds. (#/hr)	7					7	3		4	4		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	4	0	0	4	4	0	0	0	0	0	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	18.9	50.0		5.1	36.2	36.2	16.9	25.5		28.2	36.8	36.8
Effective Green, g (s)	20.0	51.5		6.2	37.7	37.7	18.0	27.0		29.3	38.3	38.3
Actuated g/C Ratio	0.15	0.40		0.05	0.29	0.29	0.14	0.21		0.23	0.29	0.29
Clearance Time (s)	5.1	5.5		5.1	5.5	5.5	5.1	5.5		5.1	5.5	5.5
Vehicle Extension (s)	3.0	2.2		3.0	2.2	2.2	3.0	2.2		3.0	2.2	2.2
Lane Grp Cap (vph)	257	1287		79	964	418	227	646		718	509	426
v/s Ratio Prot	c0.15	c0.17		0.02	0.07		c0.13	c0.18		c0.17	0.12	
v/s Ratio Perm						0.06						0.05
v/c Ratio	0.95	0.43		0.39	0.26	0.19	0.96	0.89		0.77	0.42	0.18
Uniform Delay, d1	54.5	28.5		60.1	35.4	34.7	55.6	50.1		47.2	36.9	34.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	41.9	0.1		3.2	0.6	1.0	48.4	14.2		5.1	0.3	0.1
Delay (s)	96.4	28.6		63.3	36.1	35.7	104.1	64.3		52.4	37.2	34.3
Level of Service	F	C		E	D	D	F	E		D	D	C
Approach Delay (s)		49.3			37.4			74.7			44.6	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	52.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.2%	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)	340	3	96	5	3	47	26	858	2	44	872	287
Future Volume (vph)	340	3	96	5	3	47	26	858	2	44	872	287
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.86		1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1598	1475	1676	1515		1644	3287		1644	4205	
Flt Permitted	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1598	1475	1676	1515		1644	3287		1644	4205	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	362	3	102	5	3	50	28	913	2	47	928	305
RTOR Reduction (vph)	0	0	80	0	47	0	0	0	0	0	46	0
Lane Group Flow (vph)	185	180	22	5	6	0	28	915	0	47	1187	0
Confl. Peds. (#/hr)			6	6			11		11	11		11
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	13.8	13.8	13.8	2.9	2.9		2.1	27.4		3.7	29.0	
Effective Green, g (s)	14.9	14.9	14.9	4.0	4.0		3.2	28.5		4.8	30.1	
Actuated g/C Ratio	0.22	0.22	0.22	0.06	0.06		0.05	0.42		0.07	0.44	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	348	349	322	98	88		77	1373		115	1855	
v/s Ratio Prot	c0.12	0.11		0.00	c0.00		0.02	0.28		c0.03	c0.28	
v/s Ratio Perm			0.02									
v/c Ratio	0.53	0.52	0.07	0.05	0.07		0.36	0.67		0.41	0.64	
Uniform Delay, d1	23.6	23.5	21.1	30.3	30.3		31.5	16.0		30.3	14.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.5	0.0	0.1	0.1		1.1	1.0		0.9	0.6	
Delay (s)	24.3	24.0	21.2	30.4	30.5		32.6	17.0		31.2	15.4	
Level of Service	C	C	C	C	C		C	B		C	B	
Approach Delay (s)		23.5			30.4			17.5			16.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	68.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.7%	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)	99	438	429	0	0	623	0	813	432	275	830	321
Future Volume (vph)	99	438	429	0	0	623	0	813	432	275	830	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			1.00		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.96			0.99		1.00	0.98	1.00	1.00	0.95
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3507	1512			1591		3471	1523	3367	3471	1470
Flt Permitted		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3507	1512			1591		3471	1523	3367	3471	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	461	452	0	0	656	0	856	455	289	874	338
RTOR Reduction (vph)	0	0	12	0	0	233	0	0	75	0	0	0
Lane Group Flow (vph)	0	565	440	0	0	423	0	856	380	289	874	338
Confl. Peds. (#/hr)			38	38			68		4	4		68
Confl. Bikes (#/hr)			3			1						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		37.8	45.1			37.8		63.7	63.7	14.5	69.9	130.0
Effective Green, g (s)		37.4	44.3			37.3		63.2	63.2	13.5	69.4	130.0
Actuated g/C Ratio		0.29	0.34			0.29		0.49	0.49	0.10	0.53	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		1008	578			456		1687	740	349	1852	1470
v/s Ratio Prot			0.04					0.25		c0.09	0.25	
v/s Ratio Perm		0.16	0.25			c0.27			c0.25			0.23
v/c Ratio		0.56	0.76			0.93		0.51	0.51	0.83	0.47	0.23
Uniform Delay, d1		39.3	38.1			45.0		22.8	22.9	57.1	18.9	0.0
Progression Factor		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4	5.3			24.6		1.1	2.5	14.2	0.9	0.4
Delay (s)		39.7	43.5			69.6		23.9	25.4	71.3	19.7	0.4
Level of Service		D	D			E		C	C	E	B	A
Approach Delay (s)		41.4			69.6			24.4			25.3	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	101.1%	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	0	0	183	147	65	221	943	685	88	597	126
Future Volume (vph)	0	0	0	183	147	65	221	943	685	88	597	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					4.0		4.0	4.8		4.0	4.8	
Lane Util. Factor					0.95		0.97	0.91		1.00	0.95	
Frpb, ped/bikes					1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	
Frt					0.98		1.00	0.94		1.00	0.97	
Flt Protected					0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)					3190		3190	4342		1644	3173	
Flt Permitted					0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)					3190		3190	4342		1644	3173	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	187	150	66	226	962	699	90	609	129
RTOR Reduction (vph)	0	0	0	0	18	0	0	116	0	0	17	0
Lane Group Flow (vph)	0	0	0	0	385	0	226	1545	0	90	721	0
Confl. Peds. (#/hr)	1		1	1		1	40		11	11		40
Confl. Bikes (#/hr)									8			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type				Prot	NA		Prot	NA		Prot	NA	
Protected Phases				3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)					24.4		9.8	31.3		7.2	28.7	
Effective Green, g (s)					24.4		9.8	31.5		7.2	28.9	
Actuated g/C Ratio					0.32		0.13	0.42		0.09	0.38	
Clearance Time (s)					4.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)					2.5		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)					1025		411	1802		155	1208	
v/s Ratio Prot					c0.12		c0.07	c0.36		0.05	0.23	
v/s Ratio Perm												
v/c Ratio					0.38		0.55	0.97dr		0.58	0.60	
Uniform Delay, d1					19.9		31.0	20.2		32.9	18.8	
Progression Factor					1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2					0.2		0.8	4.4		3.5	0.9	
Delay (s)					20.0		31.8	24.6		36.4	19.8	
Level of Service					C		C	C		D	B	
Approach Delay (s)		0.0			20.0			25.4			21.6	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	12.8
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

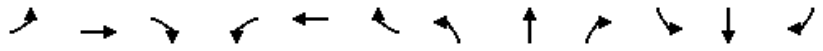
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	162	278	749	534	27
Future Volume (veh/h)	22	162	278	749	534	27
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	23	167	287	772	551	28
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	239	214	347	2217	1204	61
Arrive On Green	0.14	0.14	0.21	0.66	0.37	0.37
Sat Flow, veh/h	1681	1500	1681	3441	3326	164
Grp Volume(v), veh/h	23	167	287	772	285	294
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1726
Q Serve(g_s), s	0.6	5.2	7.9	4.9	6.2	6.2
Cycle Q Clear(g_c), s	0.6	5.2	7.9	4.9	6.2	6.2
Prop In Lane	1.00	1.00	1.00			0.10
Lane Grp Cap(c), veh/h	239	214	347	2217	623	641
V/C Ratio(X)	0.10	0.78	0.83	0.35	0.46	0.46
Avail Cap(c_a), veh/h	869	776	695	2217	1040	1071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	20.0	18.3	3.6	11.5	11.5
Incr Delay (d2), s/veh	0.1	2.4	1.9	0.1	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	4.3	3.9	2.3	3.0	3.1
LnGrp Delay(d),s/veh	18.1	22.4	20.3	3.7	12.2	12.2
LnGrp LOS	B	C	C	A	B	B
Approach Vol, veh/h	190			1059	579	
Approach Delay, s/veh	21.9			8.2	12.2	
Approach LOS	C			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		37.5		10.9	14.0	23.5		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		30.0		25.0	20.0	30.0		
Max Q Clear Time (g_c+I1), s		6.9		7.2	9.9	8.2		
Green Ext Time (p_c), s		12.8		0.3	0.3	9.7		

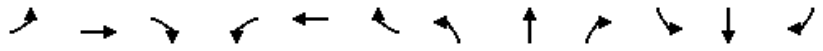
Intersection Summary	
HCM 2010 Ctrl Delay	10.9
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1077	23	1	475	2	18	0	3	5	0	7
Future Volume (veh/h)	7	1077	23	1	475	2	18	0	3	5	0	7
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	8	1171	25	1	516	2	20	0	3	5	0	8
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	1349	29	2	1348	5	107	0	39	53	1	14
Arrive On Green	0.01	0.40	0.39	0.00	0.79	0.77	0.03	0.00	0.03	0.03	0.00	0.03
Sat Flow, veh/h	1681	3355	72	1681	3426	13	1592	0	1490	304	41	553
Grp Volume(v), veh/h	8	585	611	1	252	266	20	0	3	13	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1750	1681	1676	1762	1592	0	1490	899	0	0
Q Serve(g_s), s	0.5	35.3	35.3	0.1	5.1	5.1	0.0	0.0	0.2	0.8	0.0	0.0
Cycle Q Clear(g_c), s	0.5	35.3	35.3	0.1	5.1	5.1	1.3	0.0	0.2	2.1	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.01	1.00		1.00	0.38		0.62
Lane Grp Cap(c), veh/h	17	674	703	2	660	693	107	0	39	69	0	0
V/C Ratio(X)	0.48	0.87	0.87	0.43	0.38	0.38	0.19	0.00	0.08	0.19	0.00	0.00
Avail Cap(c_a), veh/h	168	945	986	168	945	993	387	0	339	361	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.99	0.99	0.99	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	54.2	30.2	30.2	54.8	7.6	7.7	52.8	0.0	52.3	53.5	0.0	0.0
Incr Delay (d2), s/veh	6.1	4.6	4.4	41.2	1.7	1.6	0.3	0.0	0.3	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	17.1	17.8	0.1	2.5	2.7	0.6	0.0	0.1	0.4	0.0	0.0
LnGrp Delay(d),s/veh	60.3	34.8	34.7	96.0	9.3	9.2	53.1	0.0	52.6	54.0	0.0	0.0
LnGrp LOS	E	C	C	F	A	A	D		D	D		
Approach Vol, veh/h		1204			519			23			13	
Approach Delay, s/veh		34.9			9.4			53.1			54.0	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	48.2		6.9	5.1	47.3		6.9
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I2), s	2.1	37.3		4.1	2.5	7.1		3.3
Green Ext Time (p_c), s	0.0	5.9		0.0	0.0	6.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.8
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	896	87	17	393	8	46	0	18	11	0	14
Future Volume (veh/h)	17	896	87	17	393	8	46	0	18	11	0	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	18	943	92	18	414	8	48	0	19	12	0	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	1135	111	45	1238	24	117	1	25	76	13	52
Arrive On Green	0.03	0.37	0.36	0.03	0.37	0.36	0.06	0.00	0.06	0.06	0.00	0.06
Sat Flow, veh/h	1681	3086	301	1681	3365	65	1045	25	424	490	227	897
Grp Volume(v), veh/h	18	512	523	18	206	216	67	0	0	27	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1711	1681	1676	1753	1494	0	0	1615	0	0
Q Serve(g_s), s	1.2	30.6	30.6	1.2	9.7	9.8	3.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.2	30.6	30.6	1.2	9.7	9.8	4.8	0.0	0.0	1.8	0.0	0.0
Prop In Lane	1.00		0.18	1.00		0.04	0.72		0.28	0.44		0.56
Lane Grp Cap(c), veh/h	45	617	629	45	617	645	143	0	0	141	0	0
V/C Ratio(X)	0.40	0.83	0.83	0.40	0.33	0.33	0.47	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	168	975	995	168	975	1020	357	0	0	359	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.99	0.99	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	52.6	31.6	31.7	52.6	25.1	25.1	51.0	0.0	0.0	49.6	0.0	0.0
Incr Delay (d2), s/veh	5.1	3.2	3.2	5.5	1.4	1.4	2.4	0.0	0.0	0.7	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	0.6	14.6	14.9	0.6	4.8	5.0	2.1	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	57.7	34.8	34.9	58.2	26.5	26.5	53.3	0.0	0.0	50.3	0.0	0.0
LnGrp LOS	E	C	C	E	C	C	D			D		
Approach Vol, veh/h		1053			440			67			27	
Approach Delay, s/veh		35.3			27.8			53.3			50.3	
Approach LOS		D			C			D			D	

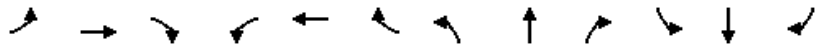
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.0	44.5		10.4	7.0	44.5		10.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	63.0		23.0	11.0	63.0		23.0
Max Q Clear Time (g_c+I1), s	3.2	32.6		3.8	3.2	11.8		6.8
Green Ext Time (p_c), s	0.0	6.9		0.3	0.0	7.2		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.2
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	879	29	18	422	16	14
Future Volume (vph)	879	29	18	422	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.94	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3333		1676	3353	1598	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3333		1676	3353	1598	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	935	31	19	449	17	15
RTOR Reduction (vph)	1	0	0	0	14	0
Lane Group Flow (vph)	965	0	19	449	18	0
Confl. Peds. (#/hr)		4	4			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	83.4		3.2	91.6	7.4	
Effective Green, g (s)	85.4		4.2	93.6	8.4	
Actuated g/C Ratio	0.78		0.04	0.85	0.08	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2587		63	2853	122	
v/s Ratio Prot	c0.29		c0.01	0.13	c0.01	
v/s Ratio Perm						
v/c Ratio	0.37		0.30	0.16	0.15	
Uniform Delay, d1	3.9		51.5	1.4	47.5	
Progression Factor	1.36		0.83	2.85	1.00	
Incremental Delay, d2	0.1		2.7	0.1	0.6	
Delay (s)	5.4		45.5	4.1	48.0	
Level of Service	A		D	A	D	
Approach Delay (s)	5.4			5.8	48.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

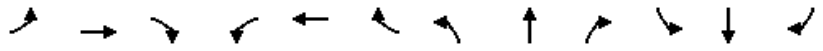
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	134	749	10	6	385	106	13	4	12	69	3	62
Future Volume (veh/h)	134	749	10	6	385	106	13	4	12	69	3	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	0.98		0.97	0.98		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	144	805	11	6	414	114	14	4	13	74	3	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	985	13	13	517	141	186	166	138	203	182	138
Arrive On Green	0.10	0.29	0.28	0.02	0.40	0.38	0.09	0.09	0.09	0.10	0.10	0.09
Sat Flow, veh/h	1681	3385	46	1681	2602	709	1295	1765	1462	1359	1765	1462
Grp Volume(v), veh/h	144	399	417	6	265	263	14	4	13	74	3	67
Grp Sat Flow(s),veh/h/ln	1681	1676	1755	1681	1676	1635	1295	1765	1462	1359	1765	1462
Q Serve(g_s), s	9.3	24.3	24.3	0.4	15.3	15.8	1.1	0.2	0.9	5.7	0.2	4.8
Cycle Q Clear(g_c), s	9.3	24.3	24.3	0.4	15.3	15.8	1.3	0.2	0.9	5.9	0.2	4.8
Prop In Lane	1.00		0.03	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	488	511	13	333	325	186	166	138	203	182	138
V/C Ratio(X)	0.86	0.82	0.82	0.47	0.80	0.81	0.08	0.02	0.09	0.36	0.02	0.49
Avail Cap(c_a), veh/h	168	914	957	168	914	892	381	433	359	409	449	359
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	36.3	36.3	53.9	31.2	31.7	45.8	45.2	45.5	47.0	44.3	47.3
Incr Delay (d2), s/veh	30.4	1.2	1.2	9.5	17.6	19.0	0.2	0.1	0.3	1.1	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	11.5	12.0	0.2	8.7	8.7	0.4	0.1	0.4	2.2	0.1	2.0
LnGrp Delay(d),s/veh	79.1	37.5	37.5	63.4	48.7	50.7	45.9	45.3	45.8	48.1	44.3	49.9
LnGrp LOS	E	D	D	E	D	D	D	D	D	D	D	D
Approach Vol, veh/h		960			534			31			144	
Approach Delay, s/veh		43.7			49.9			45.8			48.9	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	36.0		14.4	15.0	25.9		14.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	59.0		27.0	11.0	59.0		27.0
Max Q Clear Time (g_c+I1), s	12.4	26.3		7.9	11.3	17.8		3.3
Green Ext Time (p_c), s	0.0	3.0		0.6	0.0	3.0		0.7

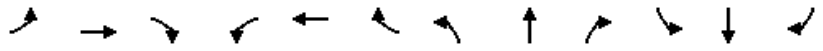
Intersection Summary	
HCM 2010 Ctrl Delay	46.2
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	734	75	7	447	10	41	1	3	11	0	14
Future Volume (veh/h)	10	734	75	7	447	10	41	1	3	11	0	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	11	781	80	7	476	11	44	1	3	12	0	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	937	96	15	1007	23	123	1	4	72	7	39
Arrive On Green	0.01	0.31	0.30	0.02	0.60	0.58	0.04	0.04	0.04	0.04	0.00	0.04
Sat Flow, veh/h	1681	3071	314	1681	3348	77	1368	31	93	561	155	894
Grp Volume(v), veh/h	11	426	435	7	238	249	48	0	0	27	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1709	1681	1676	1749	1492	0	0	1610	0	0
Q Serve(g_s), s	0.7	26.1	26.1	0.5	8.7	8.7	1.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	26.1	26.1	0.5	8.7	8.7	3.4	0.0	0.0	1.8	0.0	0.0
Prop In Lane	1.00		0.18	1.00		0.04	0.92		0.06	0.44		0.56
Lane Grp Cap(c), veh/h	22	511	521	15	504	526	128	0	0	118	0	0
V/C Ratio(X)	0.50	0.83	0.83	0.48	0.47	0.47	0.37	0.00	0.00	0.23	0.00	0.00
Avail Cap(c_a), veh/h	168	945	963	168	945	986	383	0	0	382	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	0.99	0.99	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.9	35.6	35.7	53.8	17.0	17.1	51.8	0.0	0.0	51.1	0.0	0.0
Incr Delay (d2), s/veh	6.3	2.6	2.6	8.5	3.1	3.0	0.7	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	12.5	12.7	0.2	4.4	4.6	1.5	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	60.2	38.2	38.3	62.3	20.2	20.1	52.5	0.0	0.0	51.5	0.0	0.0
LnGrp LOS	E	D	D	E	C	C	D			D		
Approach Vol, veh/h		872			494			48			27	
Approach Delay, s/veh		38.5			20.7			52.5			51.5	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	37.6		8.8	5.4	37.1		8.8
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I1), s	2.5	28.1		3.8	2.7	10.7		5.4
Green Ext Time (p_c), s	0.0	4.5		0.1	0.0	4.5		0.1

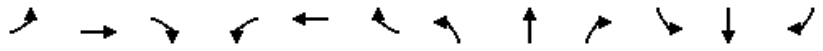
Intersection Summary	
HCM 2010 Ctrl Delay	33.1
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	697	40	2	489	23	12	5	11	22	2	19
Future Volume (veh/h)	50	697	40	2	489	23	12	5	11	22	2	19
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.98	0.98		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	51	704	40	2	494	23	12	5	11	22	2	19
Adj No. of Lanes	0	2	0	0	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	82	875	50	34	997	46	78	32	41	91	14	44
Arrive On Green	0.31	0.31	0.29	0.63	0.63	0.59	0.07	0.07	0.06	0.07	0.07	0.06
Sat Flow, veh/h	144	2799	161	3	3189	148	465	471	606	613	213	654
Grp Volume(v), veh/h	404	0	391	273	0	246	28	0	0	43	0	0
Grp Sat Flow(s),veh/h/ln	1531	0	1573	1761	0	1580	1542	0	0	1481	0	0
Q Serve(g_s), s	18.0	0.0	25.0	0.0	0.0	9.4	0.0	0.0	0.0	1.1	0.0	0.0
Cycle Q Clear(g_c), s	27.3	0.0	25.0	9.2	0.0	9.4	1.8	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.13		0.10	0.01		0.09	0.43		0.39	0.51		0.44
Lane Grp Cap(c), veh/h	515	0	492	583	0	494	151	0	0	150	0	0
V/C Ratio(X)	0.78	0.00	0.80	0.47	0.00	0.50	0.19	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	752	0	729	847	0	732	732	0	0	715	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.97	0.00	0.97	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	35.4	0.0	34.7	15.9	0.0	16.1	48.8	0.0	0.0	49.3	0.0	0.0
Incr Delay (d2), s/veh	1.8	0.0	2.0	2.6	0.0	3.5	0.6	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	0.0	11.1	4.8	0.0	4.4	0.8	0.0	0.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	37.1	0.0	36.6	18.5	0.0	19.5	49.4	0.0	0.0	50.4	0.0	0.0
LnGrp LOS	D		D	B		B	D			D		
Approach Vol, veh/h		795			519			28			43	
Approach Delay, s/veh		36.9			19.0			49.4			50.4	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		38.4		11.4		38.4		11.4
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		49.0		50.0		49.0		50.0
Max Q Clear Time (g_c+I1), s		29.3		4.9		11.4		3.8
Green Ext Time (p_c), s		3.0		0.3		3.2		0.3

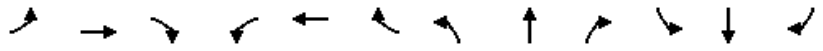
Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	651	105	104	476	78	84	19	71	66	14	19
Future Volume (veh/h)	16	651	105	104	476	78	84	19	71	66	14	19
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		0.99	1.00		0.99	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	16	671	108	107	491	80	87	20	73	68	14	20
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	30	894	144	131	1068	173	109	136	107	86	41	58
Arrive On Green	0.02	0.31	0.30	0.08	0.37	0.36	0.06	0.08	0.07	0.05	0.06	0.06
Sat Flow, veh/h	1681	2891	465	1681	2887	468	1681	1765	1475	1681	642	917
Grp Volume(v), veh/h	16	389	390	107	284	287	87	20	73	68	0	34
Grp Sat Flow(s),veh/h/ln	1681	1676	1679	1681	1676	1679	1681	1765	1475	1681	0	1559
Q Serve(g_s), s	1.0	22.9	23.0	6.9	14.1	14.3	5.6	1.2	5.3	4.4	0.0	2.3
Cycle Q Clear(g_c), s	1.0	22.9	23.0	6.9	14.1	14.3	5.6	1.2	5.3	4.4	0.0	2.3
Prop In Lane	1.00		0.28	1.00		0.28	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	30	519	519	131	620	621	109	136	107	86	0	99
V/C Ratio(X)	0.54	0.75	0.75	0.81	0.46	0.46	0.80	0.15	0.68	0.79	0.00	0.34
Avail Cap(c_a), veh/h	199	655	656	199	655	656	199	401	329	199	0	354
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	0.81	0.81	0.81	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.6	34.2	34.3	49.9	26.3	26.5	50.7	47.4	49.8	51.6	0.0	49.5
Incr Delay (d2), s/veh	5.4	4.2	4.2	6.8	2.0	2.0	5.0	0.2	2.9	6.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	11.2	11.2	3.5	6.9	7.0	2.8	0.6	2.3	2.2	0.0	1.0
LnGrp Delay(d),s/veh	59.0	38.4	38.6	56.7	28.3	28.5	55.7	47.6	52.7	57.6	0.0	50.2
LnGrp LOS	E	D	D	E	C	C	E	D	D	E		D
Approach Vol, veh/h		795			678			180			102	
Approach Delay, s/veh		38.9			32.8			53.6			55.1	
Approach LOS		D			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	38.0	9.6	12.5	5.9	44.7	11.1	11.0
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	13.0	42.0	13.0	24.5	13.0	42.0	13.0	24.5
Max Q Clear Time (g_c+I1), s	8.9	25.0	6.4	7.3	3.0	16.3	7.6	4.3
Green Ext Time (p_c), s	0.0	8.0	0.0	0.2	0.0	9.7	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	39.0
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	223	461	141	98	334	188	133	804	118	189	717	276
Future Volume (veh/h)	223	461	141	98	334	188	133	804	118	189	717	276
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	232	480	147	102	348	196	139	838	123	197	747	288
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	241	641	195	135	640	282	173	1323	580	216	1408	616
Arrive On Green	0.15	0.26	0.25	0.08	0.19	0.19	0.10	0.40	0.40	0.13	0.43	0.43
Sat Flow, veh/h	1648	2478	754	1648	3288	1448	1648	3288	1441	1648	3288	1439
Grp Volume(v), veh/h	232	317	310	102	348	196	139	838	123	197	747	288
Grp Sat Flow(s),veh/h/ln	1648	1644	1587	1648	1644	1448	1648	1644	1441	1648	1644	1439
Q Serve(g_s), s	18.2	23.0	23.4	7.9	12.4	16.4	10.7	26.6	7.3	15.3	21.8	18.6
Cycle Q Clear(g_c), s	18.2	23.0	23.4	7.9	12.4	16.4	10.7	26.6	7.3	15.3	21.8	18.6
Prop In Lane	1.00		0.47	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	241	426	411	135	640	282	173	1323	580	216	1408	616
V/C Ratio(X)	0.96	0.75	0.75	0.76	0.54	0.70	0.80	0.63	0.21	0.91	0.53	0.47
Avail Cap(c_a), veh/h	241	539	520	139	883	389	178	1323	580	216	1408	616
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.34	0.34	0.34	0.92	0.92	0.92	0.66	0.66	0.66
Uniform Delay (d), s/veh	55.2	44.2	44.6	58.4	47.2	48.8	56.9	31.1	25.4	55.8	27.5	26.6
Incr Delay (d2), s/veh	45.5	4.0	4.4	7.5	0.2	1.1	20.9	0.9	0.2	28.9	0.9	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	11.4	11.0	10.7	3.9	5.7	6.7	5.9	12.2	2.9	8.7	10.0	7.7
LnGrp Delay(d),s/veh	100.7	48.2	49.0	66.0	47.4	49.9	77.8	32.1	25.5	84.6	28.4	28.2
LnGrp LOS	F	D	D	E	D	D	E	C	C	F	C	C
Approach Vol, veh/h		859			646			1100			1232	
Approach Delay, s/veh		62.6			51.1			37.1			37.4	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.6	59.7	14.6	38.1	21.0	56.3	23.0	29.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	45.0	10.0	41.6	16.0	42.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	12.7	23.8	9.9	25.4	17.3	28.6	20.2	18.4
Green Ext Time (p_c), s	0.0	10.6	0.0	4.8	0.0	8.1	0.0	4.7

Intersection Summary	
HCM 2010 Ctrl Delay	45.3
HCM 2010 LOS	D

Notes

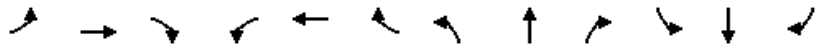
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	523	2	500	0	0	0	0	862	432	298	731	0
Future Volume (vph)	523	2	500	0	0	0	0	862	432	298	731	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.99					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.94	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1536	1485					4696		1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1536	1485					4696		1736	3471	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	551	2	526	0	0	0	0	907	455	314	769	0
RTOR Reduction (vph)	0	30	71	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	347	323	308	0	0	0	0	1309	0	314	769	0
Confl. Peds. (#/hr)			1	1			30		1	1		30
Confl. Bikes (#/hr)									4			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	32.3	32.3	32.3					61.7		13.0	78.7	
Effective Green, g (s)	32.4	32.4	32.4					61.8		12.0	78.8	
Actuated g/C Ratio	0.27	0.27	0.27					0.51		0.10	0.66	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	453	414	400					2418		173	2279	
v/s Ratio Prot	0.21	c0.21						c0.28		c0.18	0.22	
v/s Ratio Perm			0.21									
v/c Ratio	0.77	0.78	0.77					0.54		1.82	0.34	
Uniform Delay, d1	40.3	40.5	40.4					19.6		54.0	9.1	
Progression Factor	1.00	1.00	1.00					1.00		1.09	0.38	
Incremental Delay, d2	6.8	8.5	8.1					0.9		385.3	0.3	
Delay (s)	47.2	49.0	48.5					20.4		444.2	3.8	
Level of Service	D	D	D					C		F	A	
Approach Delay (s)		48.2			0.0			20.4			131.5	
Approach LOS		D			A			C			F	

Intersection Summary			
HCM 2000 Control Delay	63.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	74.3%	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	0	0	207	212	286	406	843	136	84	822	334
Future Volume (vph)	0	0	0	207	212	286	406	843	136	84	822	334
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.9		4.0	4.4		4.5	4.4	4.0
Lane Util. Factor					0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	1.00
Frt					0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)					3213		3367	3388		1736	3471	1527
Flt Permitted					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)					3213		3367	3388		1736	3471	1527
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	220	226	304	432	897	145	89	874	355
RTOR Reduction (vph)	0	0	0	0	102	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	648	0	432	1033	0	89	874	355
Confl. Peds. (#/hr)							13		1	1		13
Confl. Bikes (#/hr)									2			3
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA		Prot	NA		Prot	NA	Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases												Free
Actuated Green, G (s)					27.1		18.5	69.7		10.7	61.9	120.0
Effective Green, g (s)					27.2		18.5	69.8		10.2	62.0	120.0
Actuated g/C Ratio					0.23		0.15	0.58		0.08	0.52	1.00
Clearance Time (s)					4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)					2.5		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)					728		519	1970		147	1793	1527
v/s Ratio Prot					c0.20		c0.13	c0.30		c0.05	0.25	
v/s Ratio Perm												0.23
v/c Ratio					0.89		0.83	0.52		0.61	0.49	0.23
Uniform Delay, d1					45.0		49.2	15.1		53.0	18.7	0.0
Progression Factor					1.00		1.06	1.03		1.00	1.00	1.00
Incremental Delay, d2					12.8		9.3	0.9		4.8	1.0	0.4
Delay (s)					57.7		61.6	16.5		57.7	19.7	0.4
Level of Service					E		E	B		E	B	A
Approach Delay (s)		0.0			57.7			29.7			17.0	
Approach LOS		A			E			C			B	

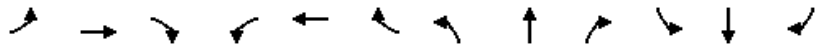
Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1278	55	78	274	64	60	192	128	314	321	21
Future Volume (veh/h)	9	1278	55	78	274	64	60	192	128	314	321	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		0.97	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	9	1318	57	80	282	66	62	198	132	324	331	0
Adj No. of Lanes	1	2	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	1400	60	101	1593	693	79	257	216	349	541	460
Arrive On Green	0.01	0.43	0.43	0.06	0.48	0.48	0.05	0.15	0.15	0.21	0.31	0.00
Sat Flow, veh/h	1681	3270	141	1681	3353	1458	1681	1765	1488	1681	1765	1500
Grp Volume(v), veh/h	9	675	700	80	282	66	62	198	132	324	331	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1735	1681	1676	1458	1681	1765	1488	1681	1765	1500
Q Serve(g_s), s	0.6	43.7	43.9	5.3	5.5	2.8	4.1	12.3	9.4	21.5	18.2	0.0
Cycle Q Clear(g_c), s	0.6	43.7	43.9	5.3	5.5	2.8	4.1	12.3	9.4	21.5	18.2	0.0
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	22	718	743	101	1593	693	79	257	216	349	541	460
V/C Ratio(X)	0.41	0.94	0.94	0.79	0.18	0.10	0.79	0.77	0.61	0.93	0.61	0.00
Avail Cap(c_a), veh/h	296	739	765	296	1593	693	296	622	525	370	622	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.5	31.0	31.1	52.6	17.1	16.4	53.5	46.7	45.5	44.1	33.6	0.0
Incr Delay (d2), s/veh	4.5	19.6	19.6	5.2	0.1	0.1	6.4	1.9	1.0	27.6	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	24.0	25.1	2.6	2.5	1.1	2.1	6.1	3.9	12.7	8.9	0.0
LnGrp Delay(d),s/veh	60.0	50.6	50.7	57.9	17.1	16.4	59.9	48.5	46.5	71.7	34.3	0.0
LnGrp LOS	E	D	D	E	B	B	E	D	D	E	C	
Approach Vol, veh/h		1384			428			392			655	
Approach Delay, s/veh		50.7			24.6			49.6			52.8	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	53.6	9.3	39.8	5.5	58.9	27.6	21.5
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	50.0	20.0	40.0	20.0	50.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	7.3	45.9	6.1	20.2	2.6	7.5	23.5	14.3
Green Ext Time (p_c), s	0.1	2.7	0.0	2.2	0.0	16.8	0.1	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	47.2
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	951	74	44	461	98	33	154	69	235	184	27
Future Volume (veh/h)	77	951	74	44	461	98	33	154	69	235	184	27
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	89	1093	85	51	530	113	38	177	79	270	211	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	2	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	1622	126	81	1368	291	69	235	199	338	345	293
Arrive On Green	0.07	0.52	0.52	0.05	0.50	0.50	0.04	0.13	0.13	0.10	0.20	0.00
Sat Flow, veh/h	1681	3147	245	1681	2753	585	1681	1765	1500	3261	1765	1500
Grp Volume(v), veh/h	89	582	596	51	322	321	38	177	79	270	211	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1715	1681	1676	1661	1681	1765	1500	1630	1765	1500
Q Serve(g_s), s	4.7	23.2	23.2	2.7	10.8	10.8	2.0	8.7	4.3	7.3	9.8	0.0
Cycle Q Clear(g_c), s	4.7	23.2	23.2	2.7	10.8	10.8	2.0	8.7	4.3	7.3	9.8	0.0
Prop In Lane	1.00		0.14	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	864	884	81	833	826	69	235	199	338	345	293
V/C Ratio(X)	0.80	0.67	0.67	0.63	0.39	0.39	0.55	0.75	0.40	0.80	0.61	0.00
Avail Cap(c_a), veh/h	149	864	884	149	833	826	187	431	367	362	431	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.4	16.2	16.2	42.1	14.1	14.1	42.4	37.6	35.7	39.4	33.1	0.0
Incr Delay (d2), s/veh	14.0	4.2	4.1	3.0	0.4	0.4	2.6	1.9	0.5	10.2	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	11.7	11.9	1.3	5.0	5.0	1.0	4.3	1.8	3.7	4.9	0.0
LnGrp Delay(d),s/veh	55.4	20.4	20.3	45.1	14.5	14.5	44.9	39.5	36.2	49.6	33.7	0.0
LnGrp LOS	E	C	C	D	B	B	D	D	D	D	C	
Approach Vol, veh/h		1267			694			294			481	
Approach Delay, s/veh		22.8			16.8			39.3			42.6	
Approach LOS		C			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	51.4	7.7	22.6	10.0	49.7	13.3	17.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	4.3	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	11.7	25.2	4.0	11.8	6.7	12.8	9.3	10.7
Green Ext Time (p_c), s	0.0	5.8	0.0	1.2	0.0	14.3	0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	26.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	319	867	67	27	400	88	54	340	42	68	148	93
Future Volume (vph)	319	867	67	27	400	88	54	340	42	68	148	93
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	1.00
Satd. Flow (prot)	1676	3311		1676	3262			1731			1737	1473
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.98	1.00
Satd. Flow (perm)	1676	3311		1676	3262			1731			1737	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	336	913	71	28	421	93	57	358	44	72	156	98
RTOR Reduction (vph)	0	2	0	0	10	0	0	2	0	0	0	83
Lane Group Flow (vph)	336	982	0	28	504	0	0	457	0	0	228	15
Confl. Peds. (#/hr)			1	1			3					3
Confl. Bikes (#/hr)			1									
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	37.8	66.1		6.2	34.5			50.7			25.9	25.9
Effective Green, g (s)	37.8	66.1		6.2	34.5			50.7			25.9	25.9
Actuated g/C Ratio	0.22	0.39		0.04	0.20			0.30			0.15	0.15
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	375	1295		61	666			519			266	225
v/s Ratio Prot	c0.20	c0.30		0.02	0.15			c0.26			c0.13	
v/s Ratio Perm												0.01
v/c Ratio	0.90	0.76		0.46	0.76			0.88			0.86	0.07
Uniform Delay, d1	63.6	44.5		79.7	63.2			56.2			69.7	61.2
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	22.4	2.8		2.0	5.2			15.5			22.1	0.0
Delay (s)	86.1	47.2		81.7	68.4			71.7			91.8	61.2
Level of Service	F	D		F	E			E			F	E
Approach Delay (s)		57.1			69.1			71.7			82.6	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	65.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	168.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	73	663	74	27	255
Future Vol, veh/h	23	73	663	74	27	255
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	78	713	80	29	274

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1085	753	0	0	792	0
Stage 1	753	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	240	410	-	-	829	-
Stage 1	465	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	230	410	-	-	829	-
Mov Cap-2 Maneuver	230	-	-	-	-	-
Stage 1	465	-	-	-	-	-
Stage 2	697	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.8	0	0.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	345	829	-
HCM Lane V/C Ratio	-	-	0.299	0.035	-
HCM Control Delay (s)	-	-	19.8	9.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1736	152	102	716	135	147
Future Volume (veh/h)	1736	152	102	716	135	147
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.99	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	1827	160	107	754	142	155
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1950	865	306	2692	199	178
Arrive On Green	0.58	0.58	0.18	0.80	0.12	0.12
Sat Flow, veh/h	3441	1487	1681	3441	1681	1500
Grp Volume(v), veh/h	1827	160	107	754	142	155
Grp Sat Flow(s),veh/h/ln	1676	1487	1681	1676	1681	1500
Q Serve(g_s), s	70.1	7.1	7.8	8.0	11.4	14.2
Cycle Q Clear(g_c), s	70.1	7.1	7.8	8.0	11.4	14.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1950	865	306	2692	199	178
V/C Ratio(X)	0.94	0.18	0.35	0.28	0.71	0.87
Avail Cap(c_a), veh/h	1976	876	306	2692	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	13.7	50.0	3.5	59.4	60.7
Incr Delay (d2), s/veh	10.1	0.5	0.3	0.1	1.8	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	35.0	3.0	3.6	3.7	5.4	6.3
LnGrp Delay(d),s/veh	37.0	14.2	50.3	3.6	61.2	68.5
LnGrp LOS	D	B	D	A	E	E
Approach Vol, veh/h	1987			861	297	
Approach Delay, s/veh	35.2			9.4	65.0	
Approach LOS	D			A	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	31.0	86.9		22.1		117.9		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	15.0	* 83		27.5		101.5		
Max Q Clear Time (g_c+I1), s	9.8	72.1		16.2		10.0		
Green Ext Time (p_c), s	2.7	9.3		0.4		8.7		

Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	1752	6	6	717	122	13	3	8	154	1	82
Future Volume (vph)	128	1752	6	6	717	122	13	3	8	154	1	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	1676	4815		1676	4691			1641			1681	1473
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (perm)	1676	4815		1676	4691			1641			1681	1473
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	1788	6	6	732	124	13	3	8	157	1	84
RTOR Reduction (vph)	0	0	0	0	10	0	0	8	0	0	0	73
Lane Group Flow (vph)	131	1794	0	6	846	0	0	16	0	0	158	11
Confl. Peds. (#/hr)	3					3	4					4
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	15.3	96.3		1.3	82.3			4.3			18.1	18.1
Effective Green, g (s)	15.3	96.3		1.3	82.3			4.3			18.1	18.1
Actuated g/C Ratio	0.11	0.69		0.01	0.59			0.03			0.13	0.13
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	183	3312		15	2757			50			217	190
v/s Ratio Prot	c0.08	c0.37		0.00	0.18			c0.01			c0.09	
v/s Ratio Perm												0.01
v/c Ratio	0.72	0.54		0.40	0.31			0.32			0.73	0.06
Uniform Delay, d1	60.2	10.9		69.0	14.5			66.4			58.6	53.5
Progression Factor	1.35	0.42		0.96	0.89			1.00			1.00	1.00
Incremental Delay, d2	6.7	0.4		5.6	0.1			1.4			9.9	0.0
Delay (s)	88.1	4.9		71.8	12.9			67.8			68.5	53.5
Level of Service	F	A		E	B			E			E	D
Approach Delay (s)		10.6			13.3			67.8			63.3	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.2%	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 (vph)	127	1377	171	329	639	77	248	486	494	138	262	55
Future Volume (vph)	127	1377	171	329	639	77	248	486	494	138	262	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4725		3252	4724		1526	3204	1488	1676	3252	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4725		3252	4724		1526	3204	1488	1676	3252	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	135	1465	182	350	680	82	264	517	526	147	279	59
RTOR Reduction (vph)	0	10	0	0	9	0	0	0	126	0	14	0
Lane Group Flow (vph)	135	1637	0	350	753	0	238	543	400	147	324	0
Confl. Peds. (#/hr)	9		7	7		9	7		1	1		7
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	15.2	54.6		18.9	58.3		27.3	27.3	46.2	19.2	19.2	
Effective Green, g (s)	15.2	54.6		18.9	58.3		27.3	27.3	46.2	19.2	19.2	
Actuated g/C Ratio	0.11	0.39		0.13	0.42		0.20	0.20	0.33	0.14	0.14	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	181	1842		439	1967		297	624	491	229	445	
v/s Ratio Prot	0.08	c0.35		0.11	c0.16		0.16	c0.17	c0.11	0.09	c0.10	
v/s Ratio Perm									0.16			
v/c Ratio	0.75	0.89		0.80	0.38		0.80	0.87	0.81	0.64	0.73	
Uniform Delay, d1	60.5	39.9		58.7	28.4		53.8	54.6	43.0	57.1	57.9	
Progression Factor	1.06	1.05		1.23	1.15		1.01	1.02	1.73	1.00	1.00	
Incremental Delay, d2	12.0	6.1		8.5	0.2		3.6	3.3	2.5	4.5	5.0	
Delay (s)	75.9	47.8		80.4	32.8		58.0	58.9	76.7	61.7	62.9	
Level of Service	E	D		F	C		E	E	E	E	E	
Approach Delay (s)		49.9			47.8			65.9			62.5	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.6%	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)	337	1662	4	67	793	119	35	17	24	215	7	146
Future Volume (vph)	337	1662	4	67	793	119	35	17	24	215	7	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1676	4815		1676	4687		1676	1596		1593	1601	1436
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	1676	4815		1676	4687		1676	1596		1593	1601	1436
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)	351	1731	4	70	826	124	36	18	25	224	7	152
RTOR Reduction (vph)	0	0	0	0	11	0	0	24	0	0	0	129
Lane Group Flow (vph)	351	1735	0	70	939	0	36	19	0	114	117	23
Confl. Peds. (#/hr)	17		11	11		17	21					21
Confl. Bikes (#/hr)			3			1			1			
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	34.1	82.8		8.5	57.7		7.8	7.8		20.9	20.9	20.9
Effective Green, g (s)	34.1	82.8		8.5	57.7		7.8	7.8		20.9	20.9	20.9
Actuated g/C Ratio	0.24	0.59		0.06	0.41		0.06	0.06		0.15	0.15	0.15
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	408	2847		101	1931		93	88		237	239	214
v/s Ratio Prot	c0.21	c0.36		0.04	0.20		c0.02	0.01		0.07	c0.07	
v/s Ratio Perm												0.02
v/c Ratio	0.86	0.61		0.69	0.49		0.39	0.22		0.48	0.49	0.11
Uniform Delay, d1	50.7	18.3		64.5	30.3		63.8	63.2		54.6	54.7	51.5
Progression Factor	0.72	1.23		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.0	0.5		15.3	0.3		1.0	0.5		0.6	0.6	0.1
Delay (s)	45.3	22.9		79.8	30.5		64.8	63.7		55.1	55.2	51.6
Level of Service	D	C		E	C		E	E		E	E	D
Approach Delay (s)		26.7			33.9			64.2			53.7	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.1%	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)	306	667	126	222	295	95	257	1363	744	89	483	153
Future Volume (veh/h)	306	667	126	222	295	95	257	1363	744	89	483	153
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	340	741	140	247	328	106	286	1514	827	99	537	170
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	797	350	292	567	180	168	1572	689	120	1477	657
Arrive On Green	0.10	0.24	0.24	0.09	0.23	0.23	0.10	0.47	0.47	0.07	0.44	0.44
Sat Flow, veh/h	3261	3353	1472	3261	2493	791	1681	3353	1469	1681	3353	1491
Grp Volume(v), veh/h	340	741	140	247	219	215	286	1514	827	99	537	170
Grp Sat Flow(s),veh/h/ln	1630	1676	1472	1630	1676	1608	1681	1676	1469	1681	1676	1491
Q Serve(g_s), s	14.0	30.3	11.2	10.4	16.2	16.7	14.0	61.2	65.7	8.1	14.9	10.1
Cycle Q Clear(g_c), s	14.0	30.3	11.2	10.4	16.2	16.7	14.0	61.2	65.7	8.1	14.9	10.1
Prop In Lane	1.00		1.00	1.00		0.49	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	797	350	292	381	365	168	1572	689	120	1477	657
V/C Ratio(X)	1.04	0.93	0.40	0.85	0.57	0.59	1.70	0.96	1.20	0.82	0.36	0.26
Avail Cap(c_a), veh/h	326	814	357	326	407	390	168	1572	689	408	1477	657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	52.2	44.9	62.8	48.1	48.3	63.0	36.0	37.2	64.1	26.1	24.7
Incr Delay (d2), s/veh	61.4	16.4	0.3	15.4	0.9	1.2	339.9	15.4	103.7	5.2	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	15.8	4.6	5.3	7.6	7.5	22.4	31.5	46.3	4.0	7.0	4.2
LnGrp Delay(d),s/veh	124.4	68.6	45.2	78.2	49.0	49.5	402.9	51.4	140.9	69.3	26.3	25.0
LnGrp LOS	F	E	D	E	D	D	F	D	F	E	C	C
Approach Vol, veh/h		1221			681			2627			806	
Approach Delay, s/veh		81.4			59.7			117.9			31.3	
Approach LOS		F			E			F			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	14.0	71.2	18.0	36.8	18.0	67.2	16.5	38.3
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	34.0	39.5	14.0	34.0	14.0	59.5	14.0	34.0
Max Q Clear Time (g_c+I1), s	10.1	67.7	16.0	18.7	16.0	16.9	12.4	32.3
Green Ext Time (p_c), s	0.1	0.0	0.0	4.9	0.0	22.6	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	89.0
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	492	131	265	539	446	185	1655	179	191	522	149
Future Volume (veh/h)	395	492	131	265	539	446	185	1655	179	191	522	149
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	429	535	142	288	586	485	201	1799	195	208	567	162
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	419	781	336	335	695	297	224	1739	187	231	1491	416
Arrive On Green	0.13	0.23	0.23	0.10	0.21	0.21	0.13	0.39	0.39	0.14	0.40	0.40
Sat Flow, veh/h	3261	3353	1441	3261	3353	1433	1681	4406	475	1681	3739	1043
Grp Volume(v), veh/h	429	535	142	288	586	485	201	1309	685	208	485	244
Grp Sat Flow(s),veh/h/ln	1630	1676	1441	1630	1676	1433	1681	1606	1669	1681	1606	1570
Q Serve(g_s), s	18.0	20.4	11.7	12.2	23.5	29.0	16.5	55.2	55.2	17.1	15.0	15.5
Cycle Q Clear(g_c), s	18.0	20.4	11.7	12.2	23.5	29.0	16.5	55.2	55.2	17.1	15.0	15.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.28	1.00		0.66
Lane Grp Cap(c), veh/h	419	781	336	335	695	297	224	1267	659	231	1281	626
V/C Ratio(X)	1.02	0.68	0.42	0.86	0.84	1.63	0.90	1.03	1.04	0.90	0.38	0.39
Avail Cap(c_a), veh/h	419	781	336	419	695	297	372	1267	659	372	1281	626
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.0	49.0	45.7	61.8	53.3	55.5	59.7	42.4	42.4	59.4	29.8	30.0
Incr Delay (d2), s/veh	50.0	2.1	0.3	11.8	8.9	300.0	9.0	34.1	46.0	10.7	0.9	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	11.0	9.7	4.7	6.0	11.8	36.2	8.2	30.5	33.8	8.6	6.8	7.0
LnGrp Delay(d),s/veh	111.0	51.1	46.0	73.6	62.2	355.5	68.7	76.5	88.3	70.1	30.7	31.8
LnGrp LOS	F	D	D	E	E	F	E	F	F	E	C	C
Approach Vol, veh/h		1106			1359			2195			937	
Approach Delay, s/veh		73.7			169.3			79.5			39.7	
Approach LOS		E			F			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.7	61.3	18.4	37.6	23.3	60.7	22.0	34.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	31.0	43.5	18.0	29.0	31.0	43.5	18.0	29.0
Max Q Clear Time (g_c+I1), s	19.5	17.5	14.2	22.4	19.1	57.2	20.0	31.0
Green Ext Time (p_c), s	0.2	23.5	0.2	3.5	0.2	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	93.5
HCM 2010 LOS	F

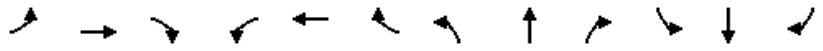
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	449	1628	118	77	1225	374	214	78	103	412	48	532
Future Volume (veh/h)	449	1628	118	77	1225	374	214	78	103	412	48	532
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	468	1696	0	80	1276	0	223	81	0	429	50	554
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	1	2
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	522	2526	787	223	2083	649	274	442	198	479	344	929
Arrive On Green	0.16	0.52	0.00	0.07	0.43	0.00	0.08	0.13	0.00	0.15	0.19	0.19
Sat Flow, veh/h	3261	4818	1500	3261	4818	1500	3261	3353	1500	3261	1765	2595
Grp Volume(v), veh/h	468	1696	0	80	1276	0	223	81	0	429	50	554
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	1500	1630	1676	1500	1630	1765	1298
Q Serve(g_s), s	19.7	36.2	0.0	3.3	28.6	0.0	9.4	3.0	0.0	18.1	3.3	24.5
Cycle Q Clear(g_c), s	19.7	36.2	0.0	3.3	28.6	0.0	9.4	3.0	0.0	18.1	3.3	24.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	522	2526	787	223	2083	649	274	442	198	479	344	929
V/C Ratio(X)	0.90	0.67	0.00	0.36	0.61	0.00	0.81	0.18	0.00	0.89	0.15	0.60
Avail Cap(c_a), veh/h	745	2526	787	303	2083	649	606	730	327	606	378	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.69	0.69	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.6	24.4	0.0	62.3	30.7	0.0	63.1	54.1	0.0	58.6	46.7	37.0
Incr Delay (d2), s/veh	8.0	1.4	0.0	0.3	0.3	0.0	2.3	0.1	0.0	11.9	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	16.4	0.0	1.5	12.7	0.0	4.3	1.4	0.0	9.0	1.6	8.9
LnGrp Delay(d),s/veh	65.6	25.9	0.0	62.6	30.9	0.0	65.3	54.1	0.0	70.5	46.8	37.6
LnGrp LOS	E	C		E	C		E	D		E	D	D
Approach Vol, veh/h		2164			1356			304			1033	
Approach Delay, s/veh		34.5			32.8			62.3			51.7	
Approach LOS		C			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.6	78.4	15.7	32.3	26.4	65.5	24.6	23.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	* 5
Max Green Setting (Gmax), s	13.0	53.0	26.0	30.0	32.0	34.0	26.0	* 31
Max Q Clear Time (g_c+I1), s	5.3	38.2	11.4	26.5	21.7	30.6	20.1	5.0
Green Ext Time (p_c), s	0.1	11.9	0.3	0.8	0.7	3.1	0.5	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	39.4
HCM 2010 LOS	D

Notes

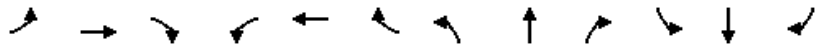
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	1815	300	0	763	25	478	658	174	131	428	162
Future Volume (veh/h)	297	1815	300	0	763	25	478	658	174	131	428	162
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	0	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	323	1973	0	0	829	0	520	715	189	142	465	176
Adj No. of Lanes	2	3	1	0	3	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	367	2215	690	0	1492	0	575	838	222	168	815	359
Arrive On Green	0.11	0.46	0.00	0.00	0.31	0.00	0.18	0.32	0.32	0.10	0.24	0.24
Sat Flow, veh/h	3261	4818	1500	0	5135	0	3261	2623	693	1681	3353	1475
Grp Volume(v), veh/h	323	1973	0	0	829	0	520	457	447	142	465	176
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	0	1606	0	1630	1676	1640	1681	1676	1475
Q Serve(g_s), s	11.7	45.0	0.0	0.0	17.2	0.0	18.8	30.6	30.6	10.0	14.6	12.3
Cycle Q Clear(g_c), s	11.7	45.0	0.0	0.0	17.2	0.0	18.8	30.6	30.6	10.0	14.6	12.3
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	367	2215	690	0	1492	0	575	536	524	168	815	359
V/C Ratio(X)	0.88	0.89	0.00	0.00	0.56	0.00	0.90	0.85	0.85	0.85	0.57	0.49
Avail Cap(c_a), veh/h	367	2215	690	0	1492	0	611	559	547	217	922	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	29.7	0.0	0.0	34.5	0.0	48.4	38.2	38.2	53.1	39.9	39.0
Incr Delay (d2), s/veh	15.6	3.6	0.0	0.0	1.5	0.0	16.5	12.3	12.5	21.8	0.9	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	20.6	0.0	0.0	7.8	0.0	9.8	15.9	15.6	5.6	6.9	5.2
LnGrp Delay(d),s/veh	68.0	33.2	0.0	0.0	36.0	0.0	64.9	50.5	50.7	74.9	40.8	40.5
LnGrp LOS	E	C			D		E	D	D	E	D	D
Approach Vol, veh/h		2296			829			1424			783	
Approach Delay, s/veh		38.1			36.0			55.8			46.9	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	18.0	42.2	25.7	34.2		60.2	16.5	43.3
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0		5.0	4.5	5.0
Max Green Setting (Gmax), s	13.5	32.0	22.5	33.0		50.0	15.5	40.0
Max Q Clear Time (g_c+I1), s	13.7	19.2	20.8	16.6		47.0	12.0	32.6
Green Ext Time (p_c), s	0.0	12.3	0.4	10.9		3.0	0.1	5.7

Intersection Summary	
HCM 2010 Ctrl Delay	43.8
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	699	99	103	327	219	137	871	241	234	998	34
Future Volume (veh/h)	103	699	99	103	327	219	137	871	241	234	998	34
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	108	736	104	108	344	231	144	917	254	246	1051	36
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	984	139	131	1124	492	169	1022	282	273	1127	493
Arrive On Green	0.08	0.34	0.34	0.08	0.34	0.34	0.10	0.27	0.27	0.16	0.34	0.34
Sat Flow, veh/h	1681	2936	415	1681	3353	1469	1681	3720	1026	1681	3353	1468
Grp Volume(v), veh/h	108	420	420	108	344	231	144	791	380	246	1051	36
Grp Sat Flow(s),veh/h/ln	1681	1676	1674	1681	1676	1469	1681	1606	1534	1681	1676	1468
Q Serve(g_s), s	7.6	26.7	26.7	7.6	9.1	14.9	10.1	28.4	28.6	17.2	36.4	2.0
Cycle Q Clear(g_c), s	7.6	26.7	26.7	7.6	9.1	14.9	10.1	28.4	28.6	17.2	36.4	2.0
Prop In Lane	1.00		0.25	1.00		1.00	1.00		0.67	1.00		1.00
Lane Grp Cap(c), veh/h	131	562	561	131	1124	492	169	882	422	273	1127	493
V/C Ratio(X)	0.83	0.75	0.75	0.83	0.31	0.47	0.85	0.90	0.90	0.90	0.93	0.07
Avail Cap(c_a), veh/h	140	562	561	140	1124	492	252	882	422	392	1174	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.5	35.4	35.4	54.5	29.6	31.5	53.1	41.9	41.9	49.3	38.5	27.1
Incr Delay (d2), s/veh	27.8	8.8	8.9	27.5	0.2	0.7	10.9	11.5	21.5	14.4	12.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	13.7	13.7	4.5	4.2	6.1	5.2	14.0	14.7	9.1	18.8	0.8
LnGrp Delay(d),s/veh	82.3	44.2	44.3	82.0	29.7	32.2	64.0	53.4	63.4	63.7	51.1	27.1
LnGrp LOS	F	D	D	F	C	C	E	D	E	E	D	C
Approach Vol, veh/h		948			683			1315			1333	
Approach Delay, s/veh		48.6			38.8			57.4			52.8	
Approach LOS		D			D			E			D	

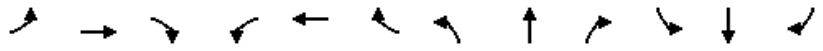
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	45.2	16.1	45.3	13.3	45.2	23.5	38.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	32.0	18.0	42.0	10.0	32.0	28.0	32.0
Max Q Clear Time (g_c+I1), s	9.6	28.7	12.1	38.4	9.6	16.9	19.2	30.6
Green Ext Time (p_c), s	0.0	2.3	0.1	2.0	0.0	7.3	0.2	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	51.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	143	0	0	441	108	397	975	15	0	0	0
Future Volume (vph)	8	143	0	0	441	108	397	975	15	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.97		1.00	1.00				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1676	1765			3241		1442	4527				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1676	1765			3241		1442	4527				
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)	9	155	0	0	479	117	432	1060	16	0	0	0
RTOR Reduction (vph)	0	0	0	0	27	0	0	1	0	0	0	0
Lane Group Flow (vph)	9	155	0	0	569	0	363	1144	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			23	23		
Confl. Bikes (#/hr)			3			1			1			
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.2	25.7			20.5		53.8	53.8				
Effective Green, g (s)	1.2	25.7			20.5		53.8	53.8				
Actuated g/C Ratio	0.01	0.29			0.23		0.60	0.60				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	22	504			738		861	2706				
v/s Ratio Prot	0.01	c0.09			c0.18		0.25	c0.25				
v/s Ratio Perm												
v/c Ratio	0.41	0.31			0.77		0.42	0.42				
Uniform Delay, d1	44.0	25.2			32.6		9.7	9.7				
Progression Factor	1.00	1.00			1.59		1.00	1.00				
Incremental Delay, d2	4.5	0.1			4.3		1.5	0.5				
Delay (s)	48.5	25.3			56.0		11.2	10.2				
Level of Service	D	C			E		B	B				
Approach Delay (s)		26.6			56.0			10.5			0.0	
Approach LOS		C			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
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 (veh/h)	314	218	131	179	106	80	106	1624	363	95	487	91
Future Volume (veh/h)	314	218	131	179	106	80	106	1624	363	95	487	91
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	324	225	135	185	109	82	109	1674	374	98	502	94
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	1065	614	123	1565	698	130	813	179	118	815	149
Arrive On Green	0.13	0.52	0.52	0.07	0.47	0.47	0.08	0.21	0.21	0.07	0.20	0.20
Sat Flow, veh/h	1681	2048	1181	1681	3353	1495	1681	3946	871	1681	4090	749
Grp Volume(v), veh/h	324	183	177	185	109	82	109	1359	689	98	392	204
Grp Sat Flow(s),veh/h/ln	1681	1676	1552	1681	1676	1495	1681	1606	1605	1681	1606	1627
Q Serve(g_s), s	19.0	8.8	9.3	11.0	2.7	4.6	9.6	30.9	30.9	8.6	16.7	17.2
Cycle Q Clear(g_c), s	19.0	8.8	9.3	11.0	2.7	4.6	9.6	30.9	30.9	8.6	16.7	17.2
Prop In Lane	1.00		0.76	1.00		1.00	1.00		0.54	1.00		0.46
Lane Grp Cap(c), veh/h	213	872	808	123	1565	698	130	662	331	118	640	324
V/C Ratio(X)	1.52	0.21	0.22	1.50	0.07	0.12	0.84	2.05	2.08	0.83	0.61	0.63
Avail Cap(c_a), veh/h	213	872	808	123	1565	698	314	662	331	403	824	418
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.5	19.4	19.5	69.5	22.0	22.6	68.3	59.5	59.5	68.8	54.8	55.0
Incr Delay (d2), s/veh	257.4	0.5	0.6	263.0	0.0	0.1	3.3	477.0	493.8	5.5	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.0	4.2	4.1	14.1	1.2	1.9	4.6	57.5	59.0	4.2	7.4	7.8
LnGrp Delay(d),s/veh	322.9	19.9	20.1	332.5	22.1	22.7	71.6	536.6	553.3	74.3	55.1	55.7
LnGrp LOS	F	B	C	F	C	C	E	F	F	E	E	E
Approach Vol, veh/h		684			376			2157			694	
Approach Delay, s/veh		163.5			174.9			518.4			58.0	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	84.0	15.6	35.4	23.0	76.0	14.6	36.4
Change Period (Y+Rc), s	4.0	6.0	4.0	5.5	4.0	6.0	4.0	5.5
Max Green Setting (Gmax), s	11.0	53.0	28.0	38.5	19.0	45.0	36.0	30.5
Max Q Clear Time (g_c+I1), s	13.0	11.3	11.6	19.2	21.0	6.6	10.6	32.9
Green Ext Time (p_c), s	0.0	5.0	0.1	10.7	0.0	5.0	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	341.6
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	505	644	70	184	325	106	183	1360	392	159	311	190
Future Volume (vph)	505	644	70	184	325	106	183	1360	392	159	311	190
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.5	6.5	5.0	6.5		5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1459	3252	4618		3252	4818	1471	3252	4818	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1459	3252	4618		3252	4818	1471	3252	4818	1468
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	537	685	74	196	346	113	195	1447	417	169	331	202
RTOR Reduction (vph)	0	0	56	0	44	0	0	0	162	0	0	117
Lane Group Flow (vph)	537	685	18	196	415	0	195	1447	255	169	331	85
Confl. Peds. (#/hr)	5		10	10		5	6		4	4		6
Confl. Bikes (#/hr)			2						2			
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8						6			2
Actuated Green, G (s)	28.3	36.6	36.6	13.5	21.8		13.4	64.2	64.2	12.2	63.0	63.0
Effective Green, g (s)	28.3	36.6	36.6	13.5	21.8		13.4	64.2	64.2	12.2	63.0	63.0
Actuated g/C Ratio	0.19	0.24	0.24	0.09	0.15		0.09	0.43	0.43	0.08	0.42	0.42
Clearance Time (s)	5.0	6.5	6.5	5.0	6.5		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	613	1175	355	292	671		290	2062	629	264	2023	616
v/s Ratio Prot	c0.17	c0.14		0.06	0.09		c0.06	c0.30		0.05	0.07	
v/s Ratio Perm			0.01						0.17			0.06
v/c Ratio	0.88	0.58	0.05	0.67	0.62		0.67	0.70	0.41	0.64	0.16	0.14
Uniform Delay, d1	59.1	50.0	43.4	66.1	60.2		66.2	35.1	29.7	66.8	27.1	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.37	0.53	0.60
Incremental Delay, d2	12.9	0.9	0.1	4.7	2.0		4.8	1.2	0.6	2.9	0.1	0.3
Delay (s)	72.1	50.9	43.5	70.8	62.2		70.9	36.3	30.3	94.5	14.4	16.3
Level of Service	E	D	D	E	E		E	D	C	F	B	B
Approach Delay (s)		59.2			64.7			38.3			34.2	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	47.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	23.5
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Existing	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	936	178	9600	2000	0.10	0.09	75.4	-	3.1	-	A

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	722	7200	0.10	71.7	3.4	A

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	1163	441	9600	2000	0.08	0.22	75.4	-	2.4	-	A

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2352	3121	0.75	27.8	21.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1732	7200	0.24	71.7	8.0	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2142	5811	0.37	62.0	8.6	A

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	1614	1129	9600	2000	0.17	0.56	60.8	57.7	6.6	8.6	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	56.5	6.5	6.5	2.7	A

Facility Overall Results

Space Mean Speed, mi/h	56.5	Density, veh/mi/ln	6.5
Average Travel Time, min	2.7	Density, pc/mi/ln	6.5

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	Existing AM
Analysis Year	2019	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	5636	6300	0.89	66.6	28.2	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	6042	7802	0.77	60.4	25.0	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5321	8400	0.65	71.3	18.0	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5523	6885	0.85	26.5	52.0	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3802	6300	0.72	16.1	78.5	F

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3703	178	6300	2000	0.75	0.09	12.8	64.2	96.6	23.1	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4445	883	4774	2000	1.17	0.44	66.3	63.9	22.3	23.7	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	33.1	43.4	43.2	4.0	F

Facility Overall Results

Space Mean Speed, mi/h	33.1	Density, veh/mi/ln	43.2
Average Travel Time, min	4.0	Density, pc/mi/ln	43.4

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	Existing AM Peak
Analysis Year	2017	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	2
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	2
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	2
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	2
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	2

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	6581	201	8400	2000	0.88	0.10	21.5	60.5	76.4	25.7	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	6177	897	8400	2000	0.81	0.45	21.0	-	73.4	-	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5135	6300	0.95	29.6	57.8	F

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5169	303	8400	2000	0.71	0.15	16.9	-	76.5	-	F

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5016	54	6300	2000	1.00	0.03	26.9	60.9	62.1	29.7	F

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4843	6300	0.99	21.5	75.2	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5835	1017	6300	2000	0.99	0.51	63.1	-	30.8	-	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	6067	7102	1.26	27.9	54.3	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4886	6279	1.25	22.4	72.7	F

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5866	1230	6300	2000	1.25	0.62	62.4	-	31.3	-	F

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7269	1403	8400	2000	1.08	0.70	65.4	-	27.8	-	F

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7269	1660	10500	2000	0.99	0.83	64.3	56.1	22.6	26.9	C

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5609	3710	10500	4000	0.84	0.93	53.4	-	21.0	-	C

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1899	4800	1.10	69.9	12.6	F

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2038	139	4800	2000	1.13	0.07	65.5	65.5	15.6	16.4	F

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1770	1770	1.56	19.7	45.0	F

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2398	4800	1.20	67.8	16.0	F

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1905	1905	1.61	21.2	45.0	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	30.7	46.5	46.2	14.0	F

Facility Overall Results

Space Mean Speed, mi/h	30.7	Density, veh/mi/ln	46.2
Average Travel Time, min	14.0	Density, pc/mi/ln	46.5

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	Existing AM Peak
Analysis Year	2017	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	2
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	2
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	2
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	2
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	2
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	4
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	4
8	Basic	Basic	Lane Drop to Port Chicago On	1680	3
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	3
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	3214	562	4200	2000	0.77	0.28	59.4	59.4	27.1	24.7	C
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2525		4200		0.60		68.9		18.3		C
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2804		4094		0.68		61.3		22.9		C
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2117	524	4800	2000	0.44	0.26	59.5	59.5	17.8	15.3	B
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1618		4800		0.34		70.5		11.5		B
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2748		5956		0.46		56.4		12.2		B
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2694		9600		0.28		70.5		9.6		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2694		7200		0.37		70.5		12.7		B
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3128		6840		0.46		64.6		16.1		B
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2676		7176		0.37		69.2		12.9		B
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3091		8170		0.38		65.3		11.8		B
Segment 12: Basic															

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2542		7200		0.35		70.5		12.0		B

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2829	287	7200	2000	0.39	0.14	68.3	65.7	13.8	14.5	B

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2947	132	7200	2000	0.39	0.07	75.4	-	12.4	-	B

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2941	165	9600	2000	0.31	0.08	70.7	60.6	10.4	8.9	A

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2784	239	9600	2000	0.29	0.12	75.4	-	9.2	-	A

Segment 17: Basic

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2556		7200		0.36		71.3		11.9		B

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3298	742	7200	2000	0.36	0.37	75.4	-	11.3	-	B

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3262	0	9600	2000	0.34	0.00	71.7	61.1	11.4	9.3	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.7	13.9	13.8	6.9	B

Facility Overall Results

Space Mean Speed, mi/h	66.7	Density, veh/mi/ln	13.8

Average Travel Time, min	6.9	Density, pc/mi/ln	13.9

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Existing	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	6569	1041	8400	2000	0.67	0.52	66.9	-	24.5	-	C

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4543	6300	0.70	32.0	47.3	F

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4577	341	8400	2000	0.52	0.17	14.0	-	81.7	-	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5030	7060	0.80	15.1	83.2	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4226	6300	0.82	16.9	83.6	F

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4121	7500	0.73	10.0	102.9	F

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	3754	872	4032	2000	1.26	0.44	67.0	58.5	14.0	15.4	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	23.0	57.5	57.3	6.5	F

Facility Overall Results

Space Mean Speed, mi/h	23.0	Density, veh/mi/ln	57.3
Average Travel Time, min	6.5	Density, pc/mi/ln	57.5

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	Existing AM
Analysis Year	2019	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	3092	6300	0.49	74.2	13.9	B

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3315	7231	0.46	63.5	13.1	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3006	8400	0.36	72.2	10.4	A

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3416	4375	0.78	54.1	15.8	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2187	6300	0.35	72.2	10.1	A

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	2350	163	6300	2000	0.37	0.08	68.8	66.0	11.4	12.0	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3156	806	6300	2000	0.50	0.40	67.6	65.3	15.6	17.4	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.3	12.7	12.6	2.0	B

Facility Overall Results

Space Mean Speed, mi/h	67.3	Density, veh/mi/ln	12.6
Average Travel Time, min	2.0	Density, pc/mi/ln	12.7

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	Existing AM Peak
Analysis Year	2017	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	2
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	2
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	2
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	2
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	2

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	3798	340	8400	2000	0.45	0.17	69.9	60.1	13.6	12.9	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3292	442	8400	2000	0.39	0.22	75.3	-	10.9	-	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2871	6300	0.46	71.6	13.4	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3208	337	8400	2000	0.34	0.17	75.4	-	9.5	-	A

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3192	425	6300	2000	0.51	0.21	65.1	59.8	16.3	16.4	B

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2787	6300	0.44	70.5	13.2	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3085	298	6300	2000	0.44	0.15	74.9	-	12.4	-	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3572	8400	0.37	75.4	10.2	A

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3146	6279	0.50	69.0	15.2	B

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3614	468	6300	2000	0.50	0.23	74.0	-	14.2	-	B

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4473	881	8400	2000	0.43	0.44	75.1	-	12.0	-	B

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4431	300	10500	2000	0.42	0.15	70.1	60.2	12.6	13.5	B

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4145	2571	10500	4000	0.39	0.64	75.3	-	11.0	-	A

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1697	4800	0.35	70.0	12.1	B

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2193	496	4800	2000	0.46	0.25	65.4	65.4	16.8	17.4	B

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2665	4118	0.65	61.9	21.5	C

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2401	4800	0.50	70.9	16.9	B

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2978	4686	0.64	64.4	23.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.8	13.5	13.5	6.1	B

Facility Overall Results

Space Mean Speed, mi/h	70.8	Density, veh/mi/ln	13.5
Average Travel Time, min	6.1	Density, pc/mi/ln	13.5

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	Existing AM Peak
Analysis Year	2017	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	2
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	2
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	2
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	2
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	2
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	4
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	4
8	Basic	Basic	Lane Drop to Port Chicago On	1680	3
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	3
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	3209	164	4200	2000	1.27	0.08	20.3	60.6	79.2	42.8	F
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2974		4200		1.17		17.4		85.5		F
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3551		3828		1.45		39.0		45.5		F
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3436	286	4200	2000	1.30	0.14	33.4	60.2	51.4	43.9	F
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2998		4200		1.23		20.0		75.1		F
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1170		1256		4.18		7.0		45.0		F
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2075		8400		0.88		63.5		6.9		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2075		6300		1.18		70.0		9.2		F
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1885		1885		1.51		14.0		45.0		F
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2444		6279		1.24		69.1		10.8		F
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1203		1203		3.24		6.7		45.0		F
Segment 12: Basic															

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2291	6300	1.21	70.4	10.1	F

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2513	222	6300	2000	1.24	0.11	68.6	65.9	12.2	12.9	F

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2615	102	6300	2000	1.24	0.05	68.7	-	12.7	-	F

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2615	451	8400	2000	0.94	0.23	68.6	59.7	9.5	9.0	A

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2164	654	8400	2000	0.89	0.33	66.6	-	8.1	-	A

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1510	6300	1.09	70.8	6.7	F

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2713	1203	6300	2000	1.09	0.60	67.4	-	13.4	-	F

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2713	0	8400	2000	0.95	0.00	71.7	61.1	9.5	7.2	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	23.0	33.4	32.9	20.1	F

Facility Overall Results

Space Mean Speed, mi/h	23.0	Density, veh/mi/ln	32.9

Average Travel Time, min	20.1	Density, pc/mi/ln	33.4

Copyright © 2019 University of Florida. All Rights Reserved.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = 371 veh/h
	Freeway Volume, V_F: 1414	
	Ramp Volume, V_R: 411	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1414	0.92	Level	6	0	0.971	1.00	1583
Ramp	411	0.92	Level	6	0	0.971	1.00	460
UpStream								
DownStream	371	0.92	Level	6	0	0.971	1.00	415

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 950 pc/h

V_3 or V_{av34} 316 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1583	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1123	Exhibit 13-8	9400	No
V_R	460	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	950	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 5.2 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.469 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 60.0 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 3:44 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	WB SR-4
Junction	NB Bailey Rd Diagonal Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	650
Freeway Volume, V_F	4768
Ramp Volume, V_R	191
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1155 ft
V_D = 854 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4768	0.92	Level	5	0	0.976	1.00	5312
Ramp	191	0.92	Level	5	0	0.976	1.00	213
UpStream								
DownStream	854	0.92	Level	5	0	0.976	1.00	951

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = 1055.69 (Equation 13-12 or 13-13)
P_{FD} = 0.617 using Equation 9 (Exhibit 13-7)
V_{12} = 3361 pc/h
V_3 or V_{av34} 1951 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5312	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	5099	Exhibit 13-8	7050	No
V_R	213	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3361	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 27.3 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.447 (Exhibit 13-12)
S_R= 54.7 mph (Exhibit 13-12)
S_0= 67.6 mph (Exhibit 13-12)
S = 58.8 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3420 ft
V_u = 411 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	485
Deceleration Lane Length L_D	
Freeway Volume, V_F	1003
Ramp Volume, V_R	371
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1003	0.92	Level	6	0	0.971	1.00	1123
Ramp	371	0.92	Level	6	0	0.971	1.00	415
UpStream	411	0.92	Level	6	0	0.971	1.00	460
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.320 using Equation 0 (Exhibit 13-6)
V_{12} = 360 pc/h
V_3 or V_{av34} = 381 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 449 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1538	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	864	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 9.0 (pc/mi/ln)
LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.296 (Exibit 13-11)
S_R = 58.2 mph (Exhibit 13-11)
S_0 = 65.0 mph (Exhibit 13-11)
S = 61.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	WB SR-4
Junction	SB Bailey Rd Loop Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	320
Freeway Volume, V_F	4577
Ramp Volume, V_R	854
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1265 ft
V_D = 288 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4577	0.92	Level	5	0	0.976	1.00	5099
Ramp	854	0.92	Level	5	0	0.976	1.00	951
UpStream								
DownStream	288	0.92	Level	5	0	0.976	1.00	321

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2760 pc/h
V_3 or V_{av34} 1169 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5099	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4148	Exhibit 13-8	9400	No
V_R	951	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2760	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 25.1 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.514 (Exhibit 13-12)
S_R= 53.2 mph (Exhibit 13-12)
S_0= 70.6 mph (Exhibit 13-12)
S = 60.0 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1360 ft
V_u = veh/h	Deceleration Lane Length L_D: 475	V_D = 273 veh/h
	Freeway Volume, V_F: 1390	
	Ramp Volume, V_R: 505	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1390	0.92	Level	6	0	0.971	1.00	1556
Ramp	505	0.92	Level	6	0	0.971	1.00	565
UpStream								
DownStream	273	0.92	Level	6	0	0.971	1.00	306

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 997 pc/h

V_3 or V_{av34} 279 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1556	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	991	Exhibit 13-8	9400	No
V_R	565	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	997	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 8.6 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.479 (Exhibit 13-12)

S_R= 54.0 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 59.1 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 3:58 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1265 ft	Acceleration Lane Length, L_A: 415	L_{down} = ft
V_u = 854 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3723	
	Ramp Volume, V_R: 288	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3723	0.92	Level	5	0	0.976	1.00	4148
Ramp	288	0.92	Level	5	0	0.976	1.00	321
UpStream	854	0.92	Level	5	0	0.976	1.00	951
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 568.83 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)

V_{12} = 2444 pc/h

V_3 or V_{av34} = 1704 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2444 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4469	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2765	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 24.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.354 (Exibit 13-11)

S_R = 56.9 mph (Exhibit 13-11)

S_0 = 60.7 mph (Exhibit 13-11)

S = 58.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 126 veh/h
	Freeway Volume, V_F: 885	
	Ramp Volume, V_R: 273	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	885	0.92	Level	6	0	0.971	1.00	991
Ramp	273	0.92	Level	6	0	0.971	1.00	306
UpStream								
DownStream	126	0.92	Level	6	0	0.971	1.00	141

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.323 using Equation 0 (Exhibit 13-6)

V_{12} = 320 pc/h

V_3 or V_{av34} = 335 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 396 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1297	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	702	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 8.0 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.297 (Exibit 13-11)

S_R= 58.2 mph (Exhibit 13-11)

S_0= 65.0 mph (Exhibit 13-11)

S = 61.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1520 ft
V_u = veh/h	Deceleration Lane Length L_D: 685	V_D = 968 veh/h
	Freeway Volume, V_F: 5040	
	Ramp Volume, V_R: 51	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5040	0.92	Level	6	0	0.971	1.00	5643
Ramp	51	0.92	Level	6	0	0.971	1.00	57
UpStream								
DownStream	968	0.92	Level	6	0	0.971	1.00	1084

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.616 using Equation 9 (Exhibit 13-7)

V_{12} = 3500 pc/h

V_3 or V_{av34} 2143 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5643	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	5586	Exhibit 13-8	7050	No
V_R	57	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3500	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 28.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.433 (Exhibit 13-12)

S_R= 55.0 mph (Exhibit 13-12)

S_0= 66.8 mph (Exhibit 13-12)

S = 59.0 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1300 ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = 273 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1158	
	Ramp Volume, V_R: 126	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1158	0.92	Level	6	0	0.971	1.00	1296
Ramp	126	0.92	Level	6	0	0.971	1.00	141
UpStream	273	0.92	Level	6	0	0.971	1.00	306
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.519 using Equation 0 (Exhibit 13-6)

V_{12} = 672 pc/h

V_3 or V_{av34} = 312 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 672 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1437	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	813	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 5.5 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.260 (Exibit 13-11)

S_R = 59.0 mph (Exhibit 13-11)

S_0 = 65.0 mph (Exhibit 13-11)

S = 61.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 380	L_{down} = 1270 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 1616 veh/h
	Freeway Volume, V_F: 4989	
	Ramp Volume, V_R: 968	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4989	0.92	Level	6	0	0.971	1.00	5586
Ramp	968	0.92	Level	6	0	0.971	1.00	1084
UpStream								
DownStream	1616	0.92	Level	6	0	0.971	1.00	1809

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.588 using Equation 3 (Exhibit 13-6)

V_{12} = 3285 pc/h

V_3 or V_{av34} = 2301 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3285 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6670	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4369	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 36.7 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.602 (Exibit 13-11)

S_R = 51.1 mph (Exhibit 13-11)

S_0 = 58.5 mph (Exhibit 13-11)

S = 53.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1410 ft
V_u = veh/h	Deceleration Lane Length L_D: 570	V_D = 228 veh/h
	Freeway Volume, V_F: 1210	
	Ramp Volume, V_R: 157	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1210	0.92	Level	6	0	0.971	1.00	1355
Ramp	157	0.92	Level	6	0	0.971	1.00	176
UpStream								
DownStream	228	0.92	Level	6	0	0.971	1.00	255

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 690 pc/h

V_3 or V_{av34} 332 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1355	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1179	Exhibit 13-8	9400	No
V_R	176	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	690	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 5.1 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.444 (Exhibit 13-12)

S_R= 54.8 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 61.8 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1270 ft	Acceleration Lane Length, L_A: 950	L_{down} = ft
V_u = 968 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F:	
	Ramp Volume, V_R: 1616	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway		0.92	Level	6	0	0.971	1.00	6874
Ramp	1616	0.92	Level	6	0	0.971	1.00	1809
UpStream	968	0.92	Level	6	0	0.971	1.00	1084
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.604 using Equation 3 (Exhibit 13-6)

V_{12} = 4153 pc/h

V_3 or V_{av34} = 2721 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 4174 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8683	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5983	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 45.4 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.801 (Exibit 13-11)

S_R = 23.6 mph (Exhibit 13-11)

S_0 = 56.1 mph (Exhibit 13-11)

S = 28.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	EB SR-4
Junction	NB Bailey Rd Loop Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	285
Freeway Volume, V_F	1053
Ramp Volume, V_R	228
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1310 ft
V_D = 706 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1053	0.92	Level	6	0	0.971	1.00	1179
Ramp	228	0.92	Level	6	0	0.971	1.00	255
UpStream								
DownStream	706	0.92	Level	6	0	0.971	1.00	790

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 658 pc/h
V_3 or V_{av34} 260 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1179	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	924	Exhibit 13-8	9400	No
V_R	255	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	658	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 7.3 (pc/mi/ln)
LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.451 (Exhibit 13-12)
S_R= 54.6 mph (Exhibit 13-12)
S_0= 71.3 mph (Exhibit 13-12)
S = 60.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3055 ft
V_u = veh/h	Deceleration Lane Length L_D: 700	V_D = 1171 veh/h
	Freeway Volume, V_F: 5789	
	Ramp Volume, V_R: 937	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5789	0.92	Level	6	0	0.971	1.00	6481
Ramp	937	0.92	Level	6	0	0.971	1.00	1049
UpStream								
DownStream	1171	0.92	Level	6	0	0.971	1.00	1311

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3417 pc/h

V_3 or V_{av34} 1532 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6481	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5432	Exhibit 13-8	9400	No
V_R	1049	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3417	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 27.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.522 (Exhibit 13-12)

S_R= 53.0 mph (Exhibit 13-12)

S_0= 69.2 mph (Exhibit 13-12)

S = 59.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1310 ft
V_u = 228 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	825
Ramp Volume, V_R	706
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	825	0.92	Level	6	0	0.971	1.00	924
Ramp	706	0.92	Level	6	0	0.971	1.00	790
UpStream	228	0.92	Level	6	0	0.971	1.00	255
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.246 using Equation 0 (Exhibit 13-6)
V_{12} = 228 pc/h
V_3 or V_{av34} = 348 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 369 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1714	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1159	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 11.6 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.305 (Exibit 13-11)
S_R = 58.0 mph (Exhibit 13-11)
S_0 = 65.0 mph (Exhibit 13-11)
S = 60.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3055 ft
V_u = 937 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	450
Deceleration Lane Length L_D	
Freeway Volume, V_F	4852
Ramp Volume, V_R	1171
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4852	0.92	Level	6	0	0.971	1.00	5432
Ramp	1171	0.92	Level	6	0	0.971	1.00	1311
UpStream	937	0.92	Level	6	0	0.971	1.00	1049
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = 1071.00 (Equation 13-6 or 13-7)
P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)
V_{12} = 3205 pc/h
V_3 or V_{av34} = 2227 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 3205 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6743	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4516	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = 37.3 (pc/mi/ln)
LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.646 (Exibit 13-11)
S_R = 50.1 mph (Exhibit 13-11)
S_0 = 58.8 mph (Exhibit 13-11)
S = 52.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed		Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = 1314 veh/h
	Freeway Volume, V_F: 6375	
	Ramp Volume, V_R: 343	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6375	0.92	Level	6	0	0.971	1.00	7137
Ramp	343	0.92	Level	6	0	0.971	1.00	384
UpStream								
DownStream	1314	0.92	Level	6	0	0.971	1.00	1471

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.564 using Equation 9 (Exhibit 13-7)

V_{12} = 4192 pc/h

V_3 or V_{av34} 2945 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 4437 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7137	Exhibit 13-8	7050	Yes
$V_{FO} = V_F - V_R$	6753	Exhibit 13-8	7050	No
V_R	384	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4192	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 35.2 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.463 (Exhibit 13-12)

S_R= 54.4 mph (Exhibit 13-12)

S_0= 64.7 mph (Exhibit 13-12)

S = 57.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	650
Freeway Volume, V_F	3616
Ramp Volume, V_R	324
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1155 ft
V_D = 805 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3616	0.92	Level	5	0	0.976	1.00	4029
Ramp	324	0.92	Level	5	0	0.976	1.00	361
UpStream								
DownStream	805	0.92	Level	5	0	0.976	1.00	897

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 1960 pc/h
V_3 or V_{av34} 1034 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4029	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3668	Exhibit 13-8	9400	No
V_R	361	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1960	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 15.3 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.460 (Exhibit 13-12)
S_R= 54.4 mph (Exhibit 13-12)
S_0= 71.2 mph (Exhibit 13-12)
S = 61.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3420 ft
V_u = 343 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	485
Deceleration Lane Length L_D	
Freeway Volume, V_F	6032
Ramp Volume, V_R	1314
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6032	0.92	Level	6	0	0.971	1.00	6753
Ramp	1314	0.92	Level	6	0	0.971	1.00	1471
UpStream	343	0.92	Level	6	0	0.971	1.00	384
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = 1403.48 (Equation 13-6 or 13-7)
P_{FM} = 0.591 using Equation 3 (Exhibit 13-6)
V_{12} = 3992 pc/h
V_3 or V_{av34} = 2761 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 4053 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8224	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5524	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = 44.8 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.265 (Exibit 13-11)
S_R = 35.9 mph (Exhibit 13-11)
S_0 = 56.1 mph (Exhibit 13-11)
S = 40.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	320
Freeway Volume, V_F	3292
Ramp Volume, V_R	
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1265 ft
V_D = 321 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3292	0.92	Level	5	0	0.976	1.00	3668
Ramp		0.92	Level	5	0	0.976	1.00	897
UpStream								
DownStream	321	0.92	Level	5	0	0.976	1.00	358

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2105 pc/h
V_3 or V_{av34} 781 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3668	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2771	Exhibit 13-8	9400	No
V_R	897	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2105	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.5 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.509 (Exhibit 13-12)
S_R= 53.3 mph (Exhibit 13-12)
S_0= 71.3 mph (Exhibit 13-12)
S = 59.7 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1360 ft
V_u = veh/h	Deceleration Lane Length L_D: 475	V_D = 211 veh/h
	Freeway Volume, V_F: 6264	
	Ramp Volume, V_R: 1467	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6264	0.92	Level	6	0	0.971	1.00	7013
Ramp	1467	0.92	Level	6	0	0.971	1.00	1642
UpStream								
DownStream	211	0.92	Level	6	0	0.971	1.00	236

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3984 pc/h

V_3 or V_{av34} 1514 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7013	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5371	Exhibit 13-8	9400	No
V_R	1642	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3984	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 34.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.576 (Exhibit 13-12)

S_R= 51.8 mph (Exhibit 13-12)

S_0= 69.3 mph (Exhibit 13-12)

S = 58.1 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 4:24 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1265 ft	Acceleration Lane Length, L_A: 415	L_{down} = ft
V_u = 805 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2487	
	Ramp Volume, V_R: 321	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2487	0.92	Level	5	0	0.976	1.00	2771
Ramp	321	0.92	Level	5	0	0.976	1.00	358
UpStream	805	0.92	Level	5	0	0.976	1.00	897
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.173 using Equation 0 (Exhibit 13-6)

V_{12} = 480 pc/h

V_3 or V_{av34} = 1145 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1108 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3129	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1466	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 14.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.309 (Exibit 13-11)

S_R = 57.9 mph (Exhibit 13-11)

S_0 = 63.8 mph (Exhibit 13-11)

S = 60.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 97 veh/h
	Freeway Volume, V_F: 4797	
	Ramp Volume, V_R: 211	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4797	0.92	Level	6	0	0.971	1.00	5371
Ramp	211	0.92	Level	6	0	0.971	1.00	236
UpStream								
DownStream	97	0.92	Level	6	0	0.971	1.00	109

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)

V_{12} = 3169 pc/h

V_3 or V_{av34} = 2202 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5607	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3405	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 29.1 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.407 (Exibit 13-11)

S_R = 55.6 mph (Exhibit 13-11)

S_0 = 58.9 mph (Exhibit 13-11)

S = 56.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	WB SR-4
Junction	San Marco Blvd Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	685
Freeway Volume, V_F	3822
Ramp Volume, V_R	405
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1520 ft
V_D = 284 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3822	0.92	Level	6	0	0.971	1.00	4279
Ramp	405	0.92	Level	6	0	0.971	1.00	453
UpStream								
DownStream	284	0.92	Level	6	0	0.971	1.00	318

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2121 pc/h
V_3 or V_{av34} 1079 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4279	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3826	Exhibit 13-8	9400	No
V_R	453	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2121	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.3 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.469 (Exhibit 13-12)
S_R= 54.2 mph (Exhibit 13-12)
S_0= 71.0 mph (Exhibit 13-12)
S = 61.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1300 ft
V_u = 211 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1000
Deceleration Lane Length L_D	
Freeway Volume, V_F	5008
Ramp Volume, V_R	97
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5008	0.92	Level	6	0	0.971	1.00	5607
Ramp	97	0.92	Level	6	0	0.971	1.00	109
UpStream	211	0.92	Level	6	0	0.971	1.00	236
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.605 using Equation 3 (Exhibit 13-6)
V_{12} = 3395 pc/h
V_3 or V_{av34} = 2212 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 3395 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5716	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3504	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 26.5 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.381 (Exibit 13-11)
S_R = 56.2 mph (Exhibit 13-11)
S_0 = 58.8 mph (Exhibit 13-11)
S = 57.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 380	L_{down} = 1270 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 459 veh/h
	Freeway Volume, V_F: 3417	
	Ramp Volume, V_R: 284	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3417	0.92	Level	6	0	0.971	1.00	3826
Ramp	284	0.92	Level	6	0	0.971	1.00	318
UpStream								
DownStream	459	0.92	Level	6	0	0.971	1.00	514

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.178 using Equation 0 (Exhibit 13-6)

V_{12} = 681 pc/h

V_3 or V_{av34} = 1572 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1530 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4144	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1848	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 17.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.319 (Exibit 13-11)

S_R = 57.7 mph (Exhibit 13-11)

S_0 = 62.7 mph (Exhibit 13-11)

S = 60.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1410 ft
V_u = veh/h	Deceleration Lane Length L_D: 570	V_D = 623 veh/h
	Freeway Volume, V_F: 5453	
	Ramp Volume, V_R: 429	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5453	0.92	Level	6	0	0.971	1.00	6105
Ramp	429	0.92	Level	6	0	0.971	1.00	480
UpStream								
DownStream	623	0.92	Level	6	0	0.971	1.00	697

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2932 pc/h

V_3 or V_{av34} 1586 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6105	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5625	Exhibit 13-8	9400	No
V_R	480	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2932	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 24.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.471 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 69.0 mph (Exhibit 13-12)

S = 61.0 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1270 ft	Acceleration Lane Length, L_A: 950	L_{down} = ft
V_u = 284 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3701	
	Ramp Volume, V_R: 459	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3701	0.92	Level	6	0	0.971	1.00	4144
Ramp	459	0.92	Level	6	0	0.971	1.00	514
UpStream	284	0.92	Level	6	0	0.971	1.00	318
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.154 using Equation 0 (Exhibit 13-6)

V_{12} = 636 pc/h

V_3 or V_{av34} = 1754 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1657 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4658	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2171	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 16.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.289 (Exibit 13-11)

S_R = 58.4 mph (Exhibit 13-11)

S_0 = 62.3 mph (Exhibit 13-11)

S = 60.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1310 ft
V_u = veh/h	Deceleration Lane Length L_D: 285	V_D = 1145 veh/h
	Freeway Volume, V_F: 5024	
	Ramp Volume, V_R: 623	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5024	0.92	Level	6	0	0.971	1.00	5625
Ramp	623	0.92	Level	6	0	0.971	1.00	697
UpStream								
DownStream	1145	0.92	Level	6	0	0.971	1.00	1282

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2846 pc/h

V_3 or V_{av34} 1389 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5625	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4928	Exhibit 13-8	9400	No
V_R	697	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2846	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.491 (Exhibit 13-12)

S_R= 53.7 mph (Exhibit 13-12)

S_0= 69.8 mph (Exhibit 13-12)

S = 60.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3055 ft
V_u = veh/h	Deceleration Lane Length L_D: 700	V_D = 446 veh/h
	Freeway Volume, V_F: 4391	
	Ramp Volume, V_R: 384	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4391	0.92	Level	6	0	0.971	1.00	4916
Ramp	384	0.92	Level	6	0	0.971	1.00	430
UpStream								
DownStream	446	0.92	Level	6	0	0.971	1.00	499

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2172 pc/h

V_3 or V_{av34} 1126 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4425	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3995	Exhibit 13-8	9400	No
V_R	430	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2172	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.6 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.467 (Exhibit 13-12)

S_R= 54.3 mph (Exhibit 13-12)

S_0= 70.8 mph (Exhibit 13-12)

S = 61.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 4:31 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1310 ft
V_u = 623 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	4401
Ramp Volume, V_R	1145
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4401	0.92	Level	6	0	0.971	1.00	4927
Ramp	1145	0.92	Level	6	0	0.971	1.00	1282
UpStream	623	0.92	Level	6	0	0.971	1.00	697
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 934.53 (Equation 13-6 or 13-7)
P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)
V_{12} = 2901 pc/h
V_3 or V_{av34} 2026 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2901 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6209	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4183	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 35.0 (pc/mi/ln)
LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.549 (Exibit 13-11)
S_R= 52.4 mph (Exhibit 13-11)
S_0= 59.5 mph (Exhibit 13-11)
S = 54.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R= mph (Exhibit 13-12)
S_0= mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3055 ft
V_u = 384 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	450
Deceleration Lane Length L_D	
Freeway Volume, V_F	4007
Ramp Volume, V_R	446
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4007	0.92	Level	6	0	0.971	1.00	4486
Ramp	446	0.92	Level	6	0	0.971	1.00	499
UpStream	384	0.92	Level	6	0	0.971	1.00	430
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.155 using Equation 0 (Exhibit 13-6)
V_{12} = 697 pc/h
V_3 or V_{av34} = 1894 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 1794 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4985	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2293	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.3 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.328 (Exibit 13-11)
S_R = 57.5 mph (Exhibit 13-11)
S_0 = 62.0 mph (Exhibit 13-11)
S = 59.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

Trip Generation

Trip Generation Planner (ITE 9th Edition)

Kimley-Horn and Associates, Inc.

Weekday Trip Generation
Trips Based on Average Rates/Equations

Project Name FariaAnnexation
Project Number 097464007

ITE Code	Land Use Description	Independent Variable	No. of Units	Avg Rate or Eq	Trip Rates: Daily Rate	Trip Rates: AM Rate	Trip Rates: PM Rate	Total Trips: Daily Trips	Total Trips: AM Trips	Total Trips: PM Trips	Total Trips: AM Trips In	Total Trips: AM Trips Out	Total Trips: PM Trips In	Total Trips: PM Trips Out	Net Trips after Pass-By Reduction: Daily Trips	Net Trips after Pass-By Reduction: AM Trips	Net Trips after Pass-By Reduction: PM Trips	Net Trips after Pass-By Reduction: AM Trips In	Net Trips after Pass-By Reduction: AM Trips Out	Net Trips after Pass-By Reduction: PM Trips In	Net Trips after Pass-By Reduction: PM Trips Out
210	Single-Family Detached Housing	Dwelling Unit(s)	1500	Eq	N/A	N/A	N/A	12560	1060	1202	265	795	757	445	12560	1060	1202	265	795	757	445
220	Apartment	Dwelling Unit(s)		Avg	6.65	0.51	0.62														
221	Low-Rise Apartment	Occ. Dwelling Unit(s)		Avg	6.59	0.46	0.58														
222	High-Rise Apartment	Dwelling Unit(s)		Avg	4.20	0.30	0.35														
223	Mid-Rise Apartment	Dwelling Unit(s)		Avg	*	0.30	0.39														
224	Rental Townhouse	Dwelling Unit(s)		Avg	*	0.70	0.72														
230	Residential Condominium/Townhouse	Dwelling Unit(s)		Avg	5.81	0.44	0.52														
231	Low-Rise Residential Condominium/Townhouse	Dwelling Unit(s)		Avg	*	0.67	0.78														
232	High-Rise Residential Condominium/Townhouse	Dwelling Unit(s)		Avg	4.18	0.34	0.38														
233	Luxury Condominium/Townhouse	Occ. Dwelling Unit(s)		Avg	*	0.56	0.55														
							Totals	12560	1060	1202	265	795	757	445	12560	1060	1202	265	795	757	445

Notes:
(1) AM and/or PM rates correspond to peak hour of generator

A Trip generation data from ITE *Trip Generation, 8th Edition*
B AM/PM rates correspond to peak of adjacent street traffic (if data available)
C Includes weekday rates only
D Total trips include pass-by trips w/ no internal capture
E Pass-by rates from ITE *Trip Generation Handbook, 2nd Edition*
F Internal capture rates from ITE *Trip Generation Handbook, 2nd Edition*
G Worksheet is intended as a planning tool. Verify results w/ ITE *Trip Generation, 9th Edition*
H Enter data only in green shaded cells

Existing Plus Project Traffic Conditions

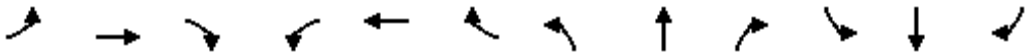
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	16	632	1	3	1237
Future Vol, veh/h	0	16	632	1	3	1237
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	672	1	3	1316

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1337	337	0	0	673	0
Stage 1	673	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	145	659	-	-	914	-
Stage 1	468	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	143	659	-	-	914	-
Mov Cap-2 Maneuver	143	-	-	-	-	-
Stage 1	468	-	-	-	-	-
Stage 2	468	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	659	914	-
HCM Lane V/C Ratio	-	-	0.026	0.003	-
HCM Control Delay (s)	-	-	10.6	9	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	199	2	226	0	0	0	0	295	353	32	1014	0
Future Volume (vph)	199	2	226	0	0	0	0	295	353	32	1014	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	219	2	248	0	0	0	0	324	388	35	1114	0

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total (vph)	221	248	162	162	388	406	743
Volume Left (vph)	219	0	0	0	0	35	0
Volume Right (vph)	0	248	0	0	388	0	0
Hadj (s)	0.23	-0.57	0.03	0.03	-0.67	0.08	0.03
Departure Headway (s)	6.6	3.2	6.6	6.6	3.2	5.9	5.8
Degree Utilization, x	0.40	0.22	0.30	0.30	0.34	0.66	1.20
Capacity (veh/h)	537	1122	531	530	1113	599	625
Control Delay (s)	13.9	7.1	11.2	11.2	6.7	18.4	125.2
Approach Delay (s)	10.3		8.7			87.4	
Approach LOS	B		A			F	

Intersection Summary				
Delay	47.9			
Level of Service	E			
Intersection Capacity Utilization	75.4%	ICU Level of Service	D	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	165.4
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	0	0	0	0	769	108	108	0	230	264	0	0	0	277	880
Future Vol, veh/h	0	0	0	0	0	769	108	108	0	230	264	0	0	0	277	880
Peak Hour Factor	0.92	0.98	0.98	0.98	0.92	0.98	0.98	0.98	0.92	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	785	110	110	0	235	269	0	0	0	283	898
Number of Lanes	0	0	0	0	0	1	1	1	0	0	2	0	0	0	2	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	3	3	0
HCM Control Delay	84.3	53.8	282.1
HCM LOS	F	F	F

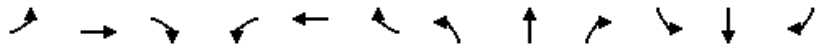
Lane	NBLn1	NBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	72%	0%	100%	75%	0%	0%	0%	0%
Vol Thru, %	28%	100%	0%	25%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	318	176	438	439	108	139	139	880
LT Vol	230	0	438	331	0	0	0	0
Through Vol	88	176	0	108	0	139	139	0
RT Vol	0	0	0	0	108	0	0	880
Lane Flow Rate	324	180	447	448	110	141	141	898
Geometry Grp	8	8	7	7	7	8	8	8
Degree of Util (X)	0.925	0.494	1.065	1.05	0.226	0.372	0.372	1.754
Departure Headway (Hd)	11.818	11.442	9.436	9.309	8.193	9.729	9.729	7.212
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	308	318	389	394	441	372	372	512
Service Time	9.518	9.142	7.136	7.009	5.893	7.429	7.429	4.912
HCM Lane V/C Ratio	1.052	0.566	1.149	1.137	0.249	0.379	0.379	1.754
HCM Control Delay	69.8	24.8	95.6	90.5	13.3	18.1	18.1	365.2
HCM Lane LOS	F	C	F	F	B	C	C	F
HCM 95th-tile Q	9	2.6	14	13.6	0.9	1.7	1.7	53.2

Intersection	
Intersection Delay, s/veh	24.5
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	191	21	2	0	2	35	41	0	109	203	0	0	12	105	286
Future Vol, veh/h	0	191	21	2	0	2	35	41	0	109	203	0	0	12	105	286
Peak Hour Factor	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	294	32	3	0	3	54	63	0	168	312	0	0	18	162	440
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	35	14.6	25.9	19.7
HCM LOS	D	B	D	C

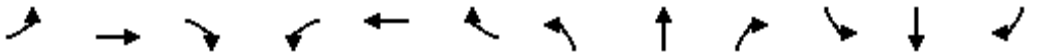
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	89%	3%	100%	0%	0%
Vol Thru, %	0%	100%	10%	45%	0%	52%	0%
Vol Right, %	0%	0%	1%	53%	0%	48%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	109	203	214	78	12	202	189
LT Vol	109	0	191	2	12	0	0
Through Vol	0	203	21	35	0	105	0
RT Vol	0	0	2	41	0	97	189
Lane Flow Rate	168	312	329	120	18	311	290
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.413	0.724	0.774	0.282	0.042	0.629	0.557
Departure Headway (Hd)	8.871	8.351	8.466	8.469	8.146	7.282	6.907
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	404	431	425	422	438	495	520
Service Time	6.669	6.149	6.243	6.268	5.929	5.064	4.689
HCM Lane V/C Ratio	0.416	0.724	0.774	0.284	0.041	0.628	0.558
HCM Control Delay	17.8	30.3	35	14.6	11.3	21.7	18.1
HCM Lane LOS	C	D	D	B	B	C	C
HCM 95th-tile Q	2	5.7	6.6	1.1	0.1	4.3	3.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	435	4	4	6	2	34	2	430	3	8	393	140
Future Volume (veh/h)	435	4	4	6	2	34	2	430	3	8	393	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	604	6	6	8	3	47	3	597	4	11	546	194
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	607	293	293	12	4	69	7	1056	7	12	758	268
Arrive On Green	0.36	0.36	0.36	0.06	0.06	0.06	0.00	0.31	0.31	0.01	0.31	0.31
Sat Flow, veh/h	1681	810	810	211	79	1239	1681	3414	23	1681	2427	859
Grp Volume(v), veh/h	604	0	12	58	0	0	3	293	308	11	377	363
Grp Sat Flow(s),veh/h/ln	1681	0	1621	1529	0	0	1681	1676	1760	1681	1676	1610
Q Serve(g_s), s	29.7	0.0	0.4	3.1	0.0	0.0	0.1	12.1	12.2	0.5	16.5	16.6
Cycle Q Clear(g_c), s	29.7	0.0	0.4	3.1	0.0	0.0	0.1	12.1	12.2	0.5	16.5	16.6
Prop In Lane	1.00		0.50	0.14		0.81	1.00		0.01	1.00		0.53
Lane Grp Cap(c), veh/h	607	0	586	86	0	0	7	519	544	12	523	503
V/C Ratio(X)	0.99	0.00	0.02	0.68	0.00	0.00	0.44	0.57	0.57	0.95	0.72	0.72
Avail Cap(c_a), veh/h	607	0	586	461	0	0	202	707	742	202	707	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	17.0	38.4	0.0	0.0	41.2	24.0	24.0	41.2	25.3	25.4
Incr Delay (d2), s/veh	35.0	0.0	0.0	3.4	0.0	0.0	15.9	1.0	0.9	63.5	2.3	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	19.7	0.0	0.2	1.4	0.0	0.0	0.1	5.8	6.0	0.5	8.0	7.7
LnGrp Delay(d),s/veh	61.4	0.0	17.1	41.9	0.0	0.0	57.2	25.0	24.9	104.7	27.6	27.8
LnGrp LOS	E		B	D			E	C	C	F	C	C
Approach Vol, veh/h		616			58			604			751	
Approach Delay, s/veh		60.5			41.9			25.1			28.9	
Approach LOS		E			D			C			C	

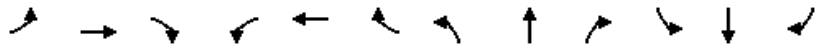
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.1	32.1		35.6	4.8	32.3		10.3
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	10.0	35.0		30.0	10.0	35.0		25.0
Max Q Clear Time (g_c+I1), s	2.5	14.2		31.7	2.1	18.6		5.1
Green Ext Time (p_c), s	0.0	8.2		0.0	0.0	7.3		0.1

Intersection Summary		
HCM 2010 Ctrl Delay	37.7	
HCM 2010 LOS	D	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	54	39	282	130	710	42	758	201	269	287	20
Future Volume (vph)	229	54	39	282	130	710	42	758	201	269	287	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	3143		1676	3353	833	1676	3238		3252	3317	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	3143		1676	3353	833	1676	3238		3252	3317	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	266	63	45	328	151	826	49	881	234	313	334	23
RTOR Reduction (vph)	0	30	0	0	0	203	0	17	0	0	3	0
Lane Group Flow (vph)	266	78	0	328	151	623	49	1098	0	313	354	0
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	18.0	46.0		18.0	46.0	46.0	8.1	28.2		18.0	38.1	
Effective Green, g (s)	18.0	46.0		18.0	46.0	46.0	8.1	28.2		18.0	38.1	
Actuated g/C Ratio	0.13	0.34		0.13	0.34	0.34	0.06	0.21		0.13	0.28	
Clearance Time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	224	1077		224	1149	285	101	680		436	941	
v/s Ratio Prot	0.16	0.02		c0.20	0.05		0.03	c0.34		c0.10	0.11	
v/s Ratio Perm						c0.75						
v/c Ratio	1.19	0.07		1.46	0.13	2.19	0.49	1.62		0.72	0.38	
Uniform Delay, d1	58.1	29.7		58.1	30.4	44.1	61.0	53.0		55.7	38.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	120.1	0.0		231.8	0.1	545.0	3.6	283.7		5.6	0.3	
Delay (s)	178.2	29.8		289.9	30.4	589.1	64.7	336.7		61.2	38.8	
Level of Service	F	C		F	C	F	E	F		E	D	
Approach Delay (s)		135.4			449.2			325.2			49.3	
Approach LOS		F			F			F			D	

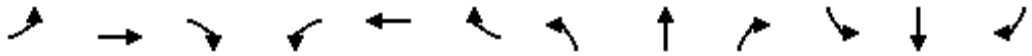
Intersection Summary			
HCM 2000 Control Delay	298.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	134.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	141.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	0	281	0	0	0	0	1555	142	0	295	273
Future Volume (veh/h)	278	0	281	0	0	0	0	1555	142	0	295	273
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	305	0	309				0	1709	156	0	324	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	908	0	418				0	2244	204	0	1674	749
Arrive On Green	0.28	0.00	0.28				0.00	0.50	0.50	0.00	0.50	0.00
Sat Flow, veh/h	3261	0	1500				0	4653	409	0	3441	1500
Grp Volume(v), veh/h	305	0	309				0	1220	645	0	324	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1692	0	1676	1500
Q Serve(g_s), s	3.5	0.0	8.8				0.0	14.5	14.6	0.0	2.5	0.0
Cycle Q Clear(g_c), s	3.5	0.0	8.8				0.0	14.5	14.6	0.0	2.5	0.0
Prop In Lane	1.00		1.00				0.00		0.24	0.00		1.00
Lane Grp Cap(c), veh/h	908	0	418				0	1604	845	0	1674	749
V/C Ratio(X)	0.34	0.00	0.74				0.00	0.76	0.76	0.00	0.19	0.00
Avail Cap(c_a), veh/h	3794	0	1746				0	1699	895	0	1774	793
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	13.6	0.0	15.5				0.0	9.6	9.6	0.0	6.6	0.0
Incr Delay (d2), s/veh	0.2	0.0	2.6				0.0	2.0	3.7	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	3.9				0.0	6.7	7.5	0.0	1.2	0.0
LnGrp Delay(d),s/veh	13.8	0.0	18.1				0.0	11.5	13.3	0.0	6.6	0.0
LnGrp LOS	B		B					B	B		A	
Approach Vol, veh/h		614						1865			324	
Approach Delay, s/veh		16.0						12.1			6.6	
Approach LOS		B						B			A	

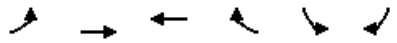
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		29.6		17.7		29.6		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		25.0		55.0		25.0		
Max Q Clear Time (g_c+I1), s		16.6		10.8		4.5		
Green Ext Time (p_c), s		7.0		2.3		14.6		

Intersection Summary	
HCM 2010 Ctrl Delay	12.3
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	324	20	20	16	392	373	0	0	1711	157
Future Volume (vph)	24	0	324	20	20	16	392	373	0	0	1711	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			*0.50	
Frpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.99	
Flt Protected	0.95		1.00		0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3252		1500		1722	1500	1676	4818			3479	
Flt Permitted	0.73		1.00		0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	2494		1500		1722	1500	1676	4818			3479	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	26	0	348	22	22	17	422	401	0	0	1840	169
RTOR Reduction (vph)	0	0	314	0	0	16	0	0	0	0	5	0
Lane Group Flow (vph)	26	0	34	0	44	1	422	401	0	0	2004	0
Confl. Bikes (#/hr)												1
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	7.7		7.7		4.3	4.3	20.3	54.7			30.4	
Effective Green, g (s)	7.7		7.7		4.3	4.3	20.3	54.7			30.4	
Actuated g/C Ratio	0.10		0.10		0.05	0.05	0.25	0.69			0.38	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	240		144		92	80	426	3306			1326	
v/s Ratio Prot					c0.03		c0.25	0.08			c0.58	
v/s Ratio Perm	0.01		c0.02			0.00						
v/c Ratio	0.11		0.23		0.48	0.01	0.99	0.12			1.51	
Uniform Delay, d1	32.9		33.3		36.6	35.7	29.6	4.3			24.7	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.1		0.6		1.4	0.0	40.9	0.0			234.1	
Delay (s)	33.0		33.9		38.0	35.7	70.6	4.3			258.7	
Level of Service	C		C		D	D	E	A			F	
Approach Delay (s)		33.8			37.4			38.3			258.7	
Approach LOS		C			D			D			F	

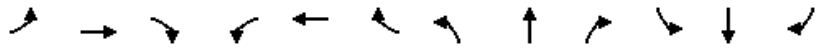
Intersection Summary			
HCM 2000 Control Delay	173.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	17.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	217	203	1193	413	241	606
Future Volume (veh/h)	217	203	1193	413	241	606
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	236	221	1297	449	262	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	369	2089	1423	928	673	309
Arrive On Green	0.11	0.62	0.42	0.42	0.21	0.00
Sat Flow, veh/h	3261	3441	3441	1458	3261	1500
Grp Volume(v), veh/h	236	221	1297	449	262	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1458	1630	1500
Q Serve(g_s), s	3.2	1.2	17.0	7.7	3.3	0.0
Cycle Q Clear(g_c), s	3.2	1.2	17.0	7.7	3.3	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	369	2089	1423	928	673	309
V/C Ratio(X)	0.64	0.11	0.91	0.48	0.39	0.00
Avail Cap(c_a), veh/h	696	2432	1431	932	1252	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.9	3.6	12.7	4.6	16.1	0.0
Incr Delay (d2), s/veh	1.8	0.0	9.1	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	1.5	0.6	9.5	4.8	1.5	0.0
LnGrp Delay(d),s/veh	21.7	3.6	21.7	5.0	16.4	0.0
LnGrp LOS	C	A	C	A	B	
Approach Vol, veh/h		457	1746		262	
Approach Delay, s/veh		12.9	17.4		16.4	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				33.2		13.7	9.3	23.9
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				34.0		18.0	10.0	20.0
Max Q Clear Time (g_c+I1), s				3.2		5.3	5.2	19.0
Green Ext Time (p_c), s				16.5		0.7	0.3	0.9

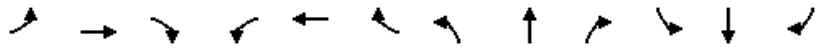
Intersection Summary	
HCM 2010 Ctrl Delay	16.5
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	235	160	251	952	5	298	15	177	9	17	9
Future Volume (veh/h)	5	235	160	251	952	5	298	15	177	9	17	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	5	250	170	267	1013	5	317	16	188	10	18	10
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	11	458	299	314	1428	7	358	528	446	21	104	58
Arrive On Green	0.01	0.24	0.24	0.19	0.42	0.42	0.21	0.30	0.30	0.01	0.10	0.10
Sat Flow, veh/h	1681	1929	1259	1681	3421	17	1681	1765	1489	1681	1058	588
Grp Volume(v), veh/h	5	216	204	267	496	522	317	16	188	10	0	28
Grp Sat Flow(s),veh/h/ln	1681	1676	1512	1681	1676	1761	1681	1765	1489	1681	0	1646
Q Serve(g_s), s	0.2	9.0	9.6	12.3	19.7	19.7	14.7	0.5	8.1	0.5	0.0	1.3
Cycle Q Clear(g_c), s	0.2	9.0	9.6	12.3	19.7	19.7	14.7	0.5	8.1	0.5	0.0	1.3
Prop In Lane	1.00		0.83	1.00		0.01	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	11	398	359	314	700	735	358	528	446	21	0	163
V/C Ratio(X)	0.45	0.54	0.57	0.85	0.71	0.71	0.89	0.03	0.42	0.48	0.00	0.17
Avail Cap(c_a), veh/h	367	606	546	670	919	966	446	638	538	691	0	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.7	26.8	27.0	31.5	19.3	19.3	30.6	19.9	22.5	39.4	0.0	33.2
Incr Delay (d2), s/veh	26.3	0.6	0.8	6.4	1.2	1.1	16.2	0.0	0.3	15.9	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.3	4.0	6.3	9.3	9.8	8.4	0.3	3.3	0.3	0.0	0.6
LnGrp Delay(d),s/veh	66.0	27.4	27.7	38.0	20.5	20.4	46.8	19.9	22.9	55.3	0.0	33.4
LnGrp LOS	E	C	C	D	C	C	D	B	C	E		C
Approach Vol, veh/h		425			1285			521			38	
Approach Delay, s/veh		28.0			24.1			37.4			39.2	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	29.5	20.1	24.5	22.2	13.4	5.6	39.0
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	33.0	29.0	32.0	29.0	21.3	41.0	17.5	44.0
Max Q Clear Time (g_c+I2), s	2.2	10.1	14.3	11.6	16.7	3.3	2.2	21.7
Green Ext Time (p_c), s	0.0	0.5	0.7	6.3	0.4	0.5	0.0	6.9

Intersection Summary	
HCM 2010 Ctrl Delay	28.1
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	283	46	18	826	4	61	11	102	38	24	31
Future Volume (veh/h)	4	283	46	18	826	4	61	11	102	38	24	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	289	47	18	843	4	62	11	104	39	24	32
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	523	85	19	639	3	103	18	173	101	62	83
Arrive On Green	0.00	0.35	0.35	0.01	0.36	0.36	0.19	0.19	0.19	0.15	0.15	0.15
Sat Flow, veh/h	1681	1474	240	1681	1755	8	541	96	908	663	408	544
Grp Volume(v), veh/h	4	0	336	18	0	847	177	0	0	95	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1713	1681	0	1763	1546	0	0	1616	0	0
Q Serve(g_s), s	0.1	0.0	8.7	0.6	0.0	20.0	5.8	0.0	0.0	2.9	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	8.7	0.6	0.0	20.0	5.8	0.0	0.0	2.9	0.0	0.0
Prop In Lane	1.00		0.14	1.00		0.00	0.35		0.59	0.41		0.34
Lane Grp Cap(c), veh/h	4	0	608	19	0	642	295	0	0	245	0	0
V/C Ratio(X)	1.04	0.00	0.55	0.94	0.00	1.32	0.60	0.00	0.00	0.39	0.00	0.00
Avail Cap(c_a), veh/h	336	0	623	336	0	642	450	0	0	470	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.4	0.0	14.2	27.1	0.0	17.5	20.3	0.0	0.0	21.0	0.0	0.0
Incr Delay (d2), s/veh	226.0	0.0	1.0	81.2	0.0	154.9	2.0	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.6	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	4.2	0.7	0.0	37.2	2.6	0.0	0.0	1.4	0.0	0.0
LnGrp Delay(d),s/veh	254.0	0.0	15.2	108.3	0.0	172.4	22.3	0.0	0.0	22.0	0.0	0.0
LnGrp LOS	F		B	F		F	C			C		
Approach Vol, veh/h		340			865			177			95	
Approach Delay, s/veh		18.0			171.0			22.3			22.0	
Approach LOS		B			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		14.5	4.6	23.5		12.3	4.1	24.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	20.0		16.0	11.0	20.0
Max Q Clear Time (g_c+I1), s		7.8	2.6	10.7		4.9	2.1	22.0
Green Ext Time (p_c), s		0.6	0.0	5.2		0.3	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		108.4
HCM 2010 LOS		F

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	141	1	45	0	0	0	0	62	14	5	102	0
Future Vol, veh/h	141	1	45	0	0	0	0	62	14	5	102	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	174	1	56	0	0	0	0	77	17	6	126	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	215	215	126	-	0	0	77	0	0
Stage 1	138	138	-	-	-	-	-	-	-
Stage 2	77	77	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	773	683	924	0	-	-	1522	-	0
Stage 1	889	782	-	0	-	-	-	-	0
Stage 2	946	831	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	770	0	924	-	-	-	1522	-	-
Mov Cap-2 Maneuver	770	0	-	-	-	-	-	-	-
Stage 1	885	0	-	-	-	-	-	-	-
Stage 2	946	0	-	-	-	-	-	-	-

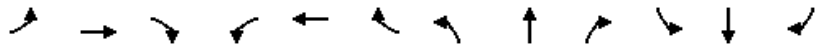
Approach	EB	NB	SB
HCM Control Delay, s	11.3	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	802	1522	-
HCM Lane V/C Ratio	-	-	0.288	0.004	-
HCM Control Delay (s)	-	-	11.3	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	21	182	107	341
Future Volume (Veh/h)	0	0	21	182	107	341
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	24	204	120	383
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	372	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	372	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	618	931	1468			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	24	204	120	383
Volume Left	24	0	0	0
Volume Right	0	0	0	383
cSH	1468	1700	1700	1700
Volume to Capacity	0.02	0.12	0.07	0.23
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.8		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		



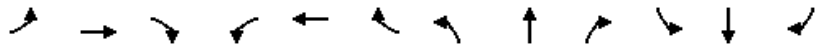
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	152	149	65	294	66	140	144	54	136	162	81
Future Volume (veh/h)	10	152	149	65	294	66	140	144	54	136	162	81
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		0.95	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	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	12	177	0	76	342	77	163	167	63	158	188	94
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	52	456	388	157	435	98	222	435	351	216	417	336
Arrive On Green	0.03	0.26	0.00	0.09	0.31	0.30	0.13	0.25	0.25	0.13	0.24	0.24
Sat Flow, veh/h	1681	1765	1500	1681	1383	311	1648	1731	1398	1648	1731	1395
Grp Volume(v), veh/h	12	177	0	76	0	419	163	167	63	158	188	94
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1695	1648	1731	1398	1648	1731	1395
Q Serve(g_s), s	0.4	5.0	0.0	2.6	0.0	13.6	5.7	4.8	2.1	5.5	5.6	3.3
Cycle Q Clear(g_c), s	0.4	5.0	0.0	2.6	0.0	13.6	5.7	4.8	2.1	5.5	5.6	3.3
Prop In Lane	1.00		1.00	1.00		0.18	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	52	456	388	157	0	532	222	435	351	216	417	336
V/C Ratio(X)	0.23	0.39	0.00	0.48	0.00	0.79	0.74	0.38	0.18	0.73	0.45	0.28
Avail Cap(c_a), veh/h	436	733	623	436	0	693	427	892	720	427	892	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	18.4	0.0	25.9	0.0	18.8	25.0	18.7	17.7	25.1	19.4	18.6
Incr Delay (d2), s/veh	2.2	0.5	0.0	2.3	0.0	4.5	4.7	0.6	0.2	4.7	0.8	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	2.5	0.0	1.3	0.0	7.0	2.9	2.3	0.8	2.8	2.8	1.3
LnGrp Delay(d),s/veh	30.6	18.9	0.0	28.2	0.0	23.4	29.7	19.2	17.9	29.9	20.2	19.0
LnGrp LOS	C	B		C		C	C	B	B	C	C	B
Approach Vol, veh/h		189			495			393			440	
Approach Delay, s/veh		19.7			24.1			23.4			23.4	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	18.9	5.9	23.3	11.9	19.1	9.6	19.5
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	15.0	* 30	15.0	* 24	15.0	30.0	15.0	24.0
Max Q Clear Time (g_c+I1), s	7.7	7.6	2.4	15.6	7.5	6.8	4.6	7.0
Green Ext Time (p_c), s	0.3	2.0	0.0	1.7	0.3	2.0	0.1	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	23.2
HCM 2010 LOS	C

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	424	31	40	1061	3	120	0	85	0	0	0
Future Volume (veh/h)	4	424	31	40	1061	3	120	0	85	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765			
Adj Flow Rate, veh/h	5	493	36	47	1234	3	140	0	99			
Adj No. of Lanes	1	2	1	1	2	0	1	1	1			
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	16	1389	603	117	1628	4	254	266	227			
Arrive On Green	0.01	0.41	0.41	0.07	0.47	0.47	0.15	0.00	0.15			
Sat Flow, veh/h	1681	3353	1455	1681	3431	8	1681	1765	1500			
Grp Volume(v), veh/h	5	493	36	47	603	634	140	0	99			
Grp Sat Flow(s),veh/h/ln	1681	1676	1455	1681	1676	1763	1681	1765	1500			
Q Serve(g_s), s	0.1	4.4	0.7	1.2	12.9	12.9	3.4	0.0	2.6			
Cycle Q Clear(g_c), s	0.1	4.4	0.7	1.2	12.9	12.9	3.4	0.0	2.6			
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	16	1389	603	117	795	837	254	266	227			
V/C Ratio(X)	0.32	0.35	0.06	0.40	0.76	0.76	0.55	0.00	0.44			
Avail Cap(c_a), veh/h	575	1989	863	575	995	1046	575	604	513			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.6	8.8	7.7	19.5	9.5	9.5	17.2	0.0	16.9			
Incr Delay (d2), s/veh	10.9	0.1	0.0	2.2	1.9	1.8	1.9	0.0	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	0.1	2.0	0.3	0.6	6.3	6.6	1.7	0.0	1.2			
LnGrp Delay(d),s/veh	32.5	8.9	7.7	21.7	11.4	11.3	19.1	0.0	18.2			
LnGrp LOS	C	A	A	C	B	B	B		B			
Approach Vol, veh/h		534			1284			239				
Approach Delay, s/veh		9.0			11.7			18.7				
Approach LOS		A			B			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	8.1	24.2			5.4	26.8		11.6
Change Period (Y+Rc), s	5.0	6.0			5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	26.0			15.0	26.0		15.0
Max Q Clear Time (g_c+I1), s	3.2	6.4			2.1	14.9		5.4
Green Ext Time (p_c), s	0.0	7.1			0.0	5.4		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	466	44	13	938	166	48
Future Volume (veh/h)	466	44	13	938	166	48
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	501	47	14	1009	178	52
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1325	124	42	1929	265	236
Arrive On Green	0.43	0.43	0.03	0.58	0.16	0.16
Sat Flow, veh/h	3177	289	1681	3441	1681	1500
Grp Volume(v), veh/h	271	277	14	1009	178	52
Grp Sat Flow(s),veh/h/ln	1676	1701	1681	1676	1681	1500
Q Serve(g_s), s	4.5	4.6	0.3	7.5	4.1	1.2
Cycle Q Clear(g_c), s	4.5	4.6	0.3	7.5	4.1	1.2
Prop In Lane		0.17	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	719	730	42	1929	265	236
V/C Ratio(X)	0.38	0.38	0.33	0.52	0.67	0.22
Avail Cap(c_a), veh/h	1017	1032	571	3580	652	582
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.0	8.0	19.7	5.3	16.4	15.1
Incr Delay (d2), s/veh	0.3	0.3	4.5	0.2	2.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	2.1	0.2	3.4	2.1	0.5
LnGrp Delay(d),s/veh	8.3	8.4	24.2	5.5	19.3	15.6
LnGrp LOS	A	A	C	A	B	B
Approach Vol, veh/h	548			1023	230	
Approach Delay, s/veh	8.3			5.8	18.5	
Approach LOS	A			A	B	

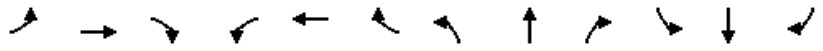
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.0	23.7				29.7		11.5
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	14.0	25.0				44.0		16.0
Max Q Clear Time (g_c+I1), s	2.3	6.6				9.5		6.1
Green Ext Time (p_c), s	0.0	10.2				14.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	460	54	48	804	147	100
Future Volume (vph)	460	54	48	804	147	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.99		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.95	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3279		1676	3353	1611	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3279		1676	3353	1611	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	529	62	55	924	169	115
RTOR Reduction (vph)	7	0	0	0	22	0
Lane Group Flow (vph)	584	0	55	924	262	0
Confl. Peds. (#/hr)		14	14		1	1
Confl. Bikes (#/hr)		2				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	22.6		6.5	62.2	21.6	
Effective Green, g (s)	23.6		7.1	62.8	22.2	
Actuated g/C Ratio	0.25		0.08	0.67	0.24	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	824		126	2244	381	
v/s Ratio Prot	c0.18		0.03	c0.28	c0.16	
v/s Ratio Perm						
v/c Ratio	0.71		0.44	0.41	0.69	
Uniform Delay, d1	32.0		41.4	7.1	32.6	
Progression Factor	1.00		1.45	0.09	1.00	
Incremental Delay, d2	2.3		2.1	0.1	5.1	
Delay (s)	34.3		62.0	0.8	37.7	
Level of Service	C		E	A	D	
Approach Delay (s)	34.3			4.2	37.7	
Approach LOS	C			A	D	

Intersection Summary				
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	93.8	Sum of lost time (s)	17.2	
Intersection Capacity Utilization	47.0%	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 (veh/h)	218	136	355	287	863	671	51	440	91	161	524	135
Future Volume (veh/h)	218	136	355	287	863	671	51	440	91	161	524	135
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1731	1731	1800	1731	1731	1731
Adj Flow Rate, veh/h	242	151	394	319	959	746	57	489	101	179	582	150
Adj No. of Lanes	1	2	0	1	2	1	1	2	0	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	220	455	396	358	1186	509	85	778	160	256	546	459
Arrive On Green	0.13	0.27	0.26	0.21	0.35	0.35	0.05	0.29	0.28	0.08	0.32	0.32
Sat Flow, veh/h	1681	1676	1457	1681	3353	1437	1648	2711	557	3198	1731	1454
Grp Volume(v), veh/h	242	151	394	319	959	746	57	295	295	179	582	150
Grp Sat Flow(s),veh/h/ln	1681	1676	1457	1681	1676	1437	1648	1644	1624	1599	1731	1454
Q Serve(g_s), s	17.0	9.4	35.1	24.0	33.6	46.0	4.4	20.3	20.6	7.1	41.0	10.2
Cycle Q Clear(g_c), s	17.0	9.4	35.1	24.0	33.6	46.0	4.4	20.3	20.6	7.1	41.0	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	220	455	396	358	1186	509	85	472	466	256	546	459
V/C Ratio(X)	1.10	0.33	1.00	0.89	0.81	1.47	0.67	0.63	0.63	0.70	1.07	0.33
Avail Cap(c_a), veh/h	220	455	396	427	1186	509	127	472	466	344	546	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.49	0.49	0.49	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	56.5	37.9	48.0	49.7	38.0	42.0	60.5	40.3	40.6	58.3	44.5	34.0
Incr Delay (d2), s/veh	90.0	0.2	43.8	10.1	3.0	215.4	8.7	2.1	2.3	3.8	56.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	4.3	18.9	12.2	16.1	48.7	2.2	9.5	9.6	3.3	28.1	4.2
LnGrp Delay(d),s/veh	146.5	38.1	91.8	59.7	41.0	257.4	69.3	42.4	42.9	62.0	101.1	34.2
LnGrp LOS	F	D	F	E	D	F	E	D	D	E	F	C
Approach Vol, veh/h		787			2024			647			911	
Approach Delay, s/veh		98.3			123.7			45.0			82.4	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.4	41.3	31.7	39.3	10.7	45.0	21.0	50.0
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	12.9	35.5	31.9	28.5	8.9	39.5	15.9	44.5
Max Q Clear Time (g_c+I1), s	9.1	22.6	26.0	37.1	6.4	43.0	19.0	48.0
Green Ext Time (p_c), s	0.2	3.4	0.6	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	98.9
HCM 2010 LOS	F

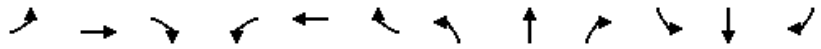
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	3	29	3	0	27	21	1306	2	12	789	108
Future Volume (vph)	134	3	29	3	0	27	21	1306	2	12	789	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1600	1473	1676	1500		1644	3288		1644	4316	
Flt Permitted	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1600	1473	1676	1500		1644	3288		1644	4316	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	143	3	31	3	0	29	22	1389	2	13	839	115
RTOR Reduction (vph)	0	0	27	0	28	0	0	0	0	0	9	0
Lane Group Flow (vph)	73	73	4	3	1	0	22	1391	0	13	945	0
Confl. Peds. (#/hr)			7	7			7		6	6		7
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	8.2	8.2	8.2	1.7	1.7		1.0	41.6		0.9	41.5	
Effective Green, g (s)	9.3	9.3	9.3	2.8	2.8		2.1	42.7		2.0	42.6	
Actuated g/C Ratio	0.13	0.13	0.13	0.04	0.04		0.03	0.59		0.03	0.59	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	203	204	188	64	57		47	1928		45	2525	
v/s Ratio Prot	c0.05	0.05		c0.00	0.00		c0.01	c0.42		0.01	0.22	
v/s Ratio Perm			0.00									
v/c Ratio	0.36	0.36	0.02	0.05	0.02		0.47	0.72		0.29	0.37	
Uniform Delay, d1	29.0	29.0	27.8	33.7	33.7		34.8	10.8		34.7	8.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4	0.0	0.1	0.1		2.7	1.2		1.3	0.0	
Delay (s)	29.4	29.4	27.8	33.8	33.7		37.5	12.0		36.0	8.1	
Level of Service	C	C	C	C	C		D	B		D	A	
Approach Delay (s)		29.1			33.7			12.4			8.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.6%	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)	89	197	200	0	0	228	0	1076	391	230	751	288
Future Volume (vph)	89	197	200	0	0	228	0	1076	391	230	751	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			1.00		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.98			1.00		1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3485	1550			1611		3471	1523	3367	3471	1505
Flt Permitted		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3485	1550			1611		3471	1523	3367	3471	1505
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	91	201	204	0	0	233	0	1098	399	235	766	294
RTOR Reduction (vph)	0	0	96	0	0	193	0	0	79	0	0	0
Lane Group Flow (vph)	0	292	108	0	0	40	0	1098	320	235	766	294
Confl. Peds. (#/hr)			10	10			22		4	4		22
Confl. Bikes (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		22.8	28.8			22.8		79.8	79.8	13.4	86.2	130.0
Effective Green, g (s)		22.4	28.0			22.3		79.3	79.3	12.4	85.7	130.0
Actuated g/C Ratio		0.17	0.22			0.17		0.61	0.61	0.10	0.66	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		600	398			276		2117	929	321	2288	1505
v/s Ratio Prot			0.01					c0.32		c0.07	0.22	
v/s Ratio Perm		0.08	0.06			0.02			0.21			0.20
v/c Ratio		0.49	0.27			0.14		0.52	0.34	0.73	0.33	0.20
Uniform Delay, d1		48.6	42.5			45.7		14.5	12.5	57.2	9.7	0.0
Progression Factor		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1			0.1		0.9	1.0	7.2	0.4	0.3
Delay (s)		48.8	42.6			45.8		15.4	13.5	64.4	10.1	0.3
Level of Service		D	D			D		B	B	E	B	A
Approach Delay (s)		46.3			45.8			14.9			17.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	72.8%	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)	0	0	0	335	277	152	664	599	300	127	509	165
Future Volume (veh/h)	0	0	0	335	277	152	664	599	300	127	509	165
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		0.97	1.00		0.96
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1765	1800	1731	1731	1800	1731	1731	1800
Adj Flow Rate, veh/h				356	295	162	706	637	319	135	541	176
Adj No. of Lanes				0	2	0	2	3	0	1	2	0
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	2	0	4	4	4	4	4	4
Cap, veh/h				415	369	207	786	1366	616	169	701	227
Arrive On Green				0.30	0.30	0.30	0.25	0.43	0.43	0.10	0.29	0.29
Sat Flow, veh/h				1396	1241	698	3198	3150	1420	1648	2414	781
Grp Volume(v), veh/h				432	0	381	706	637	319	135	368	349
Grp Sat Flow(s),veh/h/ln				1695	0	1641	1599	1575	1420	1648	1644	1551
Q Serve(g_s), s				18.4	0.0	16.3	16.4	11.0	12.6	6.1	15.7	15.8
Cycle Q Clear(g_c), s				18.4	0.0	16.3	16.4	11.0	12.6	6.1	15.7	15.8
Prop In Lane				0.82		0.43	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h				503	0	487	786	1366	616	169	477	450
V/C Ratio(X)				0.86	0.00	0.78	0.90	0.47	0.52	0.80	0.77	0.78
Avail Cap(c_a), veh/h				730	0	707	835	1366	616	430	648	611
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh				25.4	0.0	24.7	28.0	15.4	15.9	33.6	24.9	25.0
Incr Delay (d2), s/veh				6.2	0.0	2.9	11.6	0.4	1.0	3.3	4.8	5.3
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				9.4	0.0	7.7	8.5	4.8	5.1	2.9	7.7	7.4
LnGrp Delay(d),s/veh				31.7	0.0	27.6	39.6	15.8	17.0	36.9	29.7	30.3
LnGrp LOS				C		C	D	B	B	D	C	C
Approach Vol, veh/h					813			1662			852	
Approach Delay, s/veh					29.7			26.1			31.1	
Approach LOS					C			C			C	

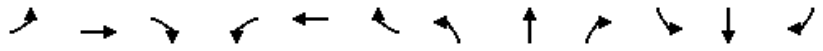
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	11.9	38.0			22.8	27.1		26.7
Change Period (Y+Rc), s	4.0	5.0			4.0	5.0		4.0
Max Green Setting (Gmax), s	20.0	30.0			20.0	30.0		33.0
Max Q Clear Time (g_c+I1), s	8.1	14.6			18.4	17.8		20.4
Green Ext Time (p_c), s	0.2	9.7			0.5	4.2		2.3

Intersection Summary		
HCM 2010 Ctrl Delay		28.3
HCM 2010 LOS		C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	232	278	492	459	40
Future Volume (veh/h)	32	232	278	492	459	40
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	33	242	290	512	478	42
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	332	296	348	2061	1020	89
Arrive On Green	0.20	0.20	0.21	0.61	0.33	0.33
Sat Flow, veh/h	1681	1500	1681	3441	3192	272
Grp Volume(v), veh/h	33	242	290	512	257	263
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1699
Q Serve(g_s), s	0.8	7.8	8.4	3.5	6.2	6.2
Cycle Q Clear(g_c), s	0.8	7.8	8.4	3.5	6.2	6.2
Prop In Lane	1.00	1.00	1.00			0.16
Lane Grp Cap(c), veh/h	332	296	348	2061	551	558
V/C Ratio(X)	0.10	0.82	0.83	0.25	0.47	0.47
Avail Cap(c_a), veh/h	830	741	664	2061	993	1007
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	19.4	19.2	4.4	13.5	13.5
Incr Delay (d2), s/veh	0.0	2.1	2.0	0.1	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	6.3	4.1	1.6	3.0	3.1
LnGrp Delay(d),s/veh	16.7	21.5	21.2	4.5	14.4	14.4
LnGrp LOS	B	C	C	A	B	B
Approach Vol, veh/h	275			802	520	
Approach Delay, s/veh	21.0			10.6	14.4	
Approach LOS	C			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		36.6		14.0	14.5	22.1		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		30.0		25.0	20.0	30.0		
Max Q Clear Time (g_c+I1), s		5.5		9.8	10.4	8.2		
Green Ext Time (p_c), s		9.8		0.4	0.3	8.2		

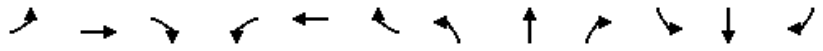
Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	356	3	4	1724	2	62	0	4	2	0	9
Future Volume (veh/h)	3	356	3	4	1724	2	62	0	4	2	0	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	440	4	5	2128	2	77	0	5	2	0	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	1622	15	11	1642	2	180	0	126	50	12	90
Arrive On Green	0.01	0.48	0.47	0.01	0.96	0.93	0.09	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1681	3405	31	1681	3437	3	1178	0	1484	49	144	1063
Grp Volume(v), veh/h	4	217	227	5	1038	1092	77	0	5	13	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1759	1681	1676	1764	1178	0	1484	1256	0	0
Q Serve(g_s), s	0.2	7.0	7.0	0.3	43.0	43.0	0.1	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	7.0	7.0	0.3	43.0	43.0	6.1	0.0	0.3	6.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.15		0.85
Lane Grp Cap(c), veh/h	9	799	838	11	801	843	180	0	126	153	0	0
V/C Ratio(X)	0.45	0.27	0.27	0.46	1.30	1.30	0.43	0.00	0.04	0.08	0.00	0.00
Avail Cap(c_a), veh/h	187	801	840	187	801	843	448	0	412	436	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.82	0.61	0.61	0.61	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.6	14.2	14.2	44.3	2.0	2.0	40.5	0.0	37.8	38.0	0.0	0.0
Incr Delay (d2), s/veh	10.4	0.1	0.1	6.5	138.7	138.7	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.3	3.4	0.1	41.1	43.2	1.9	0.0	0.1	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.1	14.3	14.3	50.8	140.7	140.7	41.0	0.0	37.8	38.1	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D		D	D		
Approach Vol, veh/h		448			2135			82			13	
Approach Delay, s/veh		14.6			140.5			40.8			38.1	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.6	46.9		11.7	4.5	47.0		11.7
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	42.0		25.0	10.0	42.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	9.0		8.0	2.2	45.0		8.1
Green Ext Time (p_c), s	0.0	14.3		0.1	0.0	0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	115.9
HCM 2010 LOS	F



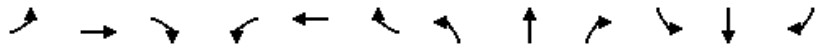
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	327	17	3	1586	12	73	1	16	23	0	16
Future Volume (veh/h)	3	327	17	3	1586	12	73	1	16	23	0	16
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	389	20	4	1888	14	87	1	19	27	0	19
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1515	78	12	1592	12	183	2	24	135	15	61
Arrive On Green	0.01	0.47	0.46	0.01	0.93	0.91	0.09	0.09	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1681	3245	166	1681	3411	25	1202	21	264	780	159	661
Grp Volume(v), veh/h	4	200	209	4	927	975	107	0	0	46	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1735	1681	1676	1760	1486	0	0	1601	0	0
Q Serve(g_s), s	0.2	6.5	6.6	0.2	42.0	42.0	3.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	6.5	6.6	0.2	42.0	42.0	6.2	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.01	0.81		0.18	0.59		0.41
Lane Grp Cap(c), veh/h	12	782	810	12	782	821	209	0	0	211	0	0
V/C Ratio(X)	0.32	0.26	0.26	0.32	1.18	1.19	0.51	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	187	782	810	187	782	821	486	0	0	492	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.68	0.68	0.68	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	14.5	14.6	44.1	3.0	3.0	39.8	0.0	0.0	38.2	0.0	0.0
Incr Delay (d2), s/veh	14.1	0.2	0.2	9.8	92.2	93.1	1.9	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.0	3.2	0.1	33.1	35.4	2.7	0.0	0.0	1.1	0.0	0.0
LnGrp Delay(d),s/veh	58.5	14.7	14.7	53.9	95.2	96.1	41.7	0.0	0.0	38.7	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D			D		
Approach Vol, veh/h		413			1906			107			46	
Approach Delay, s/veh		15.2			95.5			41.7			38.7	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	46.0		12.3	4.7	46.0		12.3
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	41.0		26.0	10.0	41.0		26.0
Max Q Clear Time (g_c+I1), s	2.2	8.6		4.3	2.2	44.0		8.2
Green Ext Time (p_c), s	0.0	15.7		0.5	0.0	0.0		0.5

Intersection Summary		
HCM 2010 Ctrl Delay		78.7
HCM 2010 LOS		E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	398	4	11	1569	25	28
Future Volume (vph)	398	4	11	1569	25	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3347		1676	3353	1589	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3347		1676	3353	1589	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	480	5	13	1890	30	34
RTOR Reduction (vph)	0	0	0	0	30	0
Lane Group Flow (vph)	485	0	13	1890	34	0
Confl. Peds. (#/hr)		2	2			1
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	63.5		1.5	70.0	9.0	
Effective Green, g (s)	65.5		2.5	72.0	10.0	
Actuated g/C Ratio	0.73		0.03	0.80	0.11	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2435		46	2682	176	
v/s Ratio Prot	0.14		0.01	c0.56	c0.02	
v/s Ratio Perm						
v/c Ratio	0.20		0.28	0.70	0.19	
Uniform Delay, d1	3.9		42.9	4.1	36.3	
Progression Factor	1.91		1.25	0.91	1.00	
Incremental Delay, d2	0.1		2.7	1.3	0.5	
Delay (s)	7.5		56.3	5.0	36.9	
Level of Service	A		E	A	D	
Approach Delay (s)	7.5			5.4	36.9	
Approach LOS	A			A	D	

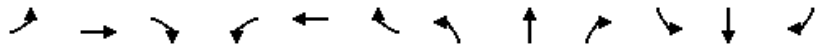
Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	316	11	10	1198	74	4	1	9	281	3	204
Future Volume (veh/h)	135	316	11	10	1198	74	4	1	9	281	3	204
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	145	340	12	11	1288	80	4	1	10	302	3	219
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	1667	59	22	1326	82	364	439	369	439	459	369
Arrive On Green	0.10	0.50	0.49	0.03	0.83	0.81	0.25	0.25	0.25	0.26	0.26	0.25
Sat Flow, veh/h	1681	3303	116	1681	3205	199	1145	1765	1484	1384	1765	1484
Grp Volume(v), veh/h	145	172	180	11	673	695	4	1	10	302	3	219
Grp Sat Flow(s),veh/h/ln	1681	1676	1743	1681	1676	1727	1145	1765	1484	1384	1765	1484
Q Serve(g_s), s	7.6	5.1	5.1	0.6	31.5	32.1	0.2	0.0	0.5	18.6	0.1	11.7
Cycle Q Clear(g_c), s	7.6	5.1	5.1	0.6	31.5	32.1	0.4	0.0	0.5	18.6	0.1	11.7
Prop In Lane	1.00		0.07	1.00		0.12	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	175	846	879	22	694	715	364	439	369	439	459	369
V/C Ratio(X)	0.83	0.20	0.20	0.49	0.97	0.97	0.01	0.00	0.03	0.69	0.01	0.59
Avail Cap(c_a), veh/h	187	846	879	187	745	768	435	549	462	525	569	462
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	12.3	12.3	43.5	7.3	7.4	25.6	25.4	25.6	31.6	24.7	29.8
Incr Delay (d2), s/veh	22.5	0.0	0.0	5.1	24.8	25.0	0.0	0.0	0.0	3.0	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	2.4	2.5	0.3	17.8	18.5	0.1	0.0	0.2	7.5	0.1	4.9
LnGrp Delay(d),s/veh	62.0	12.4	12.4	48.6	32.1	32.5	25.6	25.4	25.6	34.5	24.7	31.3
LnGrp LOS	E	B	B	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		497			1379			15			524	
Approach Delay, s/veh		26.9			32.4			25.6			33.1	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	49.5		26.4	13.4	41.3		26.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	39.0		28.0	10.0	39.0		28.0
Max Q Clear Time (g_c+I1), s	12.6	7.1		20.6	9.6	34.1		2.5
Green Ext Time (p_c), s	0.0	4.4		1.4	0.0	2.2		2.3

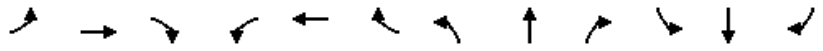
Intersection Summary		
HCM 2010 Ctrl Delay	31.4	
HCM 2010 LOS	C	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	557	40	2	1312	10	116	0	9	12	1	31
Future Volume (veh/h)	7	557	40	2	1312	10	116	0	9	12	1	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	7	563	40	2	1325	10	117	0	9	12	1	31
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	15	1291	92	5	1367	10	222	0	11	78	24	122
Arrive On Green	0.01	0.41	0.40	0.01	0.80	0.78	0.11	0.00	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1681	3172	225	1681	3410	26	1343	0	103	253	220	1129
Grp Volume(v), veh/h	7	297	306	2	651	684	126	0	0	44	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1721	1681	1676	1760	1446	0	0	1602	0	0
Q Serve(g_s), s	0.4	11.5	11.6	0.1	31.1	31.1	5.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	11.5	11.6	0.1	31.1	31.1	7.5	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.13	1.00		0.01	0.93		0.07	0.27		0.70
Lane Grp Cap(c), veh/h	15	682	700	5	672	705	234	0	0	224	0	0
V/C Ratio(X)	0.47	0.44	0.44	0.44	0.97	0.97	0.54	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	243	689	707	243	689	723	512	0	0	522	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.74	0.74	0.74	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	19.2	19.3	44.7	8.4	8.5	39.0	0.0	0.0	36.8	0.0	0.0
Incr Delay (d2), s/veh	7.2	0.3	0.3	17.2	23.3	22.7	0.7	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.3	5.5	0.1	17.4	18.1	3.1	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	51.6	19.5	19.6	61.9	31.8	31.2	39.7	0.0	0.0	37.0	0.0	0.0
LnGrp LOS	D	B	B	E	C	C	D			D		
Approach Vol, veh/h		610			1337			126			44	
Approach Delay, s/veh		19.9			31.5			39.7			37.0	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	40.6		13.7	4.8	40.1		13.7
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	13.0	36.0		28.0	13.0	36.0		28.0
Max Q Clear Time (g_c+I1), s	2.1	13.6		4.3	2.4	33.1		9.5
Green Ext Time (p_c), s	0.0	7.2		0.3	0.0	1.9		0.2

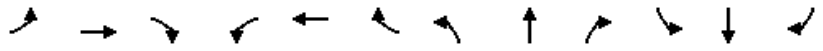
Intersection Summary		
HCM 2010 Ctrl Delay		28.8
HCM 2010 LOS		C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	490	56	1	1194	131	45	60	1	84	23	54
Future Volume (veh/h)	53	490	56	1	1194	131	45	60	1	84	23	54
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.97		0.96	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	55	510	58	1	1244	136	47	62	1	88	24	56
Adj No. of Lanes	0	2	0	0	2	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	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	98	939	117	40	1360	148	160	187	3	190	57	93
Arrive On Green	0.46	0.46	0.43	0.91	0.91	0.87	0.19	0.19	0.18	0.19	0.19	0.18
Sat Flow, veh/h	110	2058	256	0	2983	325	544	991	14	683	303	493
Grp Volume(v), veh/h	270	0	353	734	0	647	110	0	0	168	0	0
Grp Sat Flow(s),veh/h/ln	867	0	1557	1764	0	1544	1549	0	0	1480	0	0
Q Serve(g_s), s	6.6	0.0	14.4	0.0	0.0	21.5	0.0	0.0	0.0	3.6	0.0	0.0
Cycle Q Clear(g_c), s	26.1	0.0	14.4	19.6	0.0	21.5	5.3	0.0	0.0	8.8	0.0	0.0
Prop In Lane	0.20		0.16	0.00		0.21	0.43		0.01	0.52		0.33
Lane Grp Cap(c), veh/h	443	0	710	844	0	704	349	0	0	340	0	0
V/C Ratio(X)	0.61	0.00	0.50	0.87	0.00	0.92	0.31	0.00	0.00	0.49	0.00	0.00
Avail Cap(c_a), veh/h	466	0	744	883	0	738	720	0	0	681	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.98	0.70	0.00	0.70	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.0	0.0	17.4	3.0	0.0	3.4	31.7	0.0	0.0	33.2	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.2	8.7	0.0	14.5	0.5	0.0	0.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	6.2	9.4	0.0	10.1	2.4	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	19.4	0.0	17.6	11.7	0.0	17.9	32.2	0.0	0.0	34.3	0.0	0.0
LnGrp LOS	B		B	B		B	C			C		
Approach Vol, veh/h		623			1381			110			168	
Approach Delay, s/veh		18.4			14.6			32.2			34.3	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		42.2		21.0		42.2		21.0
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		41.0		38.0		41.0		38.0
Max Q Clear Time (g_c+I1), s		28.1		10.8		23.5		7.3
Green Ext Time (p_c), s		5.1		1.2		5.8		1.2

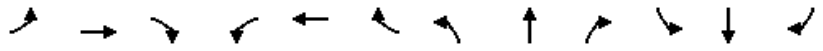
Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	527	62	38	1275	43	143	6	97	88	20	46
Future Volume (veh/h)	9	527	62	38	1275	43	143	6	97	88	20	46
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		0.99	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	9	555	65	40	1342	45	151	6	102	93	21	48
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	19	868	101	59	1029	34	182	198	157	117	35	79
Arrive On Green	0.01	0.29	0.28	0.04	0.31	0.30	0.11	0.11	0.11	0.07	0.07	0.07
Sat Flow, veh/h	1681	3022	353	1681	3307	111	1681	1765	1479	1681	471	1076
Grp Volume(v), veh/h	9	307	313	40	680	707	151	6	102	93	0	69
Grp Sat Flow(s),veh/h/ln	1681	1676	1699	1681	1676	1741	1681	1765	1479	1681	0	1546
Q Serve(g_s), s	0.5	14.4	14.5	2.1	28.0	28.0	7.9	0.3	6.0	4.9	0.0	3.9
Cycle Q Clear(g_c), s	0.5	14.4	14.5	2.1	28.0	28.0	7.9	0.3	6.0	4.9	0.0	3.9
Prop In Lane	1.00		0.21	1.00		0.06	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	19	481	488	59	522	542	182	198	157	117	0	114
V/C Ratio(X)	0.48	0.64	0.64	0.68	1.30	1.31	0.83	0.03	0.65	0.80	0.00	0.61
Avail Cap(c_a), veh/h	205	522	528	205	522	542	205	471	386	205	0	412
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.41	0.41	0.41	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.2	28.0	28.1	42.9	31.0	31.0	39.3	35.6	38.6	41.2	0.0	40.6
Incr Delay (d2), s/veh	6.4	2.6	2.7	2.1	142.1	143.3	19.9	0.0	1.7	4.6	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	0.3	7.0	7.1	1.0	33.5	35.0	4.7	0.1	2.5	2.4	0.0	1.7
LnGrp Delay(d),s/veh	50.7	30.6	30.8	45.0	173.1	174.3	59.3	35.6	40.3	45.8	0.0	42.5
LnGrp LOS	D	C	C	D	F	F	E	D	D	D		D
Approach Vol, veh/h		629			1427			259			162	
Approach Delay, s/veh		31.0			170.1			51.2			44.4	
Approach LOS		C			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	29.8	10.3	14.1	5.0	32.0	13.7	10.6
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	11.0	27.0	11.0	23.5	11.0	27.0	11.0	23.5
Max Q Clear Time (g_c+I1), s	4.1	16.5	6.9	8.0	2.5	30.0	9.9	5.9
Green Ext Time (p_c), s	0.0	8.2	0.0	0.3	0.0	0.0	0.0	0.3

Intersection Summary		
HCM 2010 Ctrl Delay	114.1	
HCM 2010 LOS	F	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	418	107	83	742	126	174	585	88	132	652	417
Future Volume (veh/h)	240	418	107	83	742	126	174	585	88	132	652	417
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	264	459	118	91	815	138	191	643	97	145	716	458
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	261	934	238	125	914	406	192	1041	455	182	1021	453
Arrive On Green	0.16	0.36	0.35	0.08	0.28	0.28	0.12	0.32	0.32	0.11	0.31	0.31
Sat Flow, veh/h	1648	2592	661	1648	3288	1460	1648	3288	1436	1648	3288	1458
Grp Volume(v), veh/h	264	290	287	91	815	138	191	643	97	145	716	458
Grp Sat Flow(s),veh/h/ln	1648	1644	1609	1648	1644	1460	1648	1644	1436	1648	1644	1458
Q Serve(g_s), s	19.0	16.4	16.7	6.5	28.6	9.0	13.9	19.9	5.9	10.3	23.0	37.3
Cycle Q Clear(g_c), s	19.0	16.4	16.7	6.5	28.6	9.0	13.9	19.9	5.9	10.3	23.0	37.3
Prop In Lane	1.00		0.41	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	592	580	125	914	406	192	1041	455	182	1021	453
V/C Ratio(X)	1.01	0.49	0.50	0.73	0.89	0.34	0.99	0.62	0.21	0.80	0.70	1.01
Avail Cap(c_a), veh/h	261	592	580	151	956	425	192	1041	455	206	1021	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.34	0.34	0.34	0.92	0.92	0.92	0.85	0.85	0.85
Uniform Delay (d), s/veh	50.5	29.8	30.1	54.2	41.6	34.6	53.0	34.8	30.1	52.0	36.5	41.4
Incr Delay (d2), s/veh	57.1	0.6	0.6	4.7	3.9	0.2	60.2	1.0	0.2	15.0	3.4	41.8
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	7.6	7.5	3.1	13.4	3.6	9.5	9.2	2.4	5.5	10.9	20.2
LnGrp Delay(d),s/veh	107.6	30.4	30.7	58.9	45.5	34.7	113.2	35.9	30.3	67.0	39.9	83.2
LnGrp LOS	F	C	C	E	D	C	F	D	C	E	D	F
Approach Vol, veh/h		841			1044			931			1319	
Approach Delay, s/veh		54.7			45.2			51.1			57.9	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	41.3	13.1	47.6	17.3	42.0	23.0	37.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	35.0	10.0	41.6	14.0	34.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	15.9	39.3	8.5	18.7	12.3	21.9	21.0	30.6
Green Ext Time (p_c), s	0.0	0.0	0.0	7.6	0.1	7.2	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	52.5
HCM 2010 LOS	D

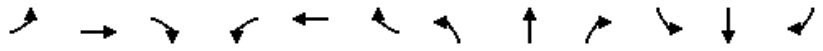
Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	276	1	422	0	0	0	0	701	324	247	813	0
Future Volume (vph)	276	1	422	0	0	0	0	701	324	247	813	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.98					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.87	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1449	1482					4714		1736	3471	
Flt Permitted	0.95	0.99	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1449	1482					4714		1736	3471	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	307	1	469	0	0	0	0	779	360	274	903	0
RTOR Reduction (vph)	0	132	132	0	0	0	0	60	0	0	0	0
Lane Group Flow (vph)	270	122	121	0	0	0	0	1079	0	274	903	0
Confl. Peds. (#/hr)			3	3			9		1	1		9
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	23.5	23.5	23.5					57.8		21.7	83.5	
Effective Green, g (s)	23.6	23.6	23.6					57.9		20.7	83.6	
Actuated g/C Ratio	0.20	0.20	0.20					0.50		0.18	0.72	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	341	294	301					2352		309	2501	
v/s Ratio Prot	c0.16	0.08						c0.23		c0.16	0.26	
v/s Ratio Perm			0.08									
v/c Ratio	0.79	0.41	0.40					0.46		0.89	0.36	
Uniform Delay, d1	43.9	40.2	40.1					18.9		46.5	6.1	
Progression Factor	1.00	1.00	1.00					0.87		1.01	1.02	
Incremental Delay, d2	11.1	0.3	0.3					0.5		22.0	0.4	
Delay (s)	55.0	40.5	40.4					16.8		68.8	6.6	
Level of Service	D	D	D					B		E	A	
Approach Delay (s)		45.5			0.0			16.8			21.1	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



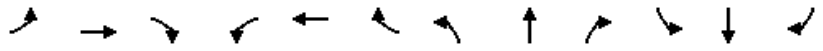
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	273	127	371	192	664	121	98	787	163
Future Volume (veh/h)	0	0	0	273	127	371	192	664	121	98	787	163
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		0.93	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1827	1900	1827	1827	1900	1827	1827	1827
Adj Flow Rate, veh/h				290	135	395	204	706	129	104	837	0
Adj No. of Lanes				0	2	0	2	2	0	1	2	1
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	4	0	4	4	4	4	4	4
Cap, veh/h				331	154	423	1195	1594	291	112	905	404
Arrive On Green				0.46	0.46	0.46	0.12	0.18	0.18	0.13	0.52	0.00
Sat Flow, veh/h				1205	561	1541	3375	2896	529	1740	3471	1553
Grp Volume(v), veh/h				425	0	395	204	423	412	104	837	0
Grp Sat Flow(s),veh/h/ln				1767	0	1541	1688	1736	1689	1740	1736	1553
Q Serve(g_s), s				25.3	0.0	28.2	6.3	25.2	25.2	6.9	25.8	0.0
Cycle Q Clear(g_c), s				25.3	0.0	28.2	6.3	25.2	25.2	6.9	25.8	0.0
Prop In Lane				0.68		1.00	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h				485	0	423	1195	955	930	112	905	404
V/C Ratio(X)				0.88	0.00	0.93	0.17	0.44	0.44	0.92	0.92	0.00
Avail Cap(c_a), veh/h				535	0	466	1195	955	930	112	1035	462
HCM Platoon Ratio				1.67	1.67	1.67	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)				0.67	0.00	0.67	0.83	0.83	0.83	0.81	0.81	0.00
Uniform Delay (d), s/veh				29.6	0.0	30.5	35.9	31.6	31.7	50.2	26.7	0.0
Incr Delay (d2), s/veh				9.8	0.0	18.5	0.0	1.2	1.3	53.4	14.0	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				13.4	0.0	14.0	3.0	12.5	12.1	5.0	13.8	0.0
LnGrp Delay(d),s/veh				39.4	0.0	48.9	35.9	32.9	32.9	103.6	40.7	0.0
LnGrp LOS				D		D	D	C	C	F	D	
Approach Vol, veh/h					820			1039			941	
Approach Delay, s/veh					44.0			33.5			47.7	
Approach LOS					D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	12.0	68.2			45.6	34.7		35.8
Change Period (Y+Rc), s	4.0	4.5			4.5	* 4.5		4.0
Max Green Setting (Gmax), s	8.0	60.5			34.0	* 35		35.0
Max Q Clear Time (g_c+I1), s	8.9	27.2			8.3	27.8		30.2
Green Ext Time (p_c), s	0.0	4.5			4.4	2.3		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	41.3
HCM 2010 LOS	D

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	196	19	74	867	105	88	205	64	54	133	27
Future Volume (veh/h)	13	196	19	74	867	105	88	205	64	54	133	27
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	14	209	20	79	922	112	94	218	68	57	141	0
Adj No. of Lanes	1	2	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	1151	109	126	1430	635	136	313	265	105	279	238
Arrive On Green	0.02	0.37	0.37	0.07	0.43	0.43	0.08	0.18	0.18	0.06	0.16	0.00
Sat Flow, veh/h	1681	3087	292	1681	3353	1489	1681	1765	1497	1681	1765	1500
Grp Volume(v), veh/h	14	112	117	79	922	112	94	218	68	57	141	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1703	1681	1676	1489	1681	1765	1497	1681	1765	1500
Q Serve(g_s), s	0.5	2.6	2.7	2.6	12.5	2.7	3.1	6.7	2.3	1.9	4.2	0.0
Cycle Q Clear(g_c), s	0.5	2.6	2.7	2.6	12.5	2.7	3.1	6.7	2.3	1.9	4.2	0.0
Prop In Lane	1.00		0.17	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	35	625	635	126	1430	635	136	313	265	105	279	238
V/C Ratio(X)	0.40	0.18	0.18	0.63	0.64	0.18	0.69	0.70	0.26	0.54	0.50	0.00
Avail Cap(c_a), veh/h	585	1458	1481	585	2916	1295	585	1228	1042	731	1228	1043
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.8	12.1	12.1	25.8	13.0	10.2	25.7	22.2	20.4	26.2	22.1	0.0
Incr Delay (d2), s/veh	2.7	0.1	0.1	1.9	0.5	0.1	2.3	1.1	0.2	1.6	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.2	1.3	1.3	5.9	1.1	1.5	3.3	0.9	0.9	2.1	0.0
LnGrp Delay(d),s/veh	30.5	12.3	12.3	27.7	13.5	10.4	28.0	23.3	20.6	27.8	22.7	0.0
LnGrp LOS	C	B	B	C	B	B	C	C	C	C	C	
Approach Vol, veh/h		243			1113			380			198	
Approach Delay, s/veh		13.3			14.2			24.0			24.1	
Approach LOS		B			B			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	8.3	26.4	8.7	14.1	5.2	29.5	7.6	15.2
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	50.0	20.0	40.0	20.0	50.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	4.6	4.7	5.1	6.2	2.5	14.5	3.9	8.7
Green Ext Time (p_c), s	0.1	10.5	0.1	1.4	0.0	10.0	0.1	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	17.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	393	45	29	1004	165	98	254	50	159	194	55
Future Volume (veh/h)	21	393	45	29	1004	165	98	254	50	159	194	55
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	22	418	48	31	1068	176	104	270	53	169	206	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	2	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	1538	176	60	1483	244	130	322	270	238	315	268
Arrive On Green	0.03	0.51	0.51	0.04	0.52	0.52	0.08	0.18	0.18	0.07	0.18	0.00
Sat Flow, veh/h	1681	3026	345	1681	2873	472	1681	1765	1480	3261	1765	1500
Grp Volume(v), veh/h	22	230	236	31	622	622	104	270	53	169	206	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1694	1681	1676	1669	1681	1765	1480	1630	1765	1500
Q Serve(g_s), s	1.2	7.1	7.1	1.6	25.7	25.9	5.5	13.3	2.7	4.6	9.8	0.0
Cycle Q Clear(g_c), s	1.2	7.1	7.1	1.6	25.7	25.9	5.5	13.3	2.7	4.6	9.8	0.0
Prop In Lane	1.00		0.20	1.00		0.28	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	47	852	862	60	865	861	130	322	270	238	315	268
V/C Ratio(X)	0.46	0.27	0.27	0.51	0.72	0.72	0.80	0.84	0.20	0.71	0.65	0.00
Avail Cap(c_a), veh/h	149	852	862	149	865	861	187	431	362	362	431	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.1	12.6	12.6	42.6	16.7	16.8	40.8	35.5	31.2	40.8	34.4	0.0
Incr Delay (d2), s/veh	2.6	0.8	0.8	2.5	3.2	3.3	9.4	8.1	0.1	1.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.5	3.5	0.8	12.5	12.5	2.9	7.2	1.1	2.1	4.8	0.0
LnGrp Delay(d),s/veh	45.7	13.4	13.4	45.1	19.9	20.0	50.2	43.6	31.3	42.3	35.3	0.0
LnGrp LOS	D	B	B	D	B	C	D	D	C	D	D	
Approach Vol, veh/h		488			1275			427			375	
Approach Delay, s/veh		14.9			20.6			43.7			38.4	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	50.8	10.9	21.1	6.5	51.5	10.6	21.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	3.2	9.1	7.5	11.8	3.2	27.9	6.6	15.3
Green Ext Time (p_c), s	0.0	15.8	0.0	1.5	0.0	3.6	0.1	1.2

Intersection Summary		
HCM 2010 Ctrl Delay		25.9
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	209	25	118	1111	45	33	138	12	113	372	657
Future Volume (vph)	139	209	25	118	1111	45	33	138	12	113	372	657
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.99			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1676	3292		1676	3330			1734			1744	1477
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (perm)	1676	3292		1676	3330			1734			1744	1477
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	153	230	27	130	1221	49	36	152	13	124	409	722
RTOR Reduction (vph)	0	4	0	0	1	0	0	2	0	0	0	448
Lane Group Flow (vph)	153	253	0	130	1269	0	0	199	0	0	533	274
Confl. Peds. (#/hr)	1					1	2					2
Confl. Bikes (#/hr)			2			2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	17.2	52.2		15.3	50.3			20.4			30.2	30.2
Effective Green, g (s)	17.2	52.2		15.3	50.3			20.4			30.2	30.2
Actuated g/C Ratio	0.12	0.38		0.11	0.36			0.15			0.22	0.22
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	208	1244		185	1212			256			381	322
v/s Ratio Prot	c0.09	0.08		0.08	c0.38			c0.11			c0.31	
v/s Ratio Perm												0.19
v/c Ratio	0.74	0.20		0.70	1.05			0.78			1.40	0.85
Uniform Delay, d1	58.3	28.9		59.2	43.9			56.7			53.9	51.8
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	11.0	0.1		9.5	39.0			12.7			194.8	18.4
Delay (s)	69.3	29.1		68.7	82.9			69.4			248.7	70.2
Level of Service	E	C		E	F			E			F	E
Approach Delay (s)		44.1			81.6			69.4			146.0	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	100.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	138.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	13

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	46	259	64	123	1076
Future Vol, veh/h	52	46	259	64	123	1076
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	52	291	72	138	1209

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1812	327	0	0	363	0
Stage 1	327	-	-	-	-	-
Stage 2	1485	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	86	714	-	-	1196	-
Stage 1	731	-	-	-	-	-
Stage 2	207	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 56	714	-	-	1196	-
Mov Cap-2 Maneuver	~ 56	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	134	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	203.9	0	0.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	99	1196	-
HCM Lane V/C Ratio	-	-	1.112	0.116	-
HCM Control Delay (s)	-	-	203.9	8.4	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	7.2	0.4	-

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	607	116	184	1864	109	163
Future Volume (veh/h)	607	116	184	1864	109	163
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	653	125	198	2004	117	175
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	853	366	834	2649	221	197
Arrive On Green	0.25	0.25	0.50	0.79	0.13	0.13
Sat Flow, veh/h	3441	1438	1681	3441	1681	1500
Grp Volume(v), veh/h	653	125	198	2004	117	175
Grp Sat Flow(s),veh/h/ln	1676	1438	1681	1676	1681	1500
Q Serve(g_s), s	25.3	9.9	9.4	43.7	9.1	16.1
Cycle Q Clear(g_c), s	25.3	9.9	9.4	43.7	9.1	16.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	853	366	834	2649	221	197
V/C Ratio(X)	0.77	0.34	0.24	0.76	0.53	0.89
Avail Cap(c_a), veh/h	1832	786	834	2649	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	42.6	20.1	7.7	56.8	59.8
Incr Delay (d2), s/veh	6.5	2.5	0.1	1.4	0.7	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	12.5	4.2	4.4	20.3	4.3	7.4
LnGrp Delay(d),s/veh	54.8	45.2	20.2	9.1	57.5	74.1
LnGrp LOS	D	D	C	A	E	E
Approach Vol, veh/h	778			2202	292	
Approach Delay, s/veh	53.3			10.1	67.4	
Approach LOS	D			B	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	75.0	41.1		23.9		116.1		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	21.0	* 77		27.5		101.5		
Max Q Clear Time (g_c+I1), s	11.4	27.3		18.1		45.7		
Green Ext Time (p_c), s	8.8	8.3		0.3		37.8		

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	685	23	9	1856	192	13	9	8	140	5	142
Future Volume (vph)	94	685	23	9	1856	192	13	9	8	140	5	142
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.99			0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (prot)	1676	4788		1676	4733			1665			1684	1474
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (perm)	1676	4788		1676	4733			1665			1684	1474
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	107	778	26	10	2109	218	15	10	9	159	6	161
RTOR Reduction (vph)	0	1	0	0	5	0	0	8	0	0	0	152
Lane Group Flow (vph)	107	803	0	10	2322	0	0	26	0	0	165	9
Confl. Peds. (#/hr)	5		6	6		5	1					1
Confl. Bikes (#/hr)			2			4						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	custom
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												3
Actuated Green, G (s)	12.7	92.4		1.2	80.9			7.9			18.5	7.9
Effective Green, g (s)	12.7	92.4		1.2	80.9			7.9			18.5	7.9
Actuated g/C Ratio	0.09	0.66		0.01	0.58			0.06			0.13	0.06
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	152	3160		14	2734			93			222	83
v/s Ratio Prot	c0.06	0.17		0.01	c0.49			c0.02			c0.10	
v/s Ratio Perm												0.01
v/c Ratio	0.70	0.25		0.71	0.85			0.27			0.74	0.11
Uniform Delay, d1	61.8	9.7		69.2	24.5			63.3			58.5	62.7
Progression Factor	1.34	0.29		1.39	0.75			1.00			1.00	1.00
Incremental Delay, d2	11.0	0.2		75.9	2.2			0.6			11.1	0.2
Delay (s)	93.7	3.0		172.2	20.5			63.9			69.6	62.9
Level of Service	F	A		F	C			E			E	E
Approach Delay (s)		13.6			21.1			63.9			66.3	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.8%	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 (vph)	85	583	215	610	1401	30	249	170	216	69	490	58
Future Volume (vph)	85	583	215	610	1401	30	249	170	216	69	490	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4590		3252	4801		1526	3149	1492	1676	3295	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4590		3252	4801		1526	3149	1492	1676	3295	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	93	641	236	670	1540	33	274	187	237	76	538	64
RTOR Reduction (vph)	0	42	0	0	1	0	0	0	150	0	6	0
Lane Group Flow (vph)	93	835	0	670	1572	0	151	310	87	76	596	0
Confl. Peds. (#/hr)	2		7	7		2	1		2	2		1
Confl. Bikes (#/hr)			2									
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	11.6	38.9		32.2	59.5		19.4	19.4	51.6	29.5	29.5	
Effective Green, g (s)	11.6	38.9		32.2	59.5		19.4	19.4	51.6	29.5	29.5	
Actuated g/C Ratio	0.08	0.28		0.23	0.42		0.14	0.14	0.37	0.21	0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	138	1275		747	2040		211	436	549	353	694	
v/s Ratio Prot	0.06	0.18		c0.21	c0.33		c0.10	0.10	0.04	0.05	c0.18	
v/s Ratio Perm									0.02			
v/c Ratio	0.67	0.65		0.90	0.77		0.72	0.71	0.16	0.22	0.86	
Uniform Delay, d1	62.4	44.6		52.3	34.4		57.7	57.6	29.6	45.7	53.2	
Progression Factor	1.21	0.69		1.43	0.89		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.5	2.6		6.2	0.8		9.2	4.5	0.0	0.1	9.9	
Delay (s)	85.0	33.3		81.1	31.4		66.9	62.1	29.7	45.8	63.2	
Level of Service	F	C		F	C		E	E	C	D	E	
Approach Delay (s)		38.3			46.3			52.1			61.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	47.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.2%	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)	150	514	0	13	1795	47	3	0	0	125	1	445
Future Volume (vph)	150	514	0	13	1795	47	3	0	0	125	1	445
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00			0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (prot)	1676	4818		1676	4796		1676			1593	1598	1445
Flt Permitted	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (perm)	1676	4818		1676	4796		1676			1593	1598	1445
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	176	605	0	15	2112	55	4	0	0	147	1	524
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	251
Lane Group Flow (vph)	176	605	0	15	2166	0	4	0	0	73	75	273
Confl. Peds. (#/hr)	3		9	9		3	17					17
Confl. Bikes (#/hr)						4						
Turn Type	Prot	NA		Prot	NA		Split			Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	15.8	83.2		2.9	70.8		6.0			27.9	27.9	27.9
Effective Green, g (s)	15.8	83.2		2.9	70.8		6.0			27.9	27.9	27.9
Actuated g/C Ratio	0.11	0.59		0.02	0.51		0.04			0.20	0.20	0.20
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	189	2863		34	2425		71			317	318	287
v/s Ratio Prot	c0.10	0.13		0.01	c0.45		c0.00			0.05	0.05	
v/s Ratio Perm												c0.19
v/c Ratio	0.93	0.21		0.44	0.89		0.06			0.23	0.24	0.95
Uniform Delay, d1	61.6	13.2		67.7	31.2		64.3			47.0	47.1	55.4
Progression Factor	0.71	0.76		1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	41.1	0.1		3.3	4.8		0.1			0.1	0.1	39.9
Delay (s)	85.0	10.2		71.0	36.0		64.4			47.2	47.2	95.3
Level of Service	F	B		E	D		E			D	D	F
Approach Delay (s)		27.0			36.2			64.4			84.7	
Approach LOS		C			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	86.4%	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)	110	242	336	603	483	59	80	369	148	43	1424	118
Future Volume (veh/h)	110	242	336	603	483	59	80	369	148	43	1424	118
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	116	255	354	635	508	62	84	388	156	45	1499	124
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	715	319	630	1077	131	102	1462	653	57	1371	605
Arrive On Green	0.05	0.21	0.21	0.19	0.36	0.36	0.06	0.44	0.44	0.03	0.41	0.41
Sat Flow, veh/h	3261	3353	1496	3261	3010	366	1681	3353	1498	1681	3353	1479
Grp Volume(v), veh/h	116	255	354	635	282	288	84	388	156	45	1499	124
Grp Sat Flow(s),veh/h/ln	1630	1676	1496	1630	1676	1699	1681	1676	1498	1681	1676	1479
Q Serve(g_s), s	5.3	9.7	32.0	29.0	19.5	19.6	7.4	11.1	9.8	4.0	61.4	8.1
Cycle Q Clear(g_c), s	5.3	9.7	32.0	29.0	19.5	19.6	7.4	11.1	9.8	4.0	61.4	8.1
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	159	715	319	630	600	608	102	1462	653	57	1371	605
V/C Ratio(X)	0.73	0.36	1.11	1.01	0.47	0.47	0.82	0.27	0.24	0.79	1.09	0.20
Avail Cap(c_a), veh/h	348	715	319	630	600	608	134	1462	653	134	1371	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	50.2	59.0	60.5	37.2	37.2	69.6	27.0	26.6	71.9	44.3	28.6
Incr Delay (d2), s/veh	2.4	0.1	83.1	37.7	0.2	0.2	19.9	0.4	0.9	8.8	53.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	4.5	20.6	16.3	9.0	9.2	4.0	5.2	4.2	2.0	38.6	3.4
LnGrp Delay(d),s/veh	72.8	50.3	142.1	98.2	37.4	37.4	89.5	27.4	27.5	80.7	98.2	28.8
LnGrp LOS	E	D	F	F	D	D	F	C	C	F	F	C
Approach Vol, veh/h		725			1205			628			1668	
Approach Delay, s/veh		98.7			69.4			35.7			92.5	
Approach LOS		F			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	70.9	11.3	58.7	13.1	66.9	33.0	37.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	12.0	58.5	16.0	45.0	12.0	58.5	29.0	32.0
Max Q Clear Time (g_c+I1), s	11.6	13.1	7.3	21.6	9.4	63.4	31.0	34.0
Green Ext Time (p_c), s	0.0	31.7	0.1	4.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	78.6
HCM 2010 LOS	E

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	321	182	61	261	1059	107
Future Volume (veh/h)	321	182	61	261	1059	107
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	349	198	66	284	1151	116
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	474	423	215	845	845	718
Arrive On Green	0.28	0.28	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1681	1500	436	1765	1765	1500
Grp Volume(v), veh/h	349	198	66	284	1151	116
Grp Sat Flow(s),veh/h/ln	1681	1500	436	1765	1765	1500
Q Serve(g_s), s	6.3	3.6	0.0	3.3	16.0	1.5
Cycle Q Clear(g_c), s	6.3	3.6	16.0	3.3	16.0	1.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	474	423	215	845	845	718
V/C Ratio(X)	0.74	0.47	0.31	0.34	1.36	0.16
Avail Cap(c_a), veh/h	804	718	215	845	845	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	9.9	16.7	5.4	8.7	4.9
Incr Delay (d2), s/veh	2.2	0.8	0.8	0.2	170.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	1.6	0.6	1.6	47.6	0.6
LnGrp Delay(d),s/veh	13.1	10.7	17.5	5.6	179.6	5.0
LnGrp LOS	B	B	B	A	F	A
Approach Vol, veh/h	547			350	1267	
Approach Delay, s/veh	12.3			7.9	163.7	
Approach LOS	B			A	F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		20.0		13.4		20.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		16.0		16.0		16.0		
Max Q Clear Time (g_c+I1), s		18.0		8.3		18.0		
Green Ext Time (p_c), s		0.0		1.2		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	100.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	684	92	308	611	140	115	321	322	422	1704	136
Future Volume (veh/h)	109	684	92	308	611	140	115	321	322	422	1704	136
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		0.91	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	116	728	98	328	650	149	122	341	343	449	1813	145
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	738	289	369	953	387	143	849	386	469	2083	166
Arrive On Green	0.05	0.22	0.22	0.11	0.28	0.28	0.09	0.26	0.26	0.28	0.46	0.46
Sat Flow, veh/h	3261	3353	1313	3261	3353	1361	1681	3212	1461	1681	4544	362
Grp Volume(v), veh/h	116	728	98	328	650	149	122	341	343	449	1280	678
Grp Sat Flow(s),veh/h/ln	1630	1676	1313	1630	1676	1361	1681	1606	1461	1681	1606	1694
Q Serve(g_s), s	5.3	32.4	9.4	14.9	25.8	13.2	10.7	13.1	33.9	39.4	53.8	54.2
Cycle Q Clear(g_c), s	5.3	32.4	9.4	14.9	25.8	13.2	10.7	13.1	33.9	39.4	53.8	54.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	159	738	289	369	953	387	143	849	386	469	1472	777
V/C Ratio(X)	0.73	0.99	0.34	0.89	0.68	0.39	0.85	0.40	0.89	0.96	0.87	0.87
Avail Cap(c_a), veh/h	391	738	289	391	953	387	269	849	386	560	1472	777
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	58.3	49.3	65.6	47.7	43.1	67.7	45.4	53.1	53.2	36.6	36.7
Incr Delay (d2), s/veh	2.4	29.7	0.3	19.7	1.7	0.2	5.4	0.4	21.9	24.0	7.2	13.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	18.1	3.5	7.7	12.1	5.0	5.2	5.9	16.0	21.5	25.3	28.1
LnGrp Delay(d),s/veh	72.7	88.0	49.6	85.3	49.3	43.4	73.1	45.9	74.9	77.2	43.8	49.7
LnGrp LOS	E	F	D	F	D	D	E	D	E	E	D	D
Approach Vol, veh/h		942			1127			806			2407	
Approach Delay, s/veh		82.1			59.0			62.4			51.7	
Approach LOS		F			E			E			D	

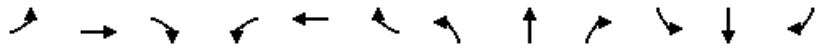
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.8	74.3	21.0	38.0	45.9	45.1	11.3	47.6
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	24.0	56.5	18.0	33.0	50.0	30.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	12.7	56.2	16.9	34.4	41.4	35.9	7.3	27.8
Green Ext Time (p_c), s	0.1	0.3	0.1	0.0	0.5	0.0	0.1	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.3
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	1182	118	69	1126	261	43	12	15	144	19	210
Future Volume (vph)	299	1182	118	69	1126	261	43	12	15	144	19	210
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	318	1257	126	73	1198	278	46	13	16	153	20	223
RTOR Reduction (vph)	0	0	49	0	0	89	0	0	15	0	0	176
Lane Group Flow (vph)	318	1257	77	73	1198	189	46	13	1	153	20	47
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1			8			1			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	15.1	67.4	67.4	8.0	60.3	60.3	8.5	7.5	7.5	9.6	8.1	23.2
Effective Green, g (s)	15.1	67.4	67.4	8.0	60.3	60.3	8.5	7.5	7.5	9.6	8.1	23.2
Actuated g/C Ratio	0.14	0.61	0.61	0.07	0.55	0.55	0.08	0.07	0.07	0.09	0.07	0.21
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	446	2952	907	236	2641	808	251	228	100	283	129	556
v/s Ratio Prot	c0.10	0.26		0.02	c0.25		0.01	0.00		c0.05	c0.01	0.01
v/s Ratio Perm			0.05			0.13			0.00			0.01
v/c Ratio	0.71	0.43	0.09	0.31	0.45	0.23	0.18	0.06	0.01	0.54	0.16	0.08
Uniform Delay, d1	45.4	11.2	8.7	48.4	14.9	12.9	47.5	47.9	47.8	48.1	47.7	34.9
Progression Factor	1.00	1.00	1.00	1.32	0.41	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.5	0.2	0.2	0.0	0.0	0.1	0.0	0.0	1.1	0.2	0.0
Delay (s)	49.8	11.6	8.9	63.9	6.1	2.9	47.6	48.0	47.8	49.2	47.9	34.9
Level of Service	D	B	A	E	A	A	D	D	D	D	D	C
Approach Delay (s)		18.6			8.2			47.7			41.1	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

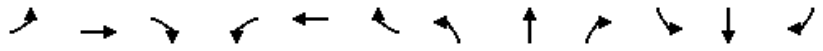
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	794	129	0	1030	8	524	492	118	111	277	244
Future Volume (veh/h)	86	794	129	0	1030	8	524	492	118	111	277	244
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	0	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	99	913	0	0	1184	0	602	566	136	128	318	280
Adj No. of Lanes	2	3	1	0	3	0	2	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	169	2126	662	0	1679	0	608	894	214	156	807	360
Arrive On Green	0.05	0.44	0.00	0.00	0.35	0.00	0.19	0.33	0.33	0.09	0.24	0.24
Sat Flow, veh/h	3261	4818	1500	0	5135	0	3261	2676	641	1681	3353	1494
Grp Volume(v), veh/h	99	913	0	0	1184	0	602	354	348	128	318	280
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	0	1606	0	1630	1676	1640	1681	1676	1494
Q Serve(g_s), s	3.3	14.4	0.0	0.0	23.4	0.0	20.3	19.6	19.7	8.2	8.8	19.3
Cycle Q Clear(g_c), s	3.3	14.4	0.0	0.0	23.4	0.0	20.3	19.6	19.7	8.2	8.8	19.3
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	169	2126	662	0	1679	0	608	560	548	156	807	360
V/C Ratio(X)	0.59	0.43	0.00	0.00	0.71	0.00	0.99	0.63	0.64	0.82	0.39	0.78
Avail Cap(c_a), veh/h	282	2126	662	0	1679	0	608	560	548	283	1006	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	21.2	0.0	0.0	31.0	0.0	44.7	30.9	30.9	49.0	35.0	39.0
Incr Delay (d2), s/veh	2.9	0.2	0.0	0.0	2.5	0.0	34.0	2.7	2.8	10.2	0.4	7.8
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	1.5	6.4	0.0	0.0	10.7	0.0	12.0	9.5	9.3	4.3	4.1	8.7
LnGrp Delay(d),s/veh	53.9	21.4	0.0	0.0	33.5	0.0	78.7	33.6	33.7	59.2	35.5	46.9
LnGrp LOS	D	C			C		E	C	C	E	D	D
Approach Vol, veh/h		1012			1184			1304			726	
Approach Delay, s/veh		24.5			33.5			54.4			44.1	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	10.2	43.3	25.0	31.5		53.5	14.7	41.8
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0		5.0	4.5	5.0
Max Green Setting (Gmax), s	9.5	28.0	20.5	33.0		42.0	18.5	35.0
Max Q Clear Time (g_c+I1), s	5.3	25.4	22.3	21.3		16.4	10.2	21.7
Green Ext Time (p_c), s	0.1	2.5	0.0	5.1		20.3	0.2	7.9

Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	232	42	126	640	255	92	1080	96	61	635	24
Future Volume (veh/h)	47	232	42	126	640	255	92	1080	96	61	635	24
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	49	242	44	131	667	266	96	1125	100	64	661	25
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	1164	208	157	1566	686	120	1279	114	81	877	385
Arrive On Green	0.04	0.41	0.41	0.09	0.47	0.47	0.07	0.28	0.28	0.05	0.26	0.26
Sat Flow, veh/h	1681	2839	508	1681	3353	1469	1681	4498	399	1681	3353	1472
Grp Volume(v), veh/h	49	141	145	131	667	266	96	803	422	64	661	25
Grp Sat Flow(s),veh/h/ln	1681	1676	1670	1681	1676	1469	1681	1606	1686	1681	1676	1472
Q Serve(g_s), s	3.2	6.0	6.2	8.4	14.6	13.0	6.2	26.2	26.3	4.1	19.9	1.4
Cycle Q Clear(g_c), s	3.2	6.0	6.2	8.4	14.6	13.0	6.2	26.2	26.3	4.1	19.9	1.4
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	62	687	685	157	1566	686	120	913	479	81	877	385
V/C Ratio(X)	0.79	0.21	0.21	0.83	0.43	0.39	0.80	0.88	0.88	0.79	0.75	0.06
Avail Cap(c_a), veh/h	183	687	685	244	1566	686	290	964	506	214	877	385
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.79	0.79	0.79	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	20.9	21.0	49.0	19.5	19.1	50.3	37.6	37.6	51.8	37.4	30.5
Incr Delay (d2), s/veh	8.3	0.7	0.7	6.0	0.1	0.3	4.7	8.6	15.0	6.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.9	2.9	4.2	6.8	5.3	3.0	12.7	14.2	2.1	9.7	0.6
LnGrp Delay(d),s/veh	60.9	21.6	21.7	55.0	19.6	19.4	55.0	46.1	52.6	58.1	40.7	30.5
LnGrp LOS	E	C	C	E	B	B	E	D	D	E	D	C
Approach Vol, veh/h		335			1064			1321			750	
Approach Delay, s/veh		27.4			23.9			48.8			41.8	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.3	50.1	11.8	33.8	8.0	56.4	9.3	36.3
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.3	29.0	19.0	28.0	12.0	33.0	14.0	33.0
Max Q Clear Time (g_c+I1), s	10.4	8.2	8.2	21.9	5.2	16.6	6.1	28.3
Green Ext Time (p_c), s	0.1	7.3	0.1	4.2	0.0	6.6	0.0	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	103	0	0	1142	177	679	838	6	0	0	0
Future Volume (vph)	3	103	0	0	1142	177	679	838	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.98		1.00	1.00				
Flt Protected	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (prot)	1676	1765			3277		1442	4489				
Flt Permitted	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (perm)	1676	1765			3277		1442	4489				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	106	0	0	1177	182	700	864	6	0	0	0
RTOR Reduction (vph)	0	0	0	0	13	0	0	1	0	0	0	0
Lane Group Flow (vph)	3	106	0	0	1346	0	385	1184	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			16	16		
Confl. Bikes (#/hr)						1						1
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.2	34.7			29.5		44.8	44.8				
Effective Green, g (s)	1.2	34.7			29.5		44.8	44.8				
Actuated g/C Ratio	0.01	0.39			0.33		0.50	0.50				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	22	680			1074		717	2234				
v/s Ratio Prot	0.00	c0.06			c0.41		c0.27	0.26				
v/s Ratio Perm												
v/c Ratio	0.14	0.16			1.25		0.54	0.53				
Uniform Delay, d1	43.9	18.1			30.2		15.5	15.4				
Progression Factor	1.00	1.00			0.91		1.00	1.00				
Incremental Delay, d2	1.0	0.0			119.8		2.9	0.9				
Delay (s)	44.9	18.1			147.3		18.4	16.3				
Level of Service	D	B			F		B	B				
Approach Delay (s)		18.9			147.3			16.8			0.0	
Approach LOS		B			F			B			A	

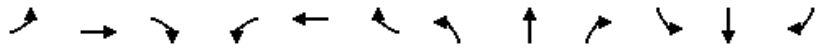
Intersection Summary			
HCM 2000 Control Delay	75.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	92	137	233	407	107	102	379	92	73	1577	581
Future Volume (vph)	62	92	137	233	407	107	102	379	92	73	1577	581
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	3025		1676	3353	1481	1676	4664		1676	4623	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	3025		1676	3353	1481	1676	4664		1676	4623	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	72	107	159	271	473	124	119	441	107	85	1834	676
RTOR Reduction (vph)	0	74	0	0	0	58	0	36	0	0	44	0
Lane Group Flow (vph)	72	192	0	271	473	66	119	512	0	85	2466	0
Confl. Peds. (#/hr)			2	2					1	1		
Confl. Bikes (#/hr)			1			1						
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	10.8	79.8		11.0	80.0	80.0	15.2	28.4		11.3	24.5	
Effective Green, g (s)	10.8	79.8		11.0	80.0	80.0	15.2	28.4		11.3	24.5	
Actuated g/C Ratio	0.07	0.53		0.07	0.53	0.53	0.10	0.19		0.08	0.16	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	120	1609		122	1788	789	169	883		126	755	
v/s Ratio Prot	0.04	0.06		c0.16	c0.14		c0.07	c0.11		0.05	c0.53	
v/s Ratio Perm						0.04						
v/c Ratio	0.60	0.12		2.22	0.26	0.08	0.70	0.58		0.67	3.27	
Uniform Delay, d1	67.5	17.5		69.5	19.0	17.1	65.2	55.4		67.6	62.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.26	0.92		1.00	1.00	
Incremental Delay, d2	5.3	0.2		575.2	0.1	0.1	10.3	0.6		10.7	1023.0	
Delay (s)	72.8	17.7		644.7	19.1	17.2	92.8	51.3		78.2	1085.8	
Level of Service	E	B		F	B	B	F	D		E	F	
Approach Delay (s)		29.4			214.2			58.7			1052.8	
Approach LOS		C			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	664.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	108.4%	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)	127	163	19	276	646	54	75	226	75	112	1197	543
Future Volume (veh/h)	127	163	19	276	646	54	75	226	75	112	1197	543
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	138	177	0	300	702	0	82	246	82	122	1301	590
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	184	724	225	345	962	0	126	2584	792	166	2643	821
Arrive On Green	0.06	0.15	0.00	0.11	0.20	0.00	0.04	0.54	0.54	0.05	0.55	0.55
Sat Flow, veh/h	3261	4818	1500	3261	4976	0	3261	4818	1477	3261	4818	1496
Grp Volume(v), veh/h	138	177	0	300	702	0	82	246	82	122	1301	590
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	0	1630	1606	1477	1630	1606	1496
Q Serve(g_s), s	6.3	4.9	0.0	13.6	20.5	0.0	3.7	3.7	4.1	5.5	25.0	44.1
Cycle Q Clear(g_c), s	6.3	4.9	0.0	13.6	20.5	0.0	3.7	3.7	4.1	5.5	25.0	44.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	184	724	225	345	962	0	126	2584	792	166	2643	821
V/C Ratio(X)	0.75	0.24	0.00	0.87	0.73	0.00	0.65	0.10	0.10	0.74	0.49	0.72
Avail Cap(c_a), veh/h	761	1718	535	456	1269	0	304	2584	792	456	2643	821
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	69.7	56.2	0.0	66.0	56.2	0.0	71.1	17.0	17.1	70.2	20.9	25.2
Incr Delay (d2), s/veh	2.3	0.2	0.0	10.8	1.9	0.0	2.1	0.0	0.1	0.2	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.2	0.0	6.6	9.3	0.0	1.7	1.7	1.7	2.5	11.1	18.3
LnGrp Delay(d),s/veh	72.1	56.5	0.0	76.9	58.1	0.0	73.2	17.0	17.1	70.4	21.0	25.7
LnGrp LOS	E	E		E	E		E	B	B	E	C	C
Approach Vol, veh/h		315			1002			410			2013	
Approach Delay, s/veh		63.3			63.7			28.3			25.4	
Approach LOS		E			E			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	10.8	89.3	13.4	36.5	12.6	87.5	20.9	29.0
Change Period (Y+Rc), s	5.0	7.0	5.0	6.5	5.0	7.0	5.0	6.5
Max Green Setting (Gmax), s	14.0	38.0	35.0	39.5	21.0	31.0	21.0	53.5
Max Q Clear Time (g_c+I1), s	5.7	46.1	8.3	22.5	7.5	6.1	15.6	6.9
Green Ext Time (p_c), s	0.1	0.0	0.2	7.0	0.1	19.0	0.3	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	39.2
HCM 2010 LOS	D

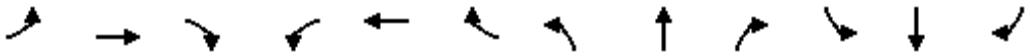
Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	25	1597	5	17	425
Future Vol, veh/h	3	25	1597	5	17	425
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	26	1664	5	18	443

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1923	834	0	0	1669	0
Stage 1	1666	-	-	-	-	-
Stage 2	257	-	-	-	-	-
Critical Hdwy	7.54	6.94	-	-	4.14	-
Critical Hdwy Stg 1	6.54	-	-	-	-	-
Critical Hdwy Stg 2	6.54	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	40	311	-	-	381	-
Stage 1	100	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	38	311	-	-	381	-
Mov Cap-2 Maneuver	38	-	-	-	-	-
Stage 1	100	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.5	0	1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	176	381	-
HCM Lane V/C Ratio	-	-	0.166	0.046	-
HCM Control Delay (s)	-	-	29.5	14.9	0.4
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	352	5	31	0	0	0	0	356	1266	88	411	0
Future Volume (vph)	352	5	31	0	0	0	0	356	1266	88	411	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	356	5	31	0	0	0	0	360	1279	89	415	0

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total (vph)	361	31	180	180	1279	227	277
Volume Left (vph)	356	0	0	0	0	89	0
Volume Right (vph)	0	31	0	0	1279	0	0
Hadj (s)	0.23	-0.57	0.03	0.03	-0.67	0.23	0.03
Departure Headway (s)	6.2	3.2	6.6	6.6	3.2	6.6	6.4
Degree Utilization, x	0.62	0.03	0.33	0.33	1.14	0.42	0.49
Capacity (veh/h)	560	1121	523	522	1135	531	548
Control Delay (s)	18.8	6.3	11.6	11.6	86.7	13.0	14.1
Approach Delay (s)	17.8		70.2			13.6	
Approach LOS	C		F			B	

Intersection Summary				
Delay	50.8			
Level of Service	F			
Intersection Capacity Utilization	128.3%	ICU Level of Service	H	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	22.7
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	0	0	0	0	343	2	66	0	160	548	0	0	0	156	310
Future Vol, veh/h	0	0	0	0	0	343	2	66	0	160	548	0	0	0	156	310
Peak Hour Factor	0.92	0.94	0.94	0.94	0.92	0.94	0.94	0.94	0.92	0.94	0.94	0.94	0.92	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	365	2	70	0	170	583	0	0	0	166	330
Number of Lanes	0	0	0	0	0	1	1	1	0	0	2	0	0	0	2	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	3	3	0
HCM Control Delay	15.6	32.6	13.8
HCM LOS	C	D	B

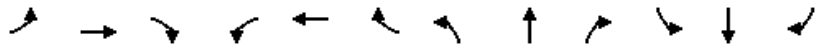
Lane	NBLn1	NBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	47%	0%	100%	99%	0%	0%	0%	0%
Vol Thru, %	53%	100%	0%	1%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	343	365	172	174	66	78	78	310
LT Vol	160	0	172	172	0	0	0	0
Through Vol	183	365	0	2	0	78	78	0
RT Vol	0	0	0	0	66	0	0	310
Lane Flow Rate	365	389	182	185	70	83	83	330
Geometry Grp	8	8	7	7	7	8	8	8
Degree of Util (X)	0.772	0.797	0.412	0.416	0.135	0.188	0.188	0.517
Departure Headway (Hd)	7.624	7.386	8.124	8.118	6.903	8.138	8.138	5.643
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	474	490	443	445	520	441	441	636
Service Time	5.371	5.133	5.862	5.856	4.64	5.885	5.885	3.389
HCM Lane V/C Ratio	0.77	0.794	0.411	0.416	0.135	0.188	0.188	0.519
HCM Control Delay	31.8	33.4	16.5	16.5	10.7	12.8	12.8	14.3
HCM Lane LOS	D	D	C	C	B	B	B	B
HCM 95th-tile Q	6.8	7.4	2	2	0.5	0.7	0.7	3

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	74	3	32	0	0	6	22	0	2	166	2	0	44	254	114
Future Vol, veh/h	0	74	3	32	0	0	6	22	0	2	166	2	0	44	254	114
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	99	4	43	0	0	8	29	0	3	221	3	0	59	339	152
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	11.8	9.4	13.2	12.3
HCM LOS	B	A	B	B

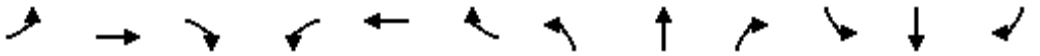
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	68%	0%	100%	0%	0%
Vol Thru, %	0%	99%	3%	21%	0%	96%	0%
Vol Right, %	0%	1%	29%	79%	0%	4%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	168	109	28	44	265	103
LT Vol	2	0	74	0	44	0	0
Through Vol	0	166	3	6	0	254	0
RT Vol	0	2	32	22	0	11	103
Lane Flow Rate	3	224	145	37	59	354	137
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.005	0.394	0.268	0.064	0.097	0.537	0.182
Departure Headway (Hd)	6.849	6.334	6.627	6.203	5.972	5.461	4.785
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	523	569	542	576	601	665	754
Service Time	4.589	4.075	4.366	3.95	3.697	3.161	2.485
HCM Lane V/C Ratio	0.006	0.394	0.268	0.064	0.098	0.532	0.182
HCM Control Delay	9.6	13.2	11.8	9.4	9.3	14.3	8.5
HCM Lane LOS	A	B	B	A	A	B	A
HCM 95th-tile Q	0	1.9	1.1	0.2	0.3	3.2	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	4	2	1	2	25	1	260	1	20	409	182
Future Volume (veh/h)	141	4	2	1	2	25	1	260	1	20	409	182
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	152	4	2	1	2	27	1	280	1	22	440	196
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	131	66	2	5	61	4	1117	4	23	766	338
Arrive On Green	0.12	0.12	0.12	0.04	0.04	0.04	0.00	0.33	0.33	0.01	0.34	0.34
Sat Flow, veh/h	1681	1110	555	51	101	1366	1681	3427	12	1681	2263	999
Grp Volume(v), veh/h	152	0	6	30	0	0	1	137	144	22	325	311
Grp Sat Flow(s),veh/h/ln	1681	0	1665	1518	0	0	1681	1676	1763	1681	1676	1585
Q Serve(g_s), s	3.9	0.0	0.1	0.9	0.0	0.0	0.0	2.7	2.7	0.6	7.1	7.2
Cycle Q Clear(g_c), s	3.9	0.0	0.1	0.9	0.0	0.0	0.0	2.7	2.7	0.6	7.1	7.2
Prop In Lane	1.00		0.33	0.03		0.90	1.00		0.01	1.00		0.63
Lane Grp Cap(c), veh/h	199	0	197	68	0	0	4	547	575	23	567	536
V/C Ratio(X)	0.76	0.00	0.03	0.44	0.00	0.00	0.26	0.25	0.25	0.95	0.57	0.58
Avail Cap(c_a), veh/h	1134	0	1123	853	0	0	378	1319	1387	378	1319	1247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	0.0	17.3	20.7	0.0	0.0	22.2	11.0	11.0	21.9	12.1	12.1
Incr Delay (d2), s/veh	2.3	0.0	0.0	1.7	0.0	0.0	13.2	0.2	0.2	40.9	0.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.1	0.4	0.0	0.0	0.0	1.3	1.3	0.5	3.4	3.3
LnGrp Delay(d),s/veh	21.3	0.0	17.4	22.3	0.0	0.0	35.4	11.2	11.2	62.8	13.0	13.1
LnGrp LOS	C		B	C			D	B	B	E	B	B
Approach Vol, veh/h		158			30			282			658	
Approach Delay, s/veh		21.1			22.3			11.3			14.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.1	20.9		10.9	4.6	21.5		7.6
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	10.0	35.0		30.0	10.0	35.0		25.0
Max Q Clear Time (g_c+I1), s	2.6	4.7		5.9	2.0	9.2		2.9
Green Ext Time (p_c), s	0.0	5.9		0.0	0.0	5.7		0.0

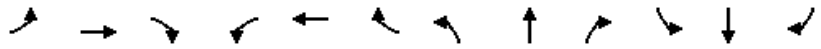
Intersection Summary	
HCM 2010 Ctrl Delay	15.0
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	90	27	149	78	315	16	336	120	581	552	95
Future Volume (vph)	134	90	27	149	78	315	16	336	120	581	552	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	3226		1676	3353	1500	1676	3209		3252	3271	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	3226		1676	3353	1500	1676	3209		3252	3271	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	143	96	29	159	83	335	17	357	128	618	587	101
RTOR Reduction (vph)	0	25	0	0	0	290	0	25	0	0	7	0
Lane Group Flow (vph)	143	100	0	159	83	45	17	460	0	618	681	0
Confl. Peds. (#/hr)			2	2			4		1	1		4
Confl. Bikes (#/hr)												1
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	13.3	12.0		14.4	13.1	13.1	2.7	22.7		24.5	44.5	
Effective Green, g (s)	13.3	12.0		14.4	13.1	13.1	2.7	22.7		24.5	44.5	
Actuated g/C Ratio	0.14	0.12		0.15	0.13	0.13	0.03	0.23		0.25	0.46	
Clearance Time (s)	5.5	7.0		5.5	7.0	7.0	5.5	6.0		5.5	6.0	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	228	396		247	450	201	46	746		816	1491	
v/s Ratio Prot	0.09	c0.03		c0.09	0.02		0.01	c0.14		c0.19	0.21	
v/s Ratio Perm						0.03						
v/c Ratio	0.63	0.25		0.64	0.18	0.22	0.37	0.62		0.76	0.46	
Uniform Delay, d1	39.8	38.7		39.2	37.5	37.7	46.6	33.6		33.8	18.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	0.6		5.6	0.3	1.0	5.0	1.5		4.0	0.2	
Delay (s)	45.1	39.3		44.8	37.9	38.7	51.6	35.1		37.9	18.5	
Level of Service	D	D		D	D	D	D	D		D	B	
Approach Delay (s)		42.4			40.3			35.6			27.6	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	97.6	Sum of lost time (s)	24.0
Intersection Capacity Utilization	62.5%	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 (veh/h)	784	0	837	0	0	0	0	679	106	0	391	211
Future Volume (veh/h)	784	0	837	0	0	0	0	679	106	0	391	211
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	834	0	890				0	722	113	0	416	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	2042	0	940				0	1036	161	0	826	369
Arrive On Green	0.63	0.00	0.63				0.00	0.25	0.25	0.00	0.25	0.00
Sat Flow, veh/h	3261	0	1500				0	4365	652	0	3441	1500
Grp Volume(v), veh/h	834	0	890				0	550	285	0	416	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1646	0	1676	1500
Q Serve(g_s), s	10.6	0.0	45.0				0.0	12.8	13.0	0.0	8.8	0.0
Cycle Q Clear(g_c), s	10.6	0.0	45.0				0.0	12.8	13.0	0.0	8.8	0.0
Prop In Lane	1.00		1.00				0.00		0.40	0.00		1.00
Lane Grp Cap(c), veh/h	2042	0	940				0	791	405	0	826	369
V/C Ratio(X)	0.41	0.00	0.95				0.00	0.69	0.70	0.00	0.50	0.00
Avail Cap(c_a), veh/h	2174	0	1000				0	974	499	0	1016	455
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	7.7	0.0	14.2				0.0	28.3	28.3	0.0	26.7	0.0
Incr Delay (d2), s/veh	0.1	0.0	16.7				0.0	1.6	3.4	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	22.7				0.0	5.8	6.3	0.0	4.1	0.0
LnGrp Delay(d),s/veh	7.9	0.0	30.8				0.0	29.9	31.7	0.0	27.2	0.0
LnGrp LOS	A		C					C	C		C	
Approach Vol, veh/h		1724						835			416	
Approach Delay, s/veh		19.7						30.5			27.2	
Approach LOS		B						C			C	

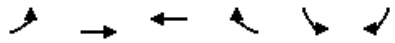
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		26.3		56.2		26.3		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		25.0		55.0		25.0		
Max Q Clear Time (g_c+I1), s		15.0		47.0		10.8		
Green Ext Time (p_c), s		5.3		4.7		6.6		

Intersection Summary	
HCM 2010 Ctrl Delay	23.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	0	172	120	83	217	164	908	0	0	762	34
Future Volume (vph)	56	0	172	120	83	217	164	908	0	0	762	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			0.86	
Frpb, ped/bikes	1.00		1.00		1.00	0.99	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.99	
Flt Protected	0.95		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3251		1500		1714	1481	1676	4818			6027	
Flt Permitted	0.63		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	2142		1500		1714	1481	1676	4818			6027	
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)	58	0	179	125	86	226	171	946	0	0	794	35
RTOR Reduction (vph)	0	0	159	0	0	178	0	0	0	0	5	0
Lane Group Flow (vph)	58	0	20	0	211	48	171	946	0	0	824	0
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	7.7		7.7		15.0	15.0	12.4	34.8			18.4	
Effective Green, g (s)	7.7		7.7		15.0	15.0	12.4	34.8			18.4	
Actuated g/C Ratio	0.11		0.11		0.21	0.21	0.18	0.49			0.26	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	233		163		364	315	294	2378			1573	
v/s Ratio Prot					c0.12		c0.10	0.20			c0.14	
v/s Ratio Perm	c0.03		0.01			0.03						
v/c Ratio	0.25		0.12		0.58	0.15	0.58	0.40			0.52	
Uniform Delay, d1	28.8		28.3		24.9	22.6	26.7	11.2			22.3	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.4		0.2		1.4	0.1	1.9	0.1			0.3	
Delay (s)	29.2		28.6		26.3	22.7	28.6	11.4			22.6	
Level of Service	C		C		C	C	C	B			C	
Approach Delay (s)		28.7			24.4			14.0			22.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	17.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	565	617	392	234	220	391
Future Volume (veh/h)	565	617	392	234	220	391
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	589	643	408	244	229	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	791	2022	902	713	699	321
Arrive On Green	0.24	0.60	0.27	0.27	0.21	0.00
Sat Flow, veh/h	3261	3441	3441	1456	3261	1500
Grp Volume(v), veh/h	589	643	408	244	229	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1456	1630	1500
Q Serve(g_s), s	7.3	4.1	4.4	4.6	2.6	0.0
Cycle Q Clear(g_c), s	7.3	4.1	4.4	4.6	2.6	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	791	2022	902	713	699	321
V/C Ratio(X)	0.74	0.32	0.45	0.34	0.33	0.00
Avail Cap(c_a), veh/h	1191	2757	1225	854	1191	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.3	4.3	13.3	7.0	14.5	0.0
Incr Delay (d2), s/veh	1.4	0.1	0.4	0.3	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	3.4	1.9	2.1	2.6	1.2	0.0
LnGrp Delay(d),s/veh	16.7	4.4	13.7	7.3	14.8	0.0
LnGrp LOS	B	A	B	A	B	
Approach Vol, veh/h		1232	652		229	
Approach Delay, s/veh		10.3	11.3		14.8	
Approach LOS		B	B		B	

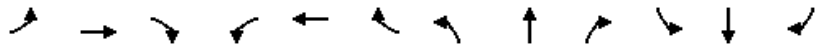
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				30.4		13.4	14.6	15.8
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				36.0		16.0	16.0	16.0
Max Q Clear Time (g_c+I1), s				6.1		4.6	9.3	6.6
Green Ext Time (p_c), s				9.2		0.6	1.3	5.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	481	230	220	321	19	262	31	386	29	18	29
Future Volume (veh/h)	24	481	230	220	321	19	262	31	386	29	18	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	25	496	237	227	331	20	270	32	398	30	19	30
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	603	287	267	1313	79	306	537	447	49	91	143
Arrive On Green	0.03	0.28	0.28	0.16	0.41	0.41	0.18	0.30	0.30	0.03	0.15	0.15
Sat Flow, veh/h	1681	2185	1038	1681	3206	193	1681	1765	1469	1681	601	948
Grp Volume(v), veh/h	25	380	353	227	172	179	270	32	398	30	0	49
Grp Sat Flow(s),veh/h/ln	1681	1676	1546	1681	1676	1722	1681	1765	1469	1681	0	1549
Q Serve(g_s), s	1.3	19.4	19.6	12.0	6.2	6.3	14.3	1.2	23.7	1.6	0.0	2.5
Cycle Q Clear(g_c), s	1.3	19.4	19.6	12.0	6.2	6.3	14.3	1.2	23.7	1.6	0.0	2.5
Prop In Lane	1.00		0.67	1.00		0.11	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	43	463	427	267	686	705	306	537	447	49	0	234
V/C Ratio(X)	0.58	0.82	0.83	0.85	0.25	0.25	0.88	0.06	0.89	0.61	0.00	0.21
Avail Cap(c_a), veh/h	321	531	490	588	806	828	391	559	465	606	0	694
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.1	31.0	31.1	37.4	17.8	17.8	36.5	22.6	30.4	43.9	0.0	34.0
Incr Delay (d2), s/veh	11.7	8.0	9.1	7.4	0.1	0.1	17.1	0.0	17.9	11.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	10.0	9.4	6.1	2.9	3.0	8.1	0.6	11.8	0.9	0.0	1.1
LnGrp Delay(d),s/veh	55.8	39.0	40.2	44.8	17.9	17.9	53.6	22.6	48.3	55.7	0.0	34.3
LnGrp LOS	E	D	D	D	B	B	D	C	D	E		C
Approach Vol, veh/h		758			578			700			79	
Approach Delay, s/veh		40.1			28.5			49.2			42.4	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	33.3	19.7	30.8	21.8	19.3	7.5	43.0
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	3.0	29.0	32.0	29.0	21.3	41.0	17.5	44.0
Max Q Clear Time (g_c+I1), s	3.6	25.7	14.0	21.6	16.3	4.5	3.3	8.3
Green Ext Time (p_c), s	0.0	0.5	0.6	3.0	0.4	1.2	0.0	5.3

Intersection Summary	
HCM 2010 Ctrl Delay	40.0
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	592	40	11	409	9	35	12	51	8	6	6
Future Volume (veh/h)	10	592	40	11	409	9	35	12	51	8	6	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	10	610	41	11	422	9	36	12	53	8	6	6
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	663	45	11	699	15	117	39	172	34	26	26
Arrive On Green	0.01	0.41	0.41	0.01	0.41	0.41	0.21	0.21	0.21	0.05	0.05	0.05
Sat Flow, veh/h	1681	1635	110	1681	1721	37	565	188	832	657	493	493
Grp Volume(v), veh/h	10	0	651	11	0	431	101	0	0	20	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1745	1681	0	1758	1585	0	0	1642	0	0
Q Serve(g_s), s	0.3	0.0	17.2	0.3	0.0	9.4	2.6	0.0	0.0	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.0	17.2	0.3	0.0	9.4	2.6	0.0	0.0	0.6	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.02	0.36		0.52	0.40		0.30
Lane Grp Cap(c), veh/h	10	0	707	11	0	714	328	0	0	86	0	0
V/C Ratio(X)	1.00	0.00	0.92	0.99	0.00	0.60	0.31	0.00	0.00	0.23	0.00	0.00
Avail Cap(c_a), veh/h	380	0	717	380	0	722	521	0	0	539	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	24.2	0.0	13.7	24.2	0.0	11.4	16.4	0.0	0.0	22.1	0.0	0.0
Incr Delay (d2), s/veh	131.9	0.0	17.1	123.6	0.0	1.4	0.5	0.0	0.0	1.4	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	0.5	0.0	11.5	0.5	0.0	4.8	1.2	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	156.1	0.0	30.8	147.8	0.0	12.8	16.9	0.0	0.0	23.5	0.0	0.0
LnGrp LOS	F		C	F		B	B			C		
Approach Vol, veh/h		661			442			101			20	
Approach Delay, s/veh		32.7			16.1			16.9			23.5	
Approach LOS		C			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		14.1	4.3	23.7		6.6	4.3	23.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	20.0		16.0	11.0	20.0
Max Q Clear Time (g_c+I1), s		4.6	2.3	19.2		2.6	2.3	11.4
Green Ext Time (p_c), s		0.3	0.0	0.5		0.0	0.0	4.4

Intersection Summary		
HCM 2010 Ctrl Delay		25.3
HCM 2010 LOS		C

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	202	0	45	0	0	0	0	117	14	5	52	0
Future Vol, veh/h	202	0	45	0	0	0	0	117	14	5	52	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	227	0	51	0	0	0	0	131	16	6	58	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	201	201	58	-	0	0	131	0	0
Stage 1	70	70	-	-	-	-	-	-	-
Stage 2	131	131	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	788	695	1008	0	-	-	1454	-	0
Stage 1	953	837	-	0	-	-	-	-	0
Stage 2	895	788	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	785	0	1008	-	-	-	1454	-	-
Mov Cap-2 Maneuver	785	0	-	-	-	-	-	-	-
Stage 1	949	0	-	-	-	-	-	-	-
Stage 2	895	0	-	-	-	-	-	-	-

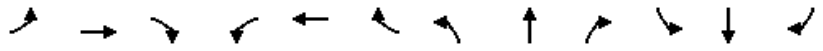
Approach	EB	NB	SB
HCM Control Delay, s	11.6	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	818	1454	-
HCM Lane V/C Ratio	-	-	0.339	0.004	-
HCM Control Delay (s)	-	-	11.6	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.5	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	38	281	57	166
Future Volume (Veh/h)	0	0	38	281	57	166
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	41	302	61	178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	445	61	61			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	445	61	61			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	555	1004	1542			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	41	302	61	178
Volume Left	41	0	0	0
Volume Right	0	0	0	178
cSH	1542	1700	1700	1700
Volume to Capacity	0.03	0.18	0.04	0.10
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	7.4	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.9		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		



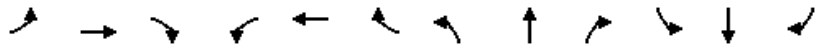
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	167	194	102	229	37	196	227	91	36	201	12
Future Volume (veh/h)	21	167	194	102	229	37	196	227	91	36	201	12
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	23	184	0	112	252	41	215	249	100	40	221	13
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	81	343	292	191	373	61	283	584	490	113	393	328
Arrive On Green	0.05	0.19	0.00	0.11	0.25	0.24	0.17	0.34	0.34	0.07	0.23	0.23
Sat Flow, veh/h	1681	1765	1500	1681	1474	240	1648	1731	1452	1648	1731	1442
Grp Volume(v), veh/h	23	184	0	112	0	293	215	249	100	40	221	13
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1713	1648	1731	1452	1648	1731	1442
Q Serve(g_s), s	0.7	5.3	0.0	3.5	0.0	8.6	7.0	6.2	2.7	1.3	6.3	0.4
Cycle Q Clear(g_c), s	0.7	5.3	0.0	3.5	0.0	8.6	7.0	6.2	2.7	1.3	6.3	0.4
Prop In Lane	1.00		1.00	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	81	343	292	191	0	433	283	584	490	113	393	328
V/C Ratio(X)	0.28	0.54	0.00	0.59	0.00	0.68	0.76	0.43	0.20	0.35	0.56	0.04
Avail Cap(c_a), veh/h	468	788	670	468	0	753	459	958	804	459	958	798
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.7	20.3	0.0	23.6	0.0	18.9	22.1	14.4	13.2	24.9	19.2	16.9
Incr Delay (d2), s/veh	1.9	1.3	0.0	2.8	0.0	1.9	4.2	0.5	0.2	1.9	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.7	0.0	1.8	0.0	4.3	3.5	3.1	1.1	0.6	3.1	0.2
LnGrp Delay(d),s/veh	27.6	21.6	0.0	26.4	0.0	20.7	26.3	14.9	13.4	26.8	20.4	16.9
LnGrp LOS	C	C		C		C	C	B	B	C	C	B
Approach Vol, veh/h		207			405			564			274	
Approach Delay, s/veh		22.3			22.3			19.0			21.2	
Approach LOS		C			C			B			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	13.6	17.1	6.7	18.6	7.8	22.9	10.4	14.9
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	15.0	* 30	15.0	* 24	15.0	30.0	15.0	24.0
Max Q Clear Time (g_c+I1), s	9.0	8.3	2.7	10.6	3.3	8.2	5.5	7.3
Green Ext Time (p_c), s	0.4	2.3	0.0	1.6	0.1	2.3	0.2	1.7

Intersection Summary	
HCM 2010 Ctrl Delay	20.8
HCM 2010 LOS	C

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	575	71	89	493	0	49	0	45	0	0	0
Future Volume (veh/h)	3	575	71	89	493	0	49	0	45	0	0	0
Number	5	2	12	1	6	16	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		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	1765	1765	1765	1765	1765	0	1765	1765	1765			
Adj Flow Rate, veh/h	3	593	73	92	508	0	51	0	46			
Adj No. of Lanes	1	2	1	1	2	0	1	1	1			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	2	2	2	2	2	0	2	2	2			
Cap, veh/h	10	1190	523	191	1552	0	197	207	176			
Arrive On Green	0.01	0.35	0.35	0.11	0.46	0.00	0.12	0.00	0.12			
Sat Flow, veh/h	1681	3353	1473	1681	3441	0	1681	1765	1500			
Grp Volume(v), veh/h	3	593	73	92	508	0	51	0	46			
Grp Sat Flow(s),veh/h/ln	1681	1676	1473	1681	1676	0	1681	1765	1500			
Q Serve(g_s), s	0.1	5.4	1.3	2.0	3.7	0.0	1.1	0.0	1.1			
Cycle Q Clear(g_c), s	0.1	5.4	1.3	2.0	3.7	0.0	1.1	0.0	1.1			
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	10	1190	523	191	1552	0	197	207	176			
V/C Ratio(X)	0.31	0.50	0.14	0.48	0.33	0.00	0.26	0.00	0.26			
Avail Cap(c_a), veh/h	653	2257	991	653	2257	0	653	685	582			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	19.1	9.8	8.5	16.1	6.6	0.0	15.5	0.0	15.5			
Incr Delay (d2), s/veh	17.2	0.1	0.0	1.9	0.0	0.0	0.7	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	0.1	2.5	0.5	1.0	1.7	0.0	0.5	0.0	0.5			
LnGrp Delay(d),s/veh	36.4	9.9	8.5	17.9	6.6	0.0	16.2	0.0	16.3			
LnGrp LOS	D	A	A	B	A		B		B			
Approach Vol, veh/h		669			600			97				
Approach Delay, s/veh		9.9			8.3			16.3				
Approach LOS		A			A			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	9.4	19.7			5.2	23.9		9.5
Change Period (Y+Rc), s	5.0	6.0			5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	26.0			15.0	26.0		15.0
Max Q Clear Time (g_c+I1), s	4.0	7.4			2.1	5.7		3.1
Green Ext Time (p_c), s	0.1	4.5			0.0	4.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	523	97	49	527	55	32
Future Volume (veh/h)	523	97	49	527	55	32
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	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	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	534	99	50	538	56	33
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1150	212	126	2046	186	166
Arrive On Green	0.41	0.41	0.07	0.61	0.11	0.11
Sat Flow, veh/h	2905	520	1681	3441	1681	1500
Grp Volume(v), veh/h	317	316	50	538	56	33
Grp Sat Flow(s),veh/h/ln	1676	1660	1681	1676	1681	1500
Q Serve(g_s), s	5.4	5.5	1.1	2.9	1.2	0.8
Cycle Q Clear(g_c), s	5.4	5.5	1.1	2.9	1.2	0.8
Prop In Lane		0.31	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	685	678	126	2046	186	166
V/C Ratio(X)	0.46	0.47	0.40	0.26	0.30	0.20
Avail Cap(c_a), veh/h	1064	1053	597	3745	683	609
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.5	8.5	17.4	3.6	16.1	15.9
Incr Delay (d2), s/veh	0.5	0.5	2.0	0.1	0.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.6	0.6	1.4	0.6	0.3
LnGrp Delay(d),s/veh	9.0	9.0	19.4	3.6	17.0	16.5
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	633			588	89	
Approach Delay, s/veh	9.0			5.0	16.8	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.9	22.1				30.0		9.4
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	14.0	25.0				44.0		16.0
Max Q Clear Time (g_c+I1), s	3.1	7.5				4.9		3.2
Green Ext Time (p_c), s	0.1	7.2				9.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	7.7
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	459	96	124	508	68	88
Future Volume (vph)	459	96	124	508	68	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.97		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3233		1676	3353	1595	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3233		1676	3353	1595	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	468	98	127	518	69	90
RTOR Reduction (vph)	15	0	0	0	45	0
Lane Group Flow (vph)	551	0	127	518	114	0
Confl. Peds. (#/hr)		15	15			
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	20.1		10.0	60.1	16.5	
Effective Green, g (s)	21.1		10.6	60.7	17.1	
Actuated g/C Ratio	0.24		0.12	0.70	0.20	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	787		205	2350	314	
v/s Ratio Prot	c0.17		c0.08	c0.15	c0.07	
v/s Ratio Perm						
v/c Ratio	0.70		0.62	0.22	0.36	
Uniform Delay, d1	29.9		36.1	4.6	30.0	
Progression Factor	1.00		1.04	0.21	1.00	
Incremental Delay, d2	2.2		5.4	0.0	0.7	
Delay (s)	32.1		43.0	1.0	30.8	
Level of Service	C		D	A	C	
Approach Delay (s)	32.1			9.3	30.8	
Approach LOS	C			A	C	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	17.2
Intersection Capacity Utilization	44.5%	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)	229	445	79	94	233	260	205	539	221	521	443	250
Future Volume (vph)	229	445	79	94	233	260	205	539	221	521	443	250
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	3251		1676	3326	1444	1644	3128		3190	1731	1447
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1676	3251		1676	3326	1444	1644	3128		3190	1731	1447
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	244	473	84	100	248	277	218	573	235	554	471	266
RTOR Reduction (vph)	0	11	0	0	0	203	0	34	0	0	0	181
Lane Group Flow (vph)	244	546	0	100	248	74	218	774	0	554	471	85
Confl. Peds. (#/hr)	7					7	3		4	4		3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	4	0	0	4	4	0	0	0	0	0	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	18.9	43.0		8.9	33.0	33.0	16.9	28.7		28.2	40.0	40.0
Effective Green, g (s)	20.0	44.5		10.0	34.5	34.5	18.0	30.2		29.3	41.5	41.5
Actuated g/C Ratio	0.15	0.34		0.08	0.27	0.27	0.14	0.23		0.23	0.32	0.32
Clearance Time (s)	5.1	5.5		5.1	5.5	5.5	5.1	5.5		5.1	5.5	5.5
Vehicle Extension (s)	3.0	2.2		3.0	2.2	2.2	3.0	2.2		3.0	2.2	2.2
Lane Grp Cap (vph)	257	1112		128	882	383	227	726		718	552	461
v/s Ratio Prot	c0.15	c0.17		0.06	0.07		c0.13	c0.25		c0.17	0.27	
v/s Ratio Perm						0.05						0.06
v/c Ratio	0.95	0.49		0.78	0.28	0.19	0.96	1.07		0.77	0.85	0.18
Uniform Delay, d1	54.5	33.8		58.9	37.9	37.0	55.6	49.9		47.2	41.4	32.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	41.9	0.2		25.9	0.8	1.1	48.4	52.5		5.1	11.9	0.1
Delay (s)	96.4	34.0		84.8	38.7	38.1	104.1	102.4		52.4	53.3	32.1
Level of Service	F	C		F	D	D	F	F		D	D	C
Approach Delay (s)		53.0			45.8			102.8			48.5	
Approach LOS		D			D			F			D	

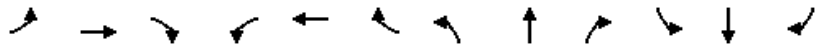
Intersection Summary			
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	340	3	104	5	3	47	30	995	2	44	1105	287
Future Volume (vph)	340	3	104	5	3	47	30	995	2	44	1105	287
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.86		1.00	1.00		1.00	0.97	
Flt Protected	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1598	1474	1676	1515		1644	3287		1644	4237	
Flt Permitted	0.95	0.95	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1598	1474	1676	1515		1644	3287		1644	4237	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	362	3	111	5	3	50	32	1059	2	47	1176	305
RTOR Reduction (vph)	0	0	90	0	47	0	0	0	0	0	28	0
Lane Group Flow (vph)	185	180	21	5	6	0	32	1061	0	47	1453	0
Confl. Peds. (#/hr)			6	6			11		11	11		11
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	13.6	13.6	13.6	3.1	3.1		2.4	36.0		3.9	37.5	
Effective Green, g (s)	14.7	14.7	14.7	4.2	4.2		3.5	37.1		5.0	38.6	
Actuated g/C Ratio	0.19	0.19	0.19	0.05	0.05		0.05	0.48		0.06	0.50	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	304	305	281	91	82		74	1583		106	2124	
v/s Ratio Prot	c0.12	0.11		0.00	c0.00		0.02	0.32		c0.03	c0.34	
v/s Ratio Perm			0.01									
v/c Ratio	0.61	0.59	0.08	0.05	0.07		0.43	0.67		0.44	0.68	
Uniform Delay, d1	28.5	28.4	25.6	34.5	34.5		35.8	15.3		34.7	14.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	2.0	0.0	0.1	0.1		1.5	0.9		1.1	0.8	
Delay (s)	30.9	30.4	25.6	34.6	34.7		37.3	16.2		35.7	15.4	
Level of Service	C	C	C	C	C		D	B		D	B	
Approach Delay (s)		29.5			34.7			16.8			16.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.1%	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)	99	438	552	0	0	623	0	888	494	275	940	321
Future Volume (vph)	99	438	552	0	0	623	0	888	494	275	940	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			1.00		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.96			0.99		1.00	0.98	1.00	1.00	0.95
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3507	1525			1591		3471	1523	3367	3471	1470
Flt Permitted		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3507	1525			1591		3471	1523	3367	3471	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	461	581	0	0	656	0	935	520	289	989	338
RTOR Reduction (vph)	0	0	10	0	0	224	0	0	76	0	0	0
Lane Group Flow (vph)	0	565	571	0	0	432	0	935	444	289	989	338
Confl. Peds. (#/hr)			38	38			68		4	4		68
Confl. Bikes (#/hr)			3			1						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		38.7	55.8			38.7		62.8	62.8	14.5	59.2	130.0
Effective Green, g (s)		38.3	55.0			38.2		62.3	62.3	13.5	58.7	130.0
Actuated g/C Ratio		0.29	0.42			0.29		0.48	0.48	0.10	0.45	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		1033	708			467		1663	729	349	1567	1470
v/s Ratio Prot			c0.10					0.27		0.09	0.28	
v/s Ratio Perm		0.16	0.27			c0.27			c0.29			c0.23
v/c Ratio		0.55	0.81			0.93		0.56	0.61	0.83	0.63	0.23
Uniform Delay, d1		38.6	32.8			44.5		24.1	24.9	57.1	27.3	0.0
Progression Factor		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	6.3			23.9		1.4	3.8	14.2	1.9	0.4
Delay (s)		38.9	39.2			68.4		25.5	28.7	71.3	29.3	0.4
Level of Service		D	D			E		C	C	E	C	A
Approach Delay (s)		39.0			68.4			26.6			30.8	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
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)	0	0	0	183	147	65	293	945	685	88	601	126
Future Volume (veh/h)	0	0	0	183	147	65	293	945	685	88	601	126
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		0.94	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1765	1800	1731	1731	1800	1731	1731	1800
Adj Flow Rate, veh/h				187	150	66	299	964	699	90	613	129
Adj No. of Lanes				0	2	0	2	3	0	1	2	0
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	2	0	4	4	4	4	4	4
Cap, veh/h				262	226	101	430	1672	732	114	1253	263
Arrive On Green				0.18	0.18	0.18	0.13	0.53	0.53	0.07	0.47	0.46
Sat Flow, veh/h				1490	1288	575	3198	3150	1379	1648	2692	565
Grp Volume(v), veh/h				212	0	191	299	964	699	90	374	368
Grp Sat Flow(s),veh/h/ln				1690	0	1662	1599	1575	1379	1648	1644	1613
Q Serve(g_s), s				6.7	0.0	6.1	5.1	11.8	27.5	3.1	9.0	9.0
Cycle Q Clear(g_c), s				6.7	0.0	6.1	5.1	11.8	27.5	3.1	9.0	9.0
Prop In Lane				0.88		0.35	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h				297	0	292	430	1672	732	114	765	751
V/C Ratio(X)				0.71	0.00	0.65	0.69	0.58	0.96	0.79	0.49	0.49
Avail Cap(c_a), veh/h				978	0	962	1122	1672	732	578	871	855
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh				22.2	0.0	21.9	23.6	9.0	12.8	26.1	10.5	10.6
Incr Delay (d2), s/veh				2.4	0.0	1.8	0.8	0.6	23.0	4.5	0.7	0.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.3	0.0	2.9	2.3	5.2	15.0	1.5	4.2	4.1
LnGrp Delay(d),s/veh				24.5	0.0	23.7	24.3	9.7	35.8	30.7	11.2	11.3
LnGrp LOS				C		C	C	A	D	C	B	B
Approach Vol, veh/h					403			1962			832	
Approach Delay, s/veh					24.2			21.2			13.4	
Approach LOS					C			C			B	

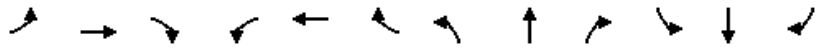
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	7.9	35.1			11.7	31.3		14.0
Change Period (Y+Rc), s	4.0	5.0			4.0	5.0		4.0
Max Green Setting (Gmax), s	20.0	30.0			20.0	30.0		33.0
Max Q Clear Time (g_c+I1), s	5.1	29.5			7.1	11.0		8.7
Green Ext Time (p_c), s	0.1	0.5			0.7	15.3		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	19.5
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	166	280	749	534	27
Future Volume (veh/h)	22	166	280	749	534	27
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	23	171	289	772	551	28
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	244	218	349	2210	1195	61
Arrive On Green	0.15	0.15	0.21	0.66	0.37	0.37
Sat Flow, veh/h	1681	1500	1681	3441	3326	164
Grp Volume(v), veh/h	23	171	289	772	285	294
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1726
Q Serve(g_s), s	0.6	5.3	8.0	5.0	6.3	6.3
Cycle Q Clear(g_c), s	0.6	5.3	8.0	5.0	6.3	6.3
Prop In Lane	1.00	1.00	1.00			0.10
Lane Grp Cap(c), veh/h	244	218	349	2210	619	637
V/C Ratio(X)	0.09	0.78	0.83	0.35	0.46	0.46
Avail Cap(c_a), veh/h	865	772	692	2210	1035	1066
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	20.0	18.4	3.7	11.7	11.7
Incr Delay (d2), s/veh	0.1	2.3	1.9	0.1	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	4.4	3.9	2.3	3.0	3.1
LnGrp Delay(d),s/veh	18.0	22.4	20.3	3.8	12.4	12.4
LnGrp LOS	B	C	C	A	B	B
Approach Vol, veh/h	194			1061	579	
Approach Delay, s/veh	21.9			8.3	12.4	
Approach LOS	C			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		37.5		11.1	14.1	23.4		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		30.0		25.0	20.0	30.0		
Max Q Clear Time (g_c+I1), s		7.0		7.3	10.0	8.3		
Green Ext Time (p_c), s		12.8		0.3	0.3	9.6		

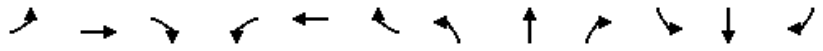
Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1115	23	1	540	2	18	0	3	5	0	7
Future Volume (veh/h)	7	1115	23	1	540	2	18	0	3	5	0	7
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	8	1212	25	1	587	2	20	0	3	5	0	8
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	1396	29	2	1395	5	107	0	39	53	1	14
Arrive On Green	0.01	0.42	0.41	0.00	0.81	0.80	0.03	0.00	0.03	0.03	0.00	0.03
Sat Flow, veh/h	1681	3358	69	1681	3427	12	1592	0	1490	304	41	553
Grp Volume(v), veh/h	8	605	632	1	287	302	20	0	3	13	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1751	1681	1676	1763	1592	0	1490	899	0	0
Q Serve(g_s), s	0.5	36.3	36.3	0.1	5.3	5.3	0.0	0.0	0.2	0.8	0.0	0.0
Cycle Q Clear(g_c), s	0.5	36.3	36.3	0.1	5.3	5.3	1.3	0.0	0.2	2.1	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.01	1.00		1.00	0.38		0.62
Lane Grp Cap(c), veh/h	17	697	728	2	683	718	107	0	39	69	0	0
V/C Ratio(X)	0.48	0.87	0.87	0.43	0.42	0.42	0.19	0.00	0.08	0.19	0.00	0.00
Avail Cap(c_a), veh/h	168	945	987	168	945	993	387	0	339	361	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.73	0.73	0.99	0.99	0.99	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	54.2	29.4	29.4	54.8	6.6	6.6	52.8	0.0	52.3	53.5	0.0	0.0
Incr Delay (d2), s/veh	5.8	4.6	4.4	41.1	1.9	1.8	0.3	0.0	0.3	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	17.7	18.5	0.1	2.7	2.9	0.6	0.0	0.1	0.4	0.0	0.0
LnGrp Delay(d),s/veh	60.0	34.0	33.8	95.9	8.4	8.3	53.1	0.0	52.6	54.0	0.0	0.0
LnGrp LOS	E	C	C	F	A	A	D		D	D		
Approach Vol, veh/h		1245			590			23			13	
Approach Delay, s/veh		34.1			8.5			53.1			54.0	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	49.7		6.9	5.1	48.8		6.9
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I1), s	2.1	38.3		4.1	2.5	7.3		3.3
Green Ext Time (p_c), s	0.0	6.4		0.0	0.0	7.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.4
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	934	87	17	458	8	46	0	18	11	0	14
Future Volume (veh/h)	17	934	87	17	458	8	46	0	18	11	0	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	18	983	92	18	482	8	48	0	19	12	0	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	1186	111	45	1291	21	117	1	25	76	13	52
Arrive On Green	0.03	0.38	0.37	0.04	0.51	0.50	0.06	0.00	0.06	0.06	0.00	0.06
Sat Flow, veh/h	1681	3099	290	1681	3375	56	1045	25	424	490	227	897
Grp Volume(v), veh/h	18	532	543	18	239	251	67	0	0	27	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1713	1681	1676	1755	1494	0	0	1615	0	0
Q Serve(g_s), s	1.2	31.5	31.6	1.2	9.5	9.5	3.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.2	31.5	31.6	1.2	9.5	9.5	4.8	0.0	0.0	1.8	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.03	0.72		0.28	0.44		0.56
Lane Grp Cap(c), veh/h	45	641	655	45	641	671	143	0	0	141	0	0
V/C Ratio(X)	0.40	0.83	0.83	0.40	0.37	0.37	0.47	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	168	975	996	168	975	1021	357	0	0	359	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	0.99	0.99	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	52.6	30.7	30.8	52.2	19.0	19.0	51.0	0.0	0.0	49.6	0.0	0.0
Incr Delay (d2), s/veh	5.1	3.4	3.3	5.5	1.6	1.6	2.4	0.0	0.0	0.7	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	0.6	15.2	15.6	0.6	4.7	4.9	2.1	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	57.7	34.1	34.1	57.7	20.7	20.6	53.3	0.0	0.0	50.3	0.0	0.0
LnGrp LOS	E	C	C	E	C	C	D			D		
Approach Vol, veh/h		1093			508			67			27	
Approach Delay, s/veh		34.5			21.9			53.3			50.3	
Approach LOS		C			C			D			D	

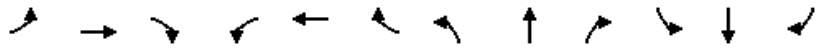
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.0	46.1		10.4	7.0	46.1		10.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	63.0		23.0	11.0	63.0		23.0
Max Q Clear Time (g_c+I1), s	3.2	33.6		3.8	3.2	11.5		6.8
Green Ext Time (p_c), s	0.0	7.5		0.3	0.0	8.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	917	29	18	487	16	14
Future Volume (vph)	917	29	18	487	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.94	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3334		1676	3353	1598	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3334		1676	3353	1598	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	976	31	19	518	17	15
RTOR Reduction (vph)	1	0	0	0	14	0
Lane Group Flow (vph)	1006	0	19	518	18	0
Confl. Peds. (#/hr)		4	4			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	83.4		3.2	91.6	7.4	
Effective Green, g (s)	85.4		4.2	93.6	8.4	
Actuated g/C Ratio	0.78		0.04	0.85	0.08	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2588		63	2853	122	
v/s Ratio Prot	c0.30		c0.01	0.15	c0.01	
v/s Ratio Perm						
v/c Ratio	0.39		0.30	0.18	0.15	
Uniform Delay, d1	3.9		51.5	1.4	47.5	
Progression Factor	1.40		0.83	3.14	1.00	
Incremental Delay, d2	0.1		2.6	0.1	0.6	
Delay (s)	5.6		45.4	4.7	48.0	
Level of Service	A		D	A	D	
Approach Delay (s)	5.6			6.1	48.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.4%	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)	138	783	10	6	443	106	13	4	12	69	3	70
Future Volume (veh/h)	138	783	10	6	443	106	13	4	12	69	3	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	0.98		0.97	0.98		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	148	842	11	6	476	114	14	4	13	74	3	75
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	1044	14	13	579	138	185	167	138	204	183	138
Arrive On Green	0.10	0.31	0.30	0.02	0.43	0.41	0.09	0.09	0.09	0.10	0.10	0.09
Sat Flow, veh/h	1681	3388	44	1681	2686	639	1286	1765	1462	1359	1765	1462
Grp Volume(v), veh/h	148	417	436	6	296	294	14	4	13	74	3	75
Grp Sat Flow(s),veh/h/ln	1681	1676	1755	1681	1676	1648	1286	1765	1462	1359	1765	1462
Q Serve(g_s), s	9.6	25.2	25.2	0.4	17.1	17.4	1.1	0.2	0.9	5.7	0.2	5.4
Cycle Q Clear(g_c), s	9.6	25.2	25.2	0.4	17.1	17.4	1.3	0.2	0.9	5.9	0.2	5.4
Prop In Lane	1.00		0.03	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	516	541	13	362	356	185	167	138	204	183	138
V/C Ratio(X)	0.88	0.81	0.81	0.47	0.82	0.83	0.08	0.02	0.09	0.36	0.02	0.54
Avail Cap(c_a), veh/h	168	914	957	168	914	899	379	433	359	409	449	359
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	35.0	35.1	53.9	29.4	29.8	45.7	45.2	45.5	46.9	44.3	47.5
Incr Delay (d2), s/veh	35.1	1.1	1.0	9.5	18.2	19.2	0.2	0.1	0.3	1.1	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	6.1	11.8	12.4	0.2	9.5	9.8	0.4	0.1	0.4	2.2	0.1	2.3
LnGrp Delay(d),s/veh	83.9	36.1	36.1	63.4	47.5	49.0	45.9	45.2	45.8	48.0	44.3	50.8
LnGrp LOS	F	D	D	E	D	D	D	D	D	D	D	D
Approach Vol, veh/h		1001			596			31			152	
Approach Delay, s/veh		43.2			48.4			45.8			49.3	
Approach LOS		D			D			D			D	

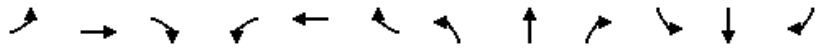
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	37.9		14.4	15.0	27.7		14.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	59.0		27.0	11.0	59.0		27.0
Max Q Clear Time (g_c+I1), s	12.4	27.2		7.9	11.6	19.4		3.3
Green Ext Time (p_c), s	0.0	3.2		0.6	0.0	3.3		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	45.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	768	75	7	505	10	41	1	3	11	0	14
Future Volume (veh/h)	10	768	75	7	505	10	41	1	3	11	0	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	11	817	80	7	537	11	44	1	3	12	0	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	980	96	15	1052	22	123	1	4	72	7	39
Arrive On Green	0.01	0.32	0.31	0.02	0.63	0.61	0.04	0.04	0.04	0.04	0.00	0.04
Sat Flow, veh/h	1681	3085	302	1681	3358	69	1368	31	93	561	155	894
Grp Volume(v), veh/h	11	444	453	7	268	280	48	0	0	27	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1711	1681	1676	1751	1492	0	0	1610	0	0
Q Serve(g_s), s	0.7	27.0	27.1	0.5	9.6	9.7	1.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	27.0	27.1	0.5	9.6	9.7	3.4	0.0	0.0	1.8	0.0	0.0
Prop In Lane	1.00		0.18	1.00		0.04	0.92		0.06	0.44		0.56
Lane Grp Cap(c), veh/h	22	532	543	15	525	549	128	0	0	118	0	0
V/C Ratio(X)	0.50	0.83	0.83	0.48	0.51	0.51	0.37	0.00	0.00	0.23	0.00	0.00
Avail Cap(c_a), veh/h	168	945	964	168	945	987	383	0	0	382	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	0.99	0.99	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.9	34.8	34.9	53.8	15.9	15.9	51.8	0.0	0.0	51.1	0.0	0.0
Incr Delay (d2), s/veh	6.3	2.5	2.5	8.5	3.5	3.3	0.7	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	12.8	13.1	0.2	4.8	5.0	1.5	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	60.2	37.4	37.4	62.2	19.4	19.3	52.5	0.0	0.0	51.5	0.0	0.0
LnGrp LOS	E	D	D	E	B	B	D			D		
Approach Vol, veh/h		908			555			48			27	
Approach Delay, s/veh		37.6			19.8			52.5			51.5	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	38.9		8.8	5.4	38.5		8.8
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I1), s	2.5	29.1		3.8	2.7	11.7		5.4
Green Ext Time (p_c), s	0.0	4.9		0.1	0.0	5.0		0.1

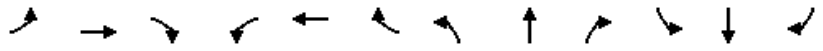
Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	726	40	2	539	23	12	5	11	22	2	27
Future Volume (veh/h)	54	726	40	2	539	23	12	5	11	22	2	27
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	55	733	40	2	544	23	12	5	11	22	2	27
Adj No. of Lanes	0	2	0	0	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	911	51	34	1056	44	79	35	43	83	13	56
Arrive On Green	0.33	0.33	0.31	0.66	0.66	0.62	0.07	0.07	0.06	0.07	0.07	0.06
Sat Flow, veh/h	148	2765	154	3	3205	135	458	485	611	506	189	782
Grp Volume(v), veh/h	418	0	410	299	0	270	28	0	0	51	0	0
Grp Sat Flow(s),veh/h/ln	1493	0	1575	1761	0	1582	1554	0	0	1477	0	0
Q Serve(g_s), s	19.2	0.0	26.0	0.0	0.0	9.8	0.0	0.0	0.0	1.8	0.0	0.0
Cycle Q Clear(g_c), s	29.0	0.0	26.0	9.6	0.0	9.8	1.8	0.0	0.0	3.5	0.0	0.0
Prop In Lane	0.13		0.10	0.01		0.09	0.43		0.39	0.43		0.53
Lane Grp Cap(c), veh/h	529	0	519	613	0	521	157	0	0	152	0	0
V/C Ratio(X)	0.79	0.00	0.79	0.49	0.00	0.52	0.18	0.00	0.00	0.34	0.00	0.00
Avail Cap(c_a), veh/h	736	0	730	847	0	733	731	0	0	715	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.96	0.00	0.96	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	34.5	0.0	33.5	14.2	0.0	14.4	48.5	0.0	0.0	49.3	0.0	0.0
Incr Delay (d2), s/veh	2.4	0.0	2.4	2.7	0.0	3.5	0.5	0.0	0.0	1.3	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	12.2	0.0	11.6	4.9	0.0	4.7	0.8	0.0	0.0	1.5	0.0	0.0
LnGrp Delay(d),s/veh	36.9	0.0	35.9	16.9	0.0	17.9	49.0	0.0	0.0	50.6	0.0	0.0
LnGrp LOS	D		D	B		B	D			D		
Approach Vol, veh/h		828			569			28			51	
Approach Delay, s/veh		36.4			17.4			49.0			50.6	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		40.2		11.8		40.2		11.8
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		49.0		50.0		49.0		50.0
Max Q Clear Time (g_c+I1), s		31.0		5.5		11.8		3.8
Green Ext Time (p_c), s		3.3		0.3		3.5		0.3

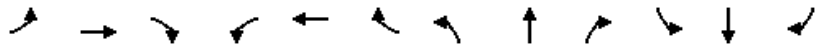
Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	676	109	104	518	78	92	19	71	66	14	19
Future Volume (veh/h)	16	676	109	104	518	78	92	19	71	66	14	19
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		0.99	1.00		0.99	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	16	697	112	107	534	80	95	20	73	68	14	20
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	30	922	148	131	1109	166	118	136	107	86	37	53
Arrive On Green	0.02	0.32	0.31	0.08	0.38	0.37	0.07	0.08	0.07	0.05	0.06	0.05
Sat Flow, veh/h	1681	2891	464	1681	2925	437	1681	1765	1475	1681	641	915
Grp Volume(v), veh/h	16	404	405	107	305	309	95	20	73	68	0	34
Grp Sat Flow(s),veh/h/ln	1681	1676	1679	1681	1676	1685	1681	1765	1475	1681	0	1556
Q Serve(g_s), s	1.0	23.8	23.9	6.9	15.2	15.4	6.1	1.2	5.3	4.4	0.0	2.3
Cycle Q Clear(g_c), s	1.0	23.8	23.9	6.9	15.2	15.4	6.1	1.2	5.3	4.4	0.0	2.3
Prop In Lane	1.00		0.28	1.00		0.26	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	30	534	535	131	636	639	118	136	107	86	0	90
V/C Ratio(X)	0.54	0.76	0.76	0.81	0.48	0.48	0.81	0.15	0.68	0.79	0.00	0.38
Avail Cap(c_a), veh/h	199	655	656	199	655	659	199	401	329	199	0	354
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.78	0.78	0.78	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.6	33.6	33.8	49.9	25.9	26.1	50.4	47.4	49.8	51.6	0.0	50.1
Incr Delay (d2), s/veh	5.3	4.5	4.5	6.6	2.0	2.0	4.8	0.2	2.9	6.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	11.7	11.7	3.5	7.4	7.5	3.0	0.6	2.3	2.2	0.0	1.0
LnGrp Delay(d),s/veh	58.9	38.1	38.3	56.5	27.9	28.1	55.2	47.6	52.7	57.6	0.0	51.0
LnGrp LOS	E	D	D	E	C	C	E	D	D	E		D
Approach Vol, veh/h		825			721			188			102	
Approach Delay, s/veh		38.6			32.2			53.4			55.4	
Approach LOS		D			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	39.1	9.6	12.5	5.9	45.7	11.7	10.4
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	13.0	42.0	13.0	24.5	13.0	42.0	13.0	24.5
Max Q Clear Time (g_c+I1), s	8.9	25.9	6.4	7.3	3.0	17.4	8.1	4.3
Green Ext Time (p_c), s	0.0	8.2	0.0	0.2	0.0	10.2	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	38.5
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	223	479	148	98	364	188	145	804	118	189	717	276
Future Volume (veh/h)	223	479	148	98	364	188	145	804	118	189	717	276
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	232	499	154	102	379	196	151	838	123	197	747	288
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	241	644	197	135	645	284	178	1318	578	216	1394	610
Arrive On Green	0.15	0.26	0.25	0.08	0.20	0.20	0.11	0.40	0.40	0.13	0.42	0.42
Sat Flow, veh/h	1648	2472	758	1648	3288	1449	1648	3288	1441	1648	3288	1439
Grp Volume(v), veh/h	232	331	322	102	379	196	151	838	123	197	747	288
Grp Sat Flow(s),veh/h/ln	1648	1644	1586	1648	1644	1449	1648	1644	1441	1648	1644	1439
Q Serve(g_s), s	18.2	24.2	24.5	7.9	13.6	16.4	11.7	26.6	7.3	15.3	22.0	18.7
Cycle Q Clear(g_c), s	18.2	24.2	24.5	7.9	13.6	16.4	11.7	26.6	7.3	15.3	22.0	18.7
Prop In Lane	1.00		0.48	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	241	428	413	135	645	284	178	1318	578	216	1394	610
V/C Ratio(X)	0.96	0.77	0.78	0.76	0.59	0.69	0.85	0.64	0.21	0.91	0.54	0.47
Avail Cap(c_a), veh/h	241	539	520	139	883	389	178	1318	578	216	1394	610
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.34	0.34	0.34	0.92	0.92	0.92	0.66	0.66	0.66
Uniform Delay (d), s/veh	55.2	44.5	44.9	58.4	47.5	48.6	57.0	31.3	25.5	55.8	27.9	27.0
Incr Delay (d2), s/veh	45.2	4.9	5.4	7.5	0.3	1.0	28.6	0.9	0.2	28.9	1.0	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	11.3	11.6	11.4	3.9	6.2	6.6	6.7	12.3	2.9	8.7	10.1	7.7
LnGrp Delay(d),s/veh	100.3	49.5	50.3	66.0	47.8	49.6	85.5	32.2	25.7	84.6	28.9	28.7
LnGrp LOS	F	D	D	E	D	D	F	C	C	F	C	C
Approach Vol, veh/h		885			677			1112			1232	
Approach Delay, s/veh		63.1			51.1			38.8			37.7	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	59.1	14.6	38.2	21.0	56.1	23.0	29.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	45.0	10.0	41.6	16.0	42.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	13.7	24.0	9.9	26.5	17.3	28.6	20.2	18.4
Green Ext Time (p_c), s	0.0	10.5	0.0	4.9	0.0	8.0	0.0	5.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.1
HCM 2010 LOS	D

Notes

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

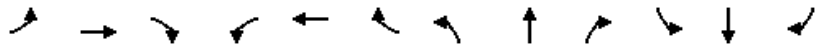
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	532	2	500	0	0	0	0	862	432	298	731	0
Future Volume (vph)	532	2	500	0	0	0	0	862	432	298	731	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.99					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.94	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1537	1485					4696		1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1537	1485					4696		1736	3471	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	560	2	526	0	0	0	0	907	455	314	769	0
RTOR Reduction (vph)	0	29	71	0	0	0	0	54	0	0	0	0
Lane Group Flow (vph)	353	327	308	0	0	0	0	1308	0	314	769	0
Confl. Peds. (#/hr)			1	1			30		1	1		30
Confl. Bikes (#/hr)									4			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	32.6	32.6	32.6					61.4		13.0	78.4	
Effective Green, g (s)	32.7	32.7	32.7					61.5		12.0	78.5	
Actuated g/C Ratio	0.27	0.27	0.27					0.51		0.10	0.65	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	458	418	404					2406		173	2270	
v/s Ratio Prot	0.21	c0.21						c0.28		c0.18	0.22	
v/s Ratio Perm			0.21									
v/c Ratio	0.77	0.78	0.76					0.54		1.82	0.34	
Uniform Delay, d1	40.2	40.4	40.1					19.8		54.0	9.2	
Progression Factor	1.00	1.00	1.00					1.00		1.10	0.37	
Incremental Delay, d2	7.2	8.5	7.5					0.9		385.3	0.3	
Delay (s)	47.4	48.9	47.6					20.7		444.5	3.7	
Level of Service	D	D	D					C		F	A	
Approach Delay (s)		48.0			0.0			20.7			131.5	
Approach LOS		D			A			C			F	

Intersection Summary			
HCM 2000 Control Delay	63.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	74.5%	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 (vph)	0	0	0	207	212	286	406	852	136	84	822	349
Future Volume (vph)	0	0	0	207	212	286	406	852	136	84	822	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.9		4.0	4.4		4.5	4.4	4.0
Lane Util. Factor					0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	1.00
Frt					0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)					3213		3367	3388		1736	3471	1527
Flt Permitted					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)					3213		3367	3388		1736	3471	1527
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	220	226	304	432	906	145	89	874	371
RTOR Reduction (vph)	0	0	0	0	102	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	648	0	432	1042	0	89	874	371
Confl. Peds. (#/hr)							13		1	1		13
Confl. Bikes (#/hr)									2			3
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA		Prot	NA		Prot	NA	Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases												Free
Actuated Green, G (s)					27.1		18.9	69.7		10.7	61.5	120.0
Effective Green, g (s)					27.2		18.9	69.8		10.2	61.6	120.0
Actuated g/C Ratio					0.23		0.16	0.58		0.08	0.51	1.00
Clearance Time (s)					4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)					2.5		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)					728		530	1970		147	1781	1527
v/s Ratio Prot					c0.20		c0.13	c0.31		c0.05	0.25	
v/s Ratio Perm												0.24
v/c Ratio					0.89		0.82	0.53		0.61	0.49	0.24
Uniform Delay, d1					45.0		48.9	15.2		53.0	19.0	0.0
Progression Factor					1.00		1.07	1.04		1.00	1.00	1.00
Incremental Delay, d2					12.8		7.8	0.9		4.8	1.0	0.4
Delay (s)					57.7		60.0	16.7		57.7	20.0	0.4
Level of Service					E		E	B		E	B	A
Approach Delay (s)		0.0			57.7			29.3			17.0	
Approach LOS		A			E			C			B	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	65.7%	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)	9	1308	55	87	292	64	60	192	143	314	321	21
Future Volume (veh/h)	9	1308	55	87	292	64	60	192	143	314	321	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		0.97	1.00		0.97	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	9	1348	57	90	301	66	62	198	147	324	331	0
Adj No. of Lanes	1	2	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	1397	59	112	1611	701	79	256	215	348	538	458
Arrive On Green	0.01	0.43	0.43	0.07	0.48	0.48	0.05	0.14	0.14	0.21	0.31	0.00
Sat Flow, veh/h	1681	3274	138	1681	3353	1459	1681	1765	1488	1681	1765	1500
Grp Volume(v), veh/h	9	689	716	90	301	66	62	198	147	324	331	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1736	1681	1676	1459	1681	1765	1488	1681	1765	1500
Q Serve(g_s), s	0.6	46.6	46.8	6.1	6.0	2.9	4.2	12.6	10.9	22.0	18.7	0.0
Cycle Q Clear(g_c), s	0.6	46.6	46.8	6.1	6.0	2.9	4.2	12.6	10.9	22.0	18.7	0.0
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	22	715	741	112	1611	701	79	256	215	348	538	458
V/C Ratio(X)	0.41	0.96	0.97	0.80	0.19	0.09	0.79	0.77	0.68	0.93	0.61	0.00
Avail Cap(c_a), veh/h	289	720	746	289	1611	701	289	607	511	361	607	516
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	57.0	32.5	32.6	53.5	17.3	16.5	54.9	47.9	47.2	45.3	34.6	0.0
Incr Delay (d2), s/veh	4.5	24.7	24.9	5.0	0.1	0.1	6.4	1.9	1.4	29.2	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	26.4	27.4	3.0	2.8	1.2	2.1	6.3	4.6	13.1	9.2	0.0
LnGrp Delay(d),s/veh	61.5	57.2	57.4	58.5	17.3	16.5	61.3	49.8	48.6	74.5	35.5	0.0
LnGrp LOS	E	E	E	E	B	B	E	D	D	E	D	
Approach Vol, veh/h		1414			457			407			655	
Approach Delay, s/veh		57.3			25.3			51.2			54.8	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	54.7	9.4	40.5	5.5	60.9	28.1	21.9
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	50.0	20.0	40.0	20.0	50.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	8.1	48.8	6.2	20.7	2.6	8.0	24.0	14.6
Green Ext Time (p_c), s	0.1	0.8	0.0	2.2	0.0	17.5	0.1	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	50.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	1019	74	44	501	98	33	162	69	235	188	27
Future Volume (veh/h)	77	1019	74	44	501	98	33	162	69	235	188	27
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	89	1171	85	51	576	113	38	186	79	270	216	0
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	2	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	1615	117	81	1376	269	69	244	207	338	354	301
Arrive On Green	0.07	0.51	0.51	0.05	0.49	0.49	0.04	0.14	0.14	0.10	0.20	0.00
Sat Flow, veh/h	1681	3165	229	1681	2797	547	1681	1765	1500	3261	1765	1500
Grp Volume(v), veh/h	89	620	636	51	345	344	38	186	79	270	216	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1718	1681	1676	1667	1681	1765	1500	1630	1765	1500
Q Serve(g_s), s	4.7	25.8	25.9	2.7	11.8	11.9	2.0	9.1	4.3	7.3	10.0	0.0
Cycle Q Clear(g_c), s	4.7	25.8	25.9	2.7	11.8	11.9	2.0	9.1	4.3	7.3	10.0	0.0
Prop In Lane	1.00		0.13	1.00		0.33	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	856	877	81	825	820	69	244	207	338	354	301
V/C Ratio(X)	0.80	0.72	0.73	0.63	0.42	0.42	0.55	0.76	0.38	0.80	0.61	0.00
Avail Cap(c_a), veh/h	149	856	877	149	825	820	187	431	367	362	431	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.4	17.1	17.1	42.1	14.6	14.6	42.4	37.4	35.3	39.4	32.8	0.0
Incr Delay (d2), s/veh	14.0	5.3	5.2	3.0	0.5	0.5	2.6	1.9	0.4	10.2	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	0.0
%ile BackOfQ(50%),veh/ln	2.6	13.1	13.5	1.3	5.6	5.6	1.0	4.6	1.8	3.7	4.9	0.0
LnGrp Delay(d),s/veh	55.4	22.4	22.4	45.1	15.1	15.1	44.9	39.2	35.7	49.6	33.4	0.0
LnGrp LOS	E	C	C	D	B	B	D	D	D	D	C	
Approach Vol, veh/h		1345			740			303			486	
Approach Delay, s/veh		24.6			17.2			39.0			42.4	
Approach LOS		C			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	50.9	7.7	23.1	10.0	49.3	13.3	17.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	4.3	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	11.7	27.9	4.0	12.0	6.7	13.9	9.3	11.1
Green Ext Time (p_c), s	0.0	3.7	0.0	1.2	0.0	14.4	0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	387	867	67	27	400	114	54	412	42	83	190	133
Future Volume (vph)	387	867	67	27	400	114	54	412	42	83	190	133
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1676	3311		1676	3241			1736			1738	1472
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (perm)	1676	3311		1676	3241			1736			1738	1472
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	407	913	71	28	421	120	57	434	44	87	200	140
RTOR Reduction (vph)	0	2	0	0	14	0	0	1	0	0	0	117
Lane Group Flow (vph)	407	982	0	28	527	0	0	534	0	0	287	23
Confl. Peds. (#/hr)			1	1			3					3
Confl. Bikes (#/hr)			1									
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	45.1	75.8		6.5	37.2			50.1			30.0	30.0
Effective Green, g (s)	45.1	75.8		6.5	37.2			50.1			30.0	30.0
Actuated g/C Ratio	0.25	0.42		0.04	0.20			0.27			0.16	0.16
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	414	1375		59	660			476			285	242
v/s Ratio Prot	c0.24	0.30		0.02	c0.16			c0.31			c0.17	
v/s Ratio Perm												0.02
v/c Ratio	0.98	0.71		0.47	0.80			1.12			1.01	0.10
Uniform Delay, d1	68.3	44.3		86.3	69.0			66.2			76.2	64.7
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	39.4	1.9		2.2	7.1			78.7			55.1	0.1
Delay (s)	107.7	46.2		88.5	76.1			144.8			131.3	64.7
Level of Service	F	D		F	E			F			F	E
Approach Delay (s)		64.2			76.7			144.8			109.5	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	88.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	182.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	81	829	74	31	352
Future Vol, veh/h	23	81	829	74	31	352
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	87	891	80	33	378

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1376	931	0	0	971	0
Stage 1	931	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	160	324	-	-	710	-
Stage 1	384	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	151	324	-	-	710	-
Mov Cap-2 Maneuver	151	-	-	-	-	-
Stage 1	384	-	-	-	-	-
Stage 2	608	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.1	0	0.8
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	259	710	-
HCM Lane V/C Ratio	-	-	0.432	0.047	-
HCM Control Delay (s)	-	-	29.1	10.3	0
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	2.1	0.1	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1751	152	102	725	135	147
Future Volume (veh/h)	1751	152	102	725	135	147
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.99	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	1843	160	107	763	142	155
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1955	867	303	2692	199	178
Arrive On Green	0.58	0.58	0.18	0.80	0.12	0.12
Sat Flow, veh/h	3441	1487	1681	3441	1681	1500
Grp Volume(v), veh/h	1843	160	107	763	142	155
Grp Sat Flow(s),veh/h/ln	1676	1487	1681	1676	1681	1500
Q Serve(g_s), s	71.2	7.0	7.8	8.1	11.4	14.2
Cycle Q Clear(g_c), s	71.2	7.0	7.8	8.1	11.4	14.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1955	867	303	2692	199	178
V/C Ratio(X)	0.94	0.18	0.35	0.28	0.71	0.87
Avail Cap(c_a), veh/h	1976	876	303	2692	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	13.6	50.2	3.5	59.4	60.7
Incr Delay (d2), s/veh	10.7	0.5	0.3	0.1	1.8	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	35.7	3.0	3.6	3.7	5.4	6.3
LnGrp Delay(d),s/veh	37.7	14.1	50.5	3.6	61.2	68.5
LnGrp LOS	D	B	D	A	E	E
Approach Vol, veh/h	2003			870	297	
Approach Delay, s/veh	35.8			9.4	65.0	
Approach LOS	D			A	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	30.8	87.1		22.1		117.9		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	15.0	* 83		27.5		101.5		
Max Q Clear Time (g_c+I1), s	9.8	73.2		16.2		10.1		
Green Ext Time (p_c), s	2.8	8.4		0.4		8.8		

Intersection Summary	
HCM 2010 Ctrl Delay	31.3
HCM 2010 LOS	C

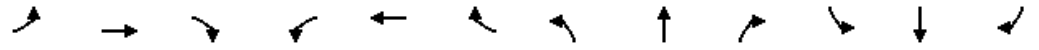
Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	1767	6	6	726	122	13	3	8	154	1	82
Future Volume (vph)	128	1767	6	6	726	122	13	3	8	154	1	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	1676	4815		1676	4693			1641			1681	1473
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (perm)	1676	4815		1676	4693			1641			1681	1473
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	1803	6	6	741	124	13	3	8	157	1	84
RTOR Reduction (vph)	0	0	0	0	10	0	0	8	0	0	0	73
Lane Group Flow (vph)	131	1809	0	6	855	0	0	16	0	0	158	11
Confl. Peds. (#/hr)	3					3	4					4
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	15.3	96.3		1.3	82.3			4.3			18.1	18.1
Effective Green, g (s)	15.3	96.3		1.3	82.3			4.3			18.1	18.1
Actuated g/C Ratio	0.11	0.69		0.01	0.59			0.03			0.13	0.13
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	183	3312		15	2758			50			217	190
v/s Ratio Prot	c0.08	c0.38		0.00	0.18			c0.01			c0.09	
v/s Ratio Perm												0.01
v/c Ratio	0.72	0.55		0.40	0.31			0.32			0.73	0.06
Uniform Delay, d1	60.2	10.9		69.0	14.5			66.4			58.6	53.5
Progression Factor	1.35	0.41		0.87	0.96			1.00			1.00	1.00
Incremental Delay, d2	6.6	0.4		5.6	0.1			1.4			9.9	0.0
Delay (s)	87.8	4.9		65.3	14.0			67.8			68.5	53.5
Level of Service	F	A		E	B			E			E	D
Approach Delay (s)		10.5			14.4			67.8			63.3	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
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 (vph)	127	1392	171	360	648	77	248	486	547	138	262	55
Future Volume (vph)	127	1392	171	360	648	77	248	486	547	138	262	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4726		3252	4725		1526	3204	1489	1676	3252	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4726		3252	4725		1526	3204	1489	1676	3252	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	135	1481	182	383	689	82	264	517	582	147	279	59
RTOR Reduction (vph)	0	10	0	0	9	0	0	0	123	0	14	0
Lane Group Flow (vph)	135	1653	0	383	762	0	238	543	459	147	324	0
Confl. Peds. (#/hr)	9		7	7		9	7		1	1		7
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	15.2	52.4		21.1	58.3		27.3	27.3	48.4	19.2	19.2	
Effective Green, g (s)	15.2	52.4		21.1	58.3		27.3	27.3	48.4	19.2	19.2	
Actuated g/C Ratio	0.11	0.37		0.15	0.42		0.20	0.20	0.35	0.14	0.14	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	181	1768		490	1967		297	624	514	229	445	
v/s Ratio Prot	0.08	c0.35		0.12	0.16		0.16	0.17	c0.13	0.09	c0.10	
v/s Ratio Perm									0.17			
v/c Ratio	0.75	0.93		0.78	0.39		0.80	0.87	0.89	0.64	0.73	
Uniform Delay, d1	60.5	42.2		57.2	28.4		53.8	54.6	43.3	57.1	57.9	
Progression Factor	1.06	1.04		1.20	1.36		1.01	1.02	1.66	1.00	1.00	
Incremental Delay, d2	12.0	9.6		6.7	0.2		1.4	1.3	2.0	4.5	5.0	
Delay (s)	75.8	53.6		75.6	38.7		55.9	56.9	74.1	61.7	62.9	
Level of Service	E	D		E	D		E	E	E	E	E	
Approach Delay (s)		55.3			51.0			64.1			62.5	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	57.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.3%	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 (vph)	405	1662	4	67	793	119	35	17	24	215	7	186
Future Volume (vph)	405	1662	4	67	793	119	35	17	24	215	7	186
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1676	4815		1676	4687		1676	1596		1593	1601	1436
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	1676	4815		1676	4687		1676	1596		1593	1601	1436
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)	422	1731	4	70	826	124	36	18	25	224	7	194
RTOR Reduction (vph)	0	0	0	0	12	0	0	24	0	0	0	165
Lane Group Flow (vph)	422	1735	0	70	938	0	36	19	0	114	117	29
Confl. Peds. (#/hr)	17		11	11		17	21					21
Confl. Bikes (#/hr)			3			1			1			
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	39.0	82.8		8.5	52.8		7.8	7.8		20.9	20.9	20.9
Effective Green, g (s)	39.0	82.8		8.5	52.8		7.8	7.8		20.9	20.9	20.9
Actuated g/C Ratio	0.28	0.59		0.06	0.38		0.06	0.06		0.15	0.15	0.15
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	466	2847		101	1767		93	88		237	239	214
v/s Ratio Prot	c0.25	c0.36		0.04	0.20		c0.02	0.01		0.07	c0.07	
v/s Ratio Perm												0.02
v/c Ratio	0.91	0.61		0.69	0.53		0.39	0.22		0.48	0.49	0.14
Uniform Delay, d1	48.7	18.3		64.5	34.0		63.8	63.2		54.6	54.7	51.7
Progression Factor	0.71	1.20		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.4	0.4		15.3	0.4		1.0	0.5		0.6	0.6	0.1
Delay (s)	44.8	22.3		79.8	34.3		64.8	63.7		55.1	55.2	51.8
Level of Service	D	C		E	C		E	E		E	E	D
Approach Delay (s)		26.7			37.5			64.2			53.6	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.1%	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)	306	667	126	222	295	95	257	1416	744	89	514	153
Future Volume (veh/h)	306	667	126	222	295	95	257	1416	744	89	514	153
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	340	741	140	247	328	106	286	1573	827	99	571	170
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	797	350	292	567	180	168	1572	689	120	1477	657
Arrive On Green	0.10	0.24	0.24	0.09	0.23	0.23	0.10	0.47	0.47	0.07	0.44	0.44
Sat Flow, veh/h	3261	3353	1472	3261	2493	791	1681	3353	1469	1681	3353	1491
Grp Volume(v), veh/h	340	741	140	247	219	215	286	1573	827	99	571	170
Grp Sat Flow(s),veh/h/ln	1630	1676	1472	1630	1676	1608	1681	1676	1469	1681	1676	1491
Q Serve(g_s), s	14.0	30.3	11.2	10.4	16.2	16.7	14.0	65.7	65.7	8.1	16.1	10.1
Cycle Q Clear(g_c), s	14.0	30.3	11.2	10.4	16.2	16.7	14.0	65.7	65.7	8.1	16.1	10.1
Prop In Lane	1.00		1.00	1.00		0.49	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	797	350	292	381	365	168	1572	689	120	1477	657
V/C Ratio(X)	1.04	0.93	0.40	0.85	0.57	0.59	1.70	1.00	1.20	0.82	0.39	0.26
Avail Cap(c_a), veh/h	326	814	357	326	407	390	168	1572	689	408	1477	657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	52.2	44.9	62.8	48.1	48.3	63.0	37.2	37.2	64.1	26.4	24.7
Incr Delay (d2), s/veh	61.4	16.4	0.3	15.4	0.9	1.2	339.9	22.8	103.7	5.2	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	15.8	4.6	5.3	7.6	7.5	22.4	35.3	46.3	4.0	7.5	4.2
LnGrp Delay(d),s/veh	124.4	68.6	45.2	78.2	49.0	49.5	402.9	60.0	140.9	69.3	26.6	25.0
LnGrp LOS	F	E	D	E	D	D	F	F	F	E	C	C
Approach Vol, veh/h		1221			681			2686			840	
Approach Delay, s/veh		81.4			59.7			121.4			31.3	
Approach LOS		F			E			F			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	14.0	71.2	18.0	36.8	18.0	67.2	16.5	38.3
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	34.0	39.5	14.0	34.0	14.0	59.5	14.0	34.0
Max Q Clear Time (g_c+I1), s	10.1	67.7	16.0	18.7	16.0	18.1	12.4	32.3
Green Ext Time (p_c), s	0.1	0.0	0.0	4.9	0.0	21.7	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	90.7
HCM 2010 LOS	F

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	180	102	173	785	310	306
Future Volume (veh/h)	180	102	173	785	310	306
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	196	111	188	853	337	333
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	309	276	578	955	955	812
Arrive On Green	0.18	0.18	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1681	1500	764	1765	1765	1500
Grp Volume(v), veh/h	196	111	188	853	337	333
Grp Sat Flow(s),veh/h/ln	1681	1500	764	1765	1765	1500
Q Serve(g_s), s	3.1	1.9	5.4	12.5	3.2	3.8
Cycle Q Clear(g_c), s	3.1	1.9	8.5	12.5	3.2	3.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	309	276	578	955	955	812
V/C Ratio(X)	0.63	0.40	0.33	0.89	0.35	0.41
Avail Cap(c_a), veh/h	924	824	584	970	970	824
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.0	10.5	6.2	5.9	3.8	3.9
Incr Delay (d2), s/veh	2.1	0.9	0.3	10.5	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.8	1.1	8.7	1.6	1.6
LnGrp Delay(d),s/veh	13.1	11.4	6.5	16.4	4.0	4.3
LnGrp LOS	B	B	A	B	A	A
Approach Vol, veh/h	307			1041	670	
Approach Delay, s/veh	12.5			14.6	4.1	
Approach LOS	B			B	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		19.8		9.4		19.8		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		16.0		16.0		16.0		
Max Q Clear Time (g_c+I1), s		14.5		5.1		5.8		
Green Ext Time (p_c), s		1.3		0.7		7.1		

Intersection Summary	
HCM 2010 Ctrl Delay	10.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	492	131	265	539	446	185	1708	179	191	553	149
Future Volume (veh/h)	395	492	131	265	539	446	185	1708	179	191	553	149
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	429	535	142	288	586	485	201	1857	195	208	601	162
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	419	781	336	335	695	297	224	1745	182	231	1511	399
Arrive On Green	0.13	0.23	0.23	0.10	0.21	0.21	0.13	0.39	0.39	0.14	0.40	0.40
Sat Flow, veh/h	3261	3353	1441	3261	3353	1433	1681	4422	461	1681	3789	1001
Grp Volume(v), veh/h	429	535	142	288	586	485	201	1346	706	208	507	256
Grp Sat Flow(s),veh/h/ln	1630	1676	1441	1630	1676	1433	1681	1606	1672	1681	1606	1578
Q Serve(g_s), s	18.0	20.4	11.7	12.2	23.5	29.0	16.5	55.2	55.2	17.1	15.8	16.3
Cycle Q Clear(g_c), s	18.0	20.4	11.7	12.2	23.5	29.0	16.5	55.2	55.2	17.1	15.8	16.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.28	1.00		0.63
Lane Grp Cap(c), veh/h	419	781	336	335	695	297	224	1267	660	231	1281	629
V/C Ratio(X)	1.02	0.68	0.42	0.86	0.84	1.63	0.90	1.06	1.07	0.90	0.40	0.41
Avail Cap(c_a), veh/h	419	781	336	419	695	297	372	1267	660	372	1281	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.0	49.0	45.7	61.8	53.3	55.5	59.7	42.4	42.4	59.4	30.1	30.2
Incr Delay (d2), s/veh	50.0	2.1	0.3	11.8	8.9	300.0	9.0	43.4	55.6	10.7	0.9	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	11.0	9.7	4.7	6.0	11.8	36.2	8.2	32.1	35.7	8.6	7.1	7.4
LnGrp Delay(d),s/veh	111.0	51.1	46.0	73.6	62.2	355.5	68.7	85.8	98.0	70.1	31.0	32.1
LnGrp LOS	F	D	D	E	E	F	E	F	F	E	C	C
Approach Vol, veh/h		1106			1359			2253			971	
Approach Delay, s/veh		73.7			169.3			88.1			39.7	
Approach LOS		E			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.7	61.3	18.4	37.6	23.3	60.7	22.0	34.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	31.0	43.5	18.0	29.0	31.0	43.5	18.0	29.0
Max Q Clear Time (g_c+I1), s	18.5	18.3	14.2	22.4	19.1	57.2	20.0	31.0
Green Ext Time (p_c), s	0.2	23.2	0.2	3.5	0.2	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	96.4
HCM 2010 LOS	F

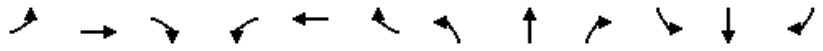
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	449	1658	118	77	1243	374	214	78	103	412	48	532
Future Volume (veh/h)	449	1658	118	77	1243	374	214	78	103	412	48	532
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	468	1727	0	80	1295	0	223	81	0	429	50	554
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	1	2
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	522	2526	787	223	2083	649	274	442	198	479	344	929
Arrive On Green	0.16	0.52	0.00	0.07	0.43	0.00	0.08	0.13	0.00	0.15	0.19	0.19
Sat Flow, veh/h	3261	4818	1500	3261	4818	1500	3261	3353	1500	3261	1765	2595
Grp Volume(v), veh/h	468	1727	0	80	1295	0	223	81	0	429	50	554
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	1500	1630	1676	1500	1630	1765	1298
Q Serve(g_s), s	19.7	37.2	0.0	3.3	29.2	0.0	9.4	3.0	0.0	18.1	3.3	24.5
Cycle Q Clear(g_c), s	19.7	37.2	0.0	3.3	29.2	0.0	9.4	3.0	0.0	18.1	3.3	24.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	522	2526	787	223	2083	649	274	442	198	479	344	929
V/C Ratio(X)	0.90	0.68	0.00	0.36	0.62	0.00	0.81	0.18	0.00	0.89	0.15	0.60
Avail Cap(c_a), veh/h	745	2526	787	303	2083	649	606	730	327	606	378	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.68	0.68	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.6	24.7	0.0	62.3	30.8	0.0	63.1	54.1	0.0	58.6	46.7	37.0
Incr Delay (d2), s/veh	8.0	1.5	0.0	0.2	0.3	0.0	2.3	0.1	0.0	11.9	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	16.8	0.0	1.5	13.0	0.0	4.3	1.4	0.0	9.0	1.6	8.9
LnGrp Delay(d),s/veh	65.6	26.2	0.0	62.5	31.1	0.0	65.3	54.1	0.0	70.5	46.8	37.6
LnGrp LOS	E	C		E	C		E	D		E	D	D
Approach Vol, veh/h		2195			1375			304			1033	
Approach Delay, s/veh		34.6			33.0			62.3			51.7	
Approach LOS		C			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.6	78.4	15.7	32.3	26.4	65.5	24.6	23.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	* 5
Max Green Setting (Gmax), s	13.0	53.0	26.0	30.0	32.0	34.0	26.0	* 31
Max Q Clear Time (g_c+I1), s	5.3	39.2	11.4	26.5	21.7	31.2	20.1	5.0
Green Ext Time (p_c), s	0.1	11.3	0.3	0.8	0.7	2.6	0.5	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	39.5
HCM 2010 LOS	D

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	1845	300	0	781	25	478	658	174	131	428	162
Future Volume (veh/h)	297	1845	300	0	781	25	478	658	174	131	428	162
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	0	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	323	2005	0	0	849	0	520	715	189	142	465	176
Adj No. of Lanes	2	3	1	0	3	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	367	2215	690	0	1492	0	575	838	222	168	815	359
Arrive On Green	0.11	0.46	0.00	0.00	0.31	0.00	0.18	0.32	0.32	0.10	0.24	0.24
Sat Flow, veh/h	3261	4818	1500	0	5135	0	3261	2623	693	1681	3353	1475
Grp Volume(v), veh/h	323	2005	0	0	849	0	520	457	447	142	465	176
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	0	1606	0	1630	1676	1640	1681	1676	1475
Q Serve(g_s), s	11.7	46.2	0.0	0.0	17.7	0.0	18.8	30.6	30.6	10.0	14.6	12.3
Cycle Q Clear(g_c), s	11.7	46.2	0.0	0.0	17.7	0.0	18.8	30.6	30.6	10.0	14.6	12.3
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	367	2215	690	0	1492	0	575	536	524	168	815	359
V/C Ratio(X)	0.88	0.91	0.00	0.00	0.57	0.00	0.90	0.85	0.85	0.85	0.57	0.49
Avail Cap(c_a), veh/h	367	2215	690	0	1492	0	611	559	547	217	922	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	30.0	0.0	0.0	34.7	0.0	48.4	38.2	38.2	53.1	39.9	39.0
Incr Delay (d2), s/veh	15.3	4.1	0.0	0.0	1.6	0.0	16.5	12.3	12.5	21.8	0.9	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	21.3	0.0	0.0	8.1	0.0	9.8	15.9	15.6	5.6	6.9	5.2
LnGrp Delay(d),s/veh	67.8	34.1	0.0	0.0	36.3	0.0	64.9	50.5	50.7	74.9	40.8	40.5
LnGrp LOS	E	C			D		E	D	D	E	D	D
Approach Vol, veh/h		2328			849			1424			783	
Approach Delay, s/veh		38.8			36.3			55.8			46.9	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	18.0	42.2	25.7	34.2		60.2	16.5	43.3
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0		5.0	4.5	5.0
Max Green Setting (Gmax), s	13.5	32.0	22.5	33.0		50.0	15.5	40.0
Max Q Clear Time (g_c+I1), s	13.7	19.7	20.8	16.6		48.2	12.0	32.6
Green Ext Time (p_c), s	0.0	11.8	0.4	10.9		1.8	0.1	5.7

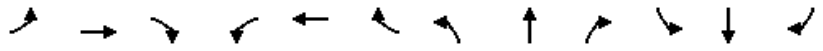
Intersection Summary	
HCM 2010 Ctrl Delay	44.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	729	99	103	345	219	137	871	241	234	998	34
Future Volume (veh/h)	103	729	99	103	345	219	137	871	241	234	998	34
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	108	767	104	108	363	231	144	917	254	246	1051	36
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	990	134	131	1124	492	169	1022	282	273	1127	493
Arrive On Green	0.08	0.34	0.34	0.08	0.34	0.34	0.10	0.27	0.27	0.16	0.34	0.34
Sat Flow, veh/h	1681	2953	400	1681	3353	1469	1681	3720	1026	1681	3353	1468
Grp Volume(v), veh/h	108	435	436	108	363	231	144	791	380	246	1051	36
Grp Sat Flow(s),veh/h/ln	1681	1676	1677	1681	1676	1469	1681	1606	1534	1681	1676	1468
Q Serve(g_s), s	7.6	28.0	28.0	7.6	9.7	14.9	10.1	28.4	28.6	17.2	36.4	2.0
Cycle Q Clear(g_c), s	7.6	28.0	28.0	7.6	9.7	14.9	10.1	28.4	28.6	17.2	36.4	2.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.67	1.00		1.00
Lane Grp Cap(c), veh/h	131	562	562	131	1124	492	169	882	422	273	1127	493
V/C Ratio(X)	0.83	0.77	0.78	0.83	0.32	0.47	0.85	0.90	0.90	0.90	0.93	0.07
Avail Cap(c_a), veh/h	140	562	562	140	1124	492	252	882	422	392	1174	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.5	35.8	35.8	54.5	29.7	31.5	53.1	41.9	41.9	49.3	38.5	27.1
Incr Delay (d2), s/veh	27.8	10.0	10.0	27.5	0.2	0.7	10.9	11.5	21.5	14.4	12.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	14.5	14.5	4.5	4.5	6.1	5.2	14.0	14.7	9.1	18.8	0.8
LnGrp Delay(d),s/veh	82.3	45.9	45.9	82.0	29.9	32.2	64.0	53.4	63.4	63.7	51.1	27.1
LnGrp LOS	F	D	D	F	C	C	E	D	E	E	D	C
Approach Vol, veh/h		979			702			1315			1333	
Approach Delay, s/veh		49.9			38.7			57.4			52.8	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	45.2	16.1	45.3	13.3	45.2	23.5	38.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	32.0	18.0	42.0	10.0	32.0	28.0	32.0
Max Q Clear Time (g_c+I1), s	9.6	30.0	12.1	38.4	9.6	16.9	19.2	30.6
Green Ext Time (p_c), s	0.0	1.5	0.1	2.0	0.0	7.6	0.2	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	51.2
HCM 2010 LOS	D

HCM 2010 Computation does not support turning movement with Shared and Exclusive lanes.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	314	231	133	179	129	80	109	1636	363	95	494	91
Future Volume (veh/h)	314	231	133	179	129	80	109	1636	363	95	494	91
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	324	238	137	185	133	82	112	1687	374	98	509	94
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	1080	600	123	1563	697	133	817	179	118	812	147
Arrive On Green	0.13	0.52	0.52	0.07	0.47	0.47	0.08	0.21	0.21	0.07	0.20	0.20
Sat Flow, veh/h	1681	2079	1154	1681	3353	1495	1681	3952	865	1681	4099	741
Grp Volume(v), veh/h	324	190	185	185	133	82	112	1367	694	98	396	207
Grp Sat Flow(s),veh/h/ln	1681	1676	1557	1681	1676	1495	1681	1606	1606	1681	1606	1629
Q Serve(g_s), s	19.0	9.2	9.7	11.0	3.3	4.6	9.9	31.0	31.0	8.6	16.9	17.5
Cycle Q Clear(g_c), s	19.0	9.2	9.7	11.0	3.3	4.6	9.9	31.0	31.0	8.6	16.9	17.5
Prop In Lane	1.00		0.74	1.00		1.00	1.00		0.54	1.00		0.46
Lane Grp Cap(c), veh/h	213	871	809	123	1563	697	133	664	332	118	636	323
V/C Ratio(X)	1.52	0.22	0.23	1.50	0.09	0.12	0.84	2.06	2.09	0.83	0.62	0.64
Avail Cap(c_a), veh/h	213	871	809	123	1563	697	314	664	332	403	824	418
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.57	0.57	0.57	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.5	19.5	19.6	69.5	22.3	22.6	68.2	59.5	59.5	68.8	55.0	55.2
Incr Delay (d2), s/veh	257.4	0.6	0.7	263.0	0.0	0.1	3.2	479.2	496.4	5.5	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.0	4.4	4.3	14.1	1.5	1.9	4.7	57.9	59.5	4.2	7.6	7.9
LnGrp Delay(d),s/veh	322.9	20.1	20.3	332.5	22.3	22.7	71.4	538.7	555.9	74.3	55.4	56.0
LnGrp LOS	F	C	C	F	C	C	E	F	F	E	E	E
Approach Vol, veh/h		699			400			2173			701	
Approach Delay, s/veh		160.5			165.8			520.1			58.2	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	83.9	15.9	35.2	23.0	75.9	14.6	36.5
Change Period (Y+Rc), s	4.0	6.0	4.0	5.5	4.0	6.0	4.0	5.5
Max Green Setting (Gmax), s	11.0	53.0	28.0	38.5	19.0	45.0	36.0	30.5
Max Q Clear Time (g_c+I1), s	13.0	11.7	11.9	19.5	21.0	6.6	10.6	33.0
Green Ext Time (p_c), s	0.0	5.4	0.1	10.3	0.0	5.4	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	339.7
HCM 2010 LOS	F

Pedestrian Green has to be less than Phase Max Green.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Existing + Project	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	995	178	9600	2000	0.10	0.09	75.4	-	3.3	-	A

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	778	7200	0.11	71.7	3.6	A

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	1219	441	9600	2000	0.08	0.22	75.4	-	2.6	-	A

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2408	3196	0.75	28.2	21.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1788	7200	0.25	71.7	8.3	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2198	5955	0.37	62.1	8.8	A

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	1670	1129	9600	2000	0.17	0.56	61.1	57.7	6.8	8.8	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	57.0	6.7	6.7	2.6	A

Facility Overall Results

Space Mean Speed, mi/h	57.0	Density, veh/mi/ln	6.7
Average Travel Time, min	2.6	Density, pc/mi/ln	6.7

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak
Analysis Year	Existing + Project	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	5812	6300	0.92	65.4	29.6	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	6215	7805	0.80	60.2	25.8	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5317	8400	0.67	71.3	17.9	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5514	7014	0.86	23.8	57.9	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3799	6300	0.75	15.3	83.0	F

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3703	178	6300	2000	0.77	0.09	12.6	63.9	97.8	23.8	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4445	883	4774	2000	1.21	0.44	66.3	63.9	22.3	23.7	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	32.0	45.3	45.1	4.2	F

Facility Overall Results

Space Mean Speed, mi/h	32.0	Density, veh/mi/ln	45.1
Average Travel Time, min	4.2	Density, pc/mi/ln	45.3

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak
Analysis Year	Existing + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	2
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	2
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	2
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	2
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	2

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	6458	201	8400	2000	0.89	0.10	20.6	60.5	78.5	25.9	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	6050	936	8400	2000	0.82	0.47	20.0	-	75.6	-	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4960	6300	0.95	27.4	60.2	F

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5129	438	8400	2000	0.71	0.22	14.9	-	86.0	-	F

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5022	59	6300	2000	1.02	0.03	25.5	60.9	65.8	30.2	F

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4850	6300	1.01	21.7	74.5	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5853	1141	6300	2000	1.01	0.57	62.8	-	31.1	-	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	6115	7173	1.28	28.4	53.8	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4885	6279	1.29	22.4	72.8	F

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5866	1279	6300	2000	1.28	0.64	62.3	-	31.4	-	F

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7341	1475	8400	2000	1.11	0.74	65.1	-	28.2	-	F

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7341	1660	10500	2000	1.02	0.83	64.3	56.1	22.8	27.1	F

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5681	3887	10500	4000	0.87	0.97	52.4	-	21.7	-	C

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1794	4800	1.13	69.9	11.9	F

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1933	139	4800	2000	1.16	0.07	65.6	65.6	14.7	15.5	F

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1652	1652	1.60	18.4	45.0	F

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2293	4800	1.23	67.7	15.3	F

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1759	1759	1.68	19.5	45.0	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	30.1	47.1	46.8	14.3	F

Facility Overall Results

Space Mean Speed, mi/h	30.1	Density, veh/mi/ln	46.8
Average Travel Time, min	14.3	Density, pc/mi/ln	47.1

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak
Analysis Year	Existing + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	2
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	2
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	2
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	2
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	2
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	4
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	4
8	Basic	Basic	Lane Drop to Port Chicago On	1680	3
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	3
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	3334	562	4200	2000	0.79	0.28	59.4	59.4	28.1	25.7	C
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2639		4200		0.63		68.1		19.4		C
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2918		4114		0.71		61.2		23.8		C
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2231	524	4800	2000	0.46	0.26	59.5	59.5	18.7	16.2	B
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1732		4800		0.36		70.5		12.3		B
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2921		6014		0.49		55.8		13.1		B
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2864		9600		0.30		70.5		10.2		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2864		7200		0.40		70.5		13.5		B
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3299		6858		0.48		64.3		17.1		B
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2830		7176		0.39		69.2		13.6		B
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3265		7986		0.41		64.7		12.6		B
Segment 12: Basic															

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2657	7200	0.37	70.5	12.6	B

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2944	287	7200	2000	0.41	0.14	68.3	65.7	14.4	15.1	B

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3079	149	7200	2000	0.41	0.07	75.4	-	13.0	-	B

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3072	210	9600	2000	0.32	0.11	70.4	60.5	10.9	9.6	A

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2872	239	9600	2000	0.30	0.12	75.4	-	9.5	-	A

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2644	7200	0.37	71.3	12.4	B

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3503	859	7200	2000	0.37	0.43	75.4	-	11.7	-	B

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3462	0	9600	2000	0.36	0.00	71.7	61.1	12.1	10.0	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.5	14.6	14.5	6.9	B

Facility Overall Results

Space Mean Speed, mi/h	66.5	Density, veh/mi/ln	14.5

Average Travel Time, min	6.9	Density, pc/mi/ln	14.6

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Existing + Project	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	6554	1041	8400	2000	0.68	0.52	66.9	-	24.5	-	C

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4535	6300	0.71	29.5	51.3	F

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4571	341	8400	2000	0.53	0.17	13.2	-	86.5	-	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5023	7074	0.81	15.0	83.9	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4224	6300	0.84	16.8	84.0	F

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4121	7504	0.74	10.0	103.0	F

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	3754	872	4032	2000	1.28	0.44	67.0	58.5	14.0	15.4	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	22.3	59.2	59.1	6.7	F

Facility Overall Results

Space Mean Speed, mi/h	22.3	Density, veh/mi/ln	59.1
Average Travel Time, min	6.7	Density, pc/mi/ln	59.2

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak
Analysis Year	Existing + Project	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	3191	6300	0.51	73.9	14.4	B

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3409	7248	0.47	63.5	13.4	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3100	8400	0.37	72.2	10.7	A

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3510	4497	0.78	54.2	16.2	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2281	6300	0.36	72.2	10.5	A

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	2444	163	6300	2000	0.39	0.08	68.7	65.9	11.9	12.4	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3250	806	6300	2000	0.52	0.40	67.6	65.3	16.0	17.9	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.3	13.1	13.0	2.0	B

Facility Overall Results

Space Mean Speed, mi/h	67.3	Density, veh/mi/ln	13.0
Average Travel Time, min	2.0	Density, pc/mi/ln	13.1

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak
Analysis Year	Existing + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	2
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	2
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	2
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	2
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	2

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	3925	340	8400	2000	0.47	0.17	69.9	60.1	14.0	13.4	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3413	554	8400	2000	0.41	0.28	75.2	-	11.3	-	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2886	6300	0.46	71.6	13.4	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3299	413	8400	2000	0.34	0.21	75.4	-	9.6	-	A

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3279	441	6300	2000	0.52	0.22	65.1	59.8	16.8	16.9	B

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2859	6300	0.45	70.5	13.5	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3227	368	6300	2000	0.45	0.18	74.8	-	12.7	-	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3712	8400	0.38	75.4	10.6	A

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3257	6279	0.52	68.8	15.8	B

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3753	496	6300	2000	0.52	0.25	73.6	-	14.8	-	B

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4610	881	8400	2000	0.44	0.44	74.9	-	12.4	-	B

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4568	300	10500	2000	0.44	0.15	70.1	60.2	13.0	13.9	B

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4282	2571	10500	4000	0.41	0.64	75.2	-	11.4	-	B

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1834	4800	0.38	70.0	13.1	B

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2330	496	4800	2000	0.49	0.25	65.2	65.2	17.9	18.5	B

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2802	4136	0.68	61.7	22.7	C

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2538	4800	0.53	70.8	17.9	B

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3115	4698	0.66	64.2	24.3	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.6	14.1	14.1	6.1	B

Facility Overall Results

Space Mean Speed, mi/h	70.6	Density, veh/mi/ln	14.1
Average Travel Time, min	6.1	Density, pc/mi/ln	14.1

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak
Analysis Year	Existing + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	2
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	2
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	2
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	2
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	2
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	4
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	4
8	Basic	Basic	Lane Drop to Port Chicago On	1680	3
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	3
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	3243	164	4200	2000	1.35	0.08	20.8	60.6	78.0	45.8	F
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2964		4200		1.25		17.2		86.0		F
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2133		2291		1.57		25.5		45.0		F
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3500	286	4200	2000	1.37	0.14	60.2	60.2	29.1	27.2	F
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3081		4200		1.31		22.9		67.3		F
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1135		1219		4.34		6.8		45.0		F
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2136		8400		0.92		63.5		7.1		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2136		6300		1.22		70.0		9.4		F
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1823		1823		1.59		13.5		45.0		F
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2460		6279		1.28		69.1		10.9		F
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1127		1127		3.52		6.3		45.0		F
Segment 12: Basic															

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2195	6300	1.23	70.4	9.7	F

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2417	222	6300	2000	1.27	0.11	68.6	65.9	11.7	12.4	F

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2528	111	6300	2000	1.26	0.06	68.7	-	12.3	-	F

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2528	580	8400	2000	0.96	0.29	67.7	59.4	9.3	9.3	A

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1948	654	8400	2000	0.90	0.33	66.2	-	7.4	-	A

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1294	6300	1.09	70.8	5.7	F

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2562	1268	6300	2000	1.09	0.63	67.3	-	12.7	-	F

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2562	0	8400	2000	0.96	0.00	71.7	61.1	8.9	6.7	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	22.6	32.6	32.1	20.4	F

Facility Overall Results

Space Mean Speed, mi/h	22.6	Density, veh/mi/ln	32.1

Average Travel Time, min	20.4	Density, pc/mi/ln	32.6

Copyright © 2019 University of Florida. All Rights Reserved.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = veh/h
	Freeway Volume, V_F: 1512	
	Ramp Volume, V_R: 427	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1512	0.92	Level	6	0	0.971	1.00	1693
Ramp	427	0.92	Level	6	0	0.971	1.00	478
UpStream								
DownStream		0.92	Level	6	0	0.971	1.00	1489

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1008 pc/h

V_3 or V_{av34} 342 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1693	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1215	Exhibit 13-8	9400	No
V_R	478	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1008	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 5.7 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.471 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 60.0 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	WB SR-4
Junction	NB Bailey Rd Diagonal Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	650
Freeway Volume, V_F	4800
Ramp Volume, V_R	191
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1155 ft
V_D = 891 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4800	0.92	Level	5	0	0.976	1.00	5348
Ramp	191	0.92	Level	5	0	0.976	1.00	213
UpStream								
DownStream	891	0.92	Level	5	0	0.976	1.00	993

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = 1103.73 (Equation 13-12 or 13-13)
P_{FD} = 0.617 using Equation 9 (Exhibit 13-7)
V_{12} = 3379 pc/h
V_3 or V_{av34} 1969 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5348	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	5135	Exhibit 13-8	7050	No
V_R	213	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3379	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 27.5 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.447 (Exhibit 13-12)
S_R= 54.7 mph (Exhibit 13-12)
S_0= 67.5 mph (Exhibit 13-12)
S = 58.8 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3420 ft
V_u = 427 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	485
Deceleration Lane Length L_D	
Freeway Volume, V_F	1085
Ramp Volume, V_R	
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1085	0.92	Level	6	0	0.971	1.00	1215
Ramp		0.92	Level	6	0	0.971	1.00	1489
UpStream	427	0.92	Level	6	0	0.971	1.00	478
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.186 using Equation 0 (Exhibit 13-6)
V_{12} = 226 pc/h
V_3 or V_{av34} = 494 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 486 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2704	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1975	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = 17.2 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.315 (Exibit 13-11)
S_R = 57.8 mph (Exhibit 13-11)
S_0 = 65.0 mph (Exhibit 13-11)
S = 59.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1265 ft
V_u = veh/h	Deceleration Lane Length L_D: 320	V_D = 417 veh/h
	Freeway Volume, V_F:	
	Ramp Volume, V_R: 891	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway		0.92	Level	5	0	0.976	1.00	4424
Ramp	891	0.92	Level	5	0	0.976	1.00	993
UpStream								
DownStream	417	0.92	Level	5	0	0.976	1.00	465

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2489 pc/h

V_3 or V_{av34} 967 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4424	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3431	Exhibit 13-8	9400	No
V_R	993	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2489	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.517 (Exhibit 13-12)

S_R= 53.1 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 59.8 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1360 ft
V_u = veh/h	Deceleration Lane Length L_D: 475	V_D = 273 veh/h
	Freeway Volume, V_F: 1488	
	Ramp Volume, V_R: 560	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1488	0.92	Level	6	0	0.971	1.00	1666
Ramp	560	0.92	Level	6	0	0.971	1.00	627
UpStream								
DownStream	273	0.92	Level	6	0	0.971	1.00	306

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1080 pc/h

V_3 or V_{av34} 293 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1666	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1039	Exhibit 13-8	9400	No
V_R	627	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1080	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 9.3 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.484 (Exhibit 13-12)

S_R= 53.9 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 58.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 5:12 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1265 ft	Acceleration Lane Length, L_A: 415	L_{down} = ft
V_u = 891 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3718	
	Ramp Volume, V_R: 417	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3718	0.92	Level	5	0	0.976	1.00	4142
Ramp	417	0.92	Level	5	0	0.976	1.00	465
UpStream	891	0.92	Level	5	0	0.976	1.00	993
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 598.36 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)

V_{12} = 2440 pc/h

V_3 or V_{av34} = 1702 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2440 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4607	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2905	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 25.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.363 (Exibit 13-11)

S_R = 56.6 mph (Exhibit 13-11)

S_0 = 60.7 mph (Exhibit 13-11)

S = 58.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 142 veh/h
	Freeway Volume, V_F: 928	
	Ramp Volume, V_R: 273	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	928	0.92	Level	6	0	0.971	1.00	1039
Ramp	273	0.92	Level	6	0	0.971	1.00	306
UpStream								
DownStream	142	0.92	Level	6	0	0.971	1.00	159

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.323 using Equation 0 (Exhibit 13-6)

V_{12} = 336 pc/h

V_3 or V_{av34} = 351 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 415 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1345	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	721	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 8.1 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.298 (Exibit 13-11)

S_R= 58.2 mph (Exhibit 13-11)

S_0= 65.0 mph (Exhibit 13-11)

S = 61.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1520 ft
V_u = veh/h	Deceleration Lane Length L_D: 685	V_D = 1086 veh/h
	Freeway Volume, V_F: 5144	
	Ramp Volume, V_R: 56	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5144	0.92	Level	6	0	0.971	1.00	5759
Ramp	56	0.92	Level	6	0	0.971	1.00	63
UpStream								
DownStream	1086	0.92	Level	6	0	0.971	1.00	1216

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.613 using Equation 9 (Exhibit 13-7)

V_{12} = 3555 pc/h

V_3 or V_{av34} 2204 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5759	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	5696	Exhibit 13-8	7050	No
V_R	63	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3555	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 28.7 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.434 (Exhibit 13-12)

S_R= 55.0 mph (Exhibit 13-12)

S_0= 66.6 mph (Exhibit 13-12)

S = 58.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1300 ft
V_u = 273 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1000
Deceleration Lane Length L_D	
Freeway Volume, V_F	1201
Ramp Volume, V_R	142
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1201	0.92	Level	6	0	0.971	1.00	1345
Ramp	142	0.92	Level	6	0	0.971	1.00	159
UpStream	273	0.92	Level	6	0	0.971	1.00	306
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.516 using Equation 0 (Exhibit 13-6)
V_{12} = 695 pc/h
V_3 or V_{av34} = 325 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 695 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1504	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	854	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 5.8 (pc/mi/ln)
LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.260 (Exibit 13-11)
S_R = 59.0 mph (Exhibit 13-11)
S_0 = 65.0 mph (Exhibit 13-11)
S = 61.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 380	L_{down} = 1270 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 1616 veh/h
	Freeway Volume, V_F: 5088	
	Ramp Volume, V_R: 1086	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5088	0.92	Level	6	0	0.971	1.00	5696
Ramp	1086	0.92	Level	6	0	0.971	1.00	1216
UpStream								
DownStream	1616	0.92	Level	6	0	0.971	1.00	1809

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.588 using Equation 3 (Exhibit 13-6)

V_{12} = 3350 pc/h

V_3 or V_{av34} = 2346 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3350 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6912	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4566	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 38.1 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.669 (Exibit 13-11)

S_R = 49.6 mph (Exhibit 13-11)

S_0 = 58.2 mph (Exhibit 13-11)

S = 52.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	5	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☑ Off
L_{up} =	ft	Deceleration Lane Length L_D	570	L_{down} =	1410 ft
V_u =	veh/h	Freeway Volume, V_F	1269	V_D =	228 veh/h
		Ramp Volume, V_R	200		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1269	0.92	Level	6	0	0.971	1.00	1421
Ramp	200	0.92	Level	6	0	0.971	1.00	224
UpStream								
DownStream	228	0.92	Level	6	0	0.971	1.00	255

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 746 pc/h

V_3 or V_{av34} 337 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1421	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1197	Exhibit 13-8	9400	No
V_R	224	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	746	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 5.5 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.448 (Exhibit 13-12)

S_R= 54.7 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 61.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 5:19 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1270 ft
V_u = 1086 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	950
Deceleration Lane Length L_D	
Freeway Volume, V_F	6174
Ramp Volume, V_R	1616
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6174	0.92	Level	6	0	0.971	1.00	6912
Ramp	1616	0.92	Level	6	0	0.971	1.00	1809
UpStream	1086	0.92	Level	6	0	0.971	1.00	1216
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.604 using Equation 3 (Exhibit 13-6)
V_{12} = 4176 pc/h
V_3 or V_{av34} = 2736 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 4212 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8721	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6021	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 45.7 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.861 (Exibit 13-11)
S_R = 22.2 mph (Exhibit 13-11)
S_0 = 56.1 mph (Exhibit 13-11)
S = 27.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	5	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	285	L_{down} =	1310 ft
V_u =	veh/h	Freeway Volume, V_F	1069	V_D =	veh/h
		Ramp Volume, V_R	228		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1069	0.92	Level	6	0	0.971	1.00	1197
Ramp	228	0.92	Level	6	0	0.971	1.00	255
UpStream								
DownStream		0.92	Level	6	0	0.971	1.00	909

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 666 pc/h

V_3 or V_{av34} 265 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1197	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	942	Exhibit 13-8	9400	No
V_R	255	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	666	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 7.4 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.451 (Exhibit 13-12)

S_R= 54.6 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 61.0 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3055 ft
V_u = veh/h	Deceleration Lane Length L_D: 700	V_D = veh/h
	Freeway Volume, V_F: 6016	
	Ramp Volume, V_R: 985	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6016	0.92	Level	6	0	0.971	1.00	6735
Ramp	985	0.92	Level	6	0	0.971	1.00	1103
UpStream								
DownStream		0.92	Level	6	0	0.971	1.00	1349

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3559 pc/h

V_3 or V_{av34} 1588 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6735	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5632	Exhibit 13-8	9400	No
V_R	1103	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3559	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 28.6 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.527 (Exhibit 13-12)

S_R= 52.9 mph (Exhibit 13-12)

S_0= 69.0 mph (Exhibit 13-12)

S = 59.4 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1310 ft	Acceleration Lane Length, L_A: 400	L_{down} = ft
V_u = 228 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 841	
	Ramp Volume, V_R:	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	841	0.92	Level	6	0	0.971	1.00	942
Ramp		0.92	Level	6	0	0.971	1.00	909
UpStream	228	0.92	Level	6	0	0.971	1.00	255
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.232 using Equation 0 (Exhibit 13-6)

V_{12} = 218 pc/h

V_3 or V_{av34} = 362 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1851	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1127	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 11.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.305 (Exibit 13-11)

S_R = 58.0 mph (Exhibit 13-11)

S_0 = 65.0 mph (Exhibit 13-11)

S = 60.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3055 ft
V_u = 985 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	450
Deceleration Lane Length L_D	
Freeway Volume, V_F	5031
Ramp Volume, V_R	
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5031	0.92	Level	6	0	0.971	1.00	5633
Ramp		0.92	Level	6	0	0.971	1.00	1349
UpStream	985	0.92	Level	6	0	0.971	1.00	1103
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = 1122.15 (Equation 13-6 or 13-7)
P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)
V_{12} = 3324 pc/h
V_3 or V_{av34} 2309 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 3324 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6982	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4673	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$
D_R = 38.5 (pc/mi/ln)
LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.707 (Exibit 13-11)
S_R= 48.7 mph (Exhibit 13-11)
S_0= 58.4 mph (Exhibit 13-11)
S = 51.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R= mph (Exhibit 13-12)
S_0= mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = 1359 veh/h
	Freeway Volume, V_F: 6621	
	Ramp Volume, V_R: 388	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6621	0.92	Grade	6	0	0.971	1.00	7413
Ramp	388	0.92	Level	6	0	0.971	1.00	434
UpStream								
DownStream	1359	0.92	Level	6	0	0.971	1.00	1521

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.555 using Equation 9 (Exhibit 13-7)

V_{12} = 4305 pc/h

V_3 or V_{av34} 3108 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 4713 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7413	Exhibit 13-8	7050	Yes
$V_{FO} = V_F - V_R$	6979	Exhibit 13-8	7050	No
V_R	434	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4305	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 37.6 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.467 (Exhibit 13-12)

S_R= 54.3 mph (Exhibit 13-12)

S_0= 64.7 mph (Exhibit 13-12)

S = 57.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1155 ft
V_u = veh/h	Deceleration Lane Length L_D: 650	V_D = 911 veh/h
	Freeway Volume, V_F: 3737	
	Ramp Volume, V_R: 324	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3737	0.92	Level	5	0	0.976	1.00	4164
Ramp	324	0.92	Level	5	0	0.976	1.00	361
UpStream								
DownStream	911	0.92	Level	5	0	0.976	1.00	1015

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2019 pc/h

V_3 or V_{av34} 1072 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4164	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3803	Exhibit 13-8	9400	No
V_R	361	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2019	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 15.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.460 (Exhibit 13-12)

S_R= 54.4 mph (Exhibit 13-12)

S_0= 71.0 mph (Exhibit 13-12)

S = 61.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 5:31 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3420 ft
V_u = 388 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	485
Deceleration Lane Length L_D	
Freeway Volume, V_F	6233
Ramp Volume, V_R	1359
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6233	0.92	Level	6	0	0.971	1.00	6978
Ramp	1359	0.92	Level	6	0	0.971	1.00	1521
UpStream	388	0.92	Level	6	0	0.971	1.00	434
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = 1462.33 (Equation 13-6 or 13-7)
P_{FM} = 0.591 using Equation 3 (Exhibit 13-6)
V_{12} = 4125 pc/h
V_3 or V_{av34} = 2853 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 4278 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8499	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5799	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = 47.0 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.574 (Exibit 13-11)
S_R = 28.8 mph (Exhibit 13-11)
S_0 = 56.1 mph (Exhibit 13-11)
S = 34.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Loop Off-ramp
Date Performed	Ex+P PM Peak - 01 - WB SR-4	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	320
Freeway Volume, V_F	3413
Ramp Volume, V_R	911
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1265 ft
V_D = 393 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3413	0.92	Level	5	0	0.976	1.00	3803
Ramp	911	0.92	Level	5	0	0.976	1.00	1015
UpStream								
DownStream	393	0.92	Level	5	0	0.976	1.00	438

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2231 pc/h
V_3 or V_{av34} 786 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3803	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2788	Exhibit 13-8	9400	No
V_R	1015	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2231	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 20.6 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.519 (Exhibit 13-12)
S_R= 53.1 mph (Exhibit 13-12)
S_0= 71.3 mph (Exhibit 13-12)
S = 59.3 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1360 ft
V_u = veh/h	Deceleration Lane Length L_D: 475	V_D = 211 veh/h
	Freeway Volume, V_F: 6511	
	Ramp Volume, V_R: 1624	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6511	0.92	Level	6	0	0.971	1.00	7289
Ramp	1624	0.92	Level	6	0	0.971	1.00	1818
UpStream								
DownStream	211	0.92	Level	6	0	0.971	1.00	236

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 4203 pc/h

V_3 or V_{av34} 1543 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7289	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5471	Exhibit 13-8	9400	No
V_R	1818	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4203	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 36.1 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

D_s = 0.592 (Exhibit 13-12)

S_R= 51.4 mph (Exhibit 13-12)

S_0= 69.2 mph (Exhibit 13-12)

S = 57.7 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1265 ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	415
Deceleration Lane Length L_D	
Freeway Volume, V_F	2502
Ramp Volume, V_R	393
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2502	0.92	Level	5	0	0.976	1.00	2788
Ramp	393	0.92	Level	5	0	0.976	1.00	438
UpStream		0.92	Level	5	0	0.976	1.00	1721
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.163 using Equation 0 (Exhibit 13-6)
V_{12} = 455 pc/h
V_3 or V_{av34} = 1166 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 1115 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3226	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1553	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 14.8 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.310 (Exibit 13-11)
S_R = 57.9 mph (Exhibit 13-11)
S_0 = 63.8 mph (Exhibit 13-11)
S = 60.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 106 veh/h
	Freeway Volume, V_F: 4887	
	Ramp Volume, V_R: 211	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4887	0.92	Level	6	0	0.971	1.00	5471
Ramp	211	0.92	Level	6	0	0.971	1.00	236
UpStream								
DownStream	106	0.92	Level	6	0	0.971	1.00	119

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)

V_{12} = 3228 pc/h

V_3 or V_{av34} = 2243 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3228 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5707	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3464	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 29.6 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.414 (Exibit 13-11)

S_R = 55.5 mph (Exhibit 13-11)

S_0 = 58.7 mph (Exhibit 13-11)

S = 56.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	WB SR-4
Junction	San Marco Blvd Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	685
Freeway Volume, V_F	3909
Ramp Volume, V_R	420
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1520 ft
V_D = 350 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3909	0.92	Level	6	0	0.971	1.00	4376
Ramp	420	0.92	Level	6	0	0.971	1.00	470
UpStream								
DownStream	350	0.92	Level	6	0	0.971	1.00	392

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2173 pc/h
V_3 or V_{av34} 1101 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4376	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3906	Exhibit 13-8	9400	No
V_R	470	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2173	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = 16.8 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.470 (Exhibit 13-12)
S_R= 54.2 mph (Exhibit 13-12)
S_0= 70.9 mph (Exhibit 13-12)
S = 61.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1300 ft
V_u = 211 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1000
Deceleration Lane Length L_D	
Freeway Volume, V_F	5098
Ramp Volume, V_R	
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5098	0.92	Level	6	0	0.971	1.00	5708
Ramp		0.92	Level	6	0	0.971	1.00	122
UpStream	211	0.92	Level	6	0	0.971	1.00	236
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.605 using Equation 3 (Exhibit 13-6)
V_{12} = 3456 pc/h
V_3 or V_{av34} = 2252 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 3456 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5830	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3578	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 27.1 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.391 (Exibit 13-11)
S_R = 56.0 mph (Exhibit 13-11)
S_0 = 58.7 mph (Exhibit 13-11)
S = 57.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 380	L_{down} = 1270 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 459 veh/h
	Freeway Volume, V_F: 3489	
	Ramp Volume, V_R: 350	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3489	0.92	Level	6	0	0.971	1.00	3906
Ramp	350	0.92	Level	6	0	0.971	1.00	392
UpStream								
DownStream	459	0.92	Level	6	0	0.971	1.00	514

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.169 using Equation 0 (Exhibit 13-6)

V_{12} = 659 pc/h

V_3 or V_{av34} = 1623 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1562 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4298	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1954	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.322 (Exibit 13-11)

S_R = 57.6 mph (Exhibit 13-11)

S_0 = 62.6 mph (Exhibit 13-11)

S = 60.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1410 ft
V_u = veh/h	Deceleration Lane Length L_D: 570	V_D = 623 veh/h
	Freeway Volume, V_F: 5569	
	Ramp Volume, V_R:	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5569	0.92	Level	6	0	0.971	1.00	6235
Ramp		0.92	Level	6	0	0.971	1.00	828
UpStream								
DownStream	623	0.92	Level	6	0	0.971	1.00	697

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3185 pc/h

V_3 or V_{av34} 1525 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6235	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5407	Exhibit 13-8	9400	No
V_R	828	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3185	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.503 (Exhibit 13-12)

S_R= 53.4 mph (Exhibit 13-12)

S_0= 69.3 mph (Exhibit 13-12)

S = 60.2 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1270 ft	Acceleration Lane Length, L_A: 950	L_{down} = ft
V_u = 350 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3839	
	Ramp Volume, V_R: 459	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3839	0.92	Level	6	0	0.971	1.00	4298
Ramp	459	0.92	Level	6	0	0.971	1.00	514
UpStream	350	0.92	Level	6	0	0.971	1.00	392
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.154 using Equation 0 (Exhibit 13-6)

V_{12} = 660 pc/h

V_3 or V_{av34} = 1819 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1719 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4812	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2233	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.291 (Exibit 13-11)

S_R = 58.3 mph (Exhibit 13-11)

S_0 = 62.2 mph (Exhibit 13-11)

S = 60.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1310 ft
V_u = veh/h	Deceleration Lane Length L_D: 285	V_D = 1207 veh/h
	Freeway Volume, V_F: 5017	
	Ramp Volume, V_R: 623	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5017	0.92	Level	6	0	0.971	1.00	5617
Ramp	623	0.92	Level	6	0	0.971	1.00	697
UpStream								
DownStream	1207	0.92	Level	6	0	0.971	1.00	1351

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2842 pc/h

V_3 or V_{av34} 1387 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5617	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4920	Exhibit 13-8	9400	No
V_R	697	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2842	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.491 (Exhibit 13-12)

S_R= 53.7 mph (Exhibit 13-12)

S_0= 69.8 mph (Exhibit 13-12)

S = 60.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3055 ft
V_u = veh/h	Deceleration Lane Length L_D: 700	V_D = 472 veh/h
	Freeway Volume, V_F: 4556	
	Ramp Volume, V_R: 411	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4556	0.92	Level	6	0	0.971	1.00	5101
Ramp	411	0.92	Level	6	0	0.971	1.00	460
UpStream								
DownStream	472	0.92	Level	6	0	0.971	1.00	528

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2261 pc/h

V_3 or V_{av34} 1165 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4591	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4131	Exhibit 13-8	9400	No
V_R	460	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2261	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 17.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.469 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 70.7 mph (Exhibit 13-12)

S = 61.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 5:49 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1310 ft	Acceleration Lane Length, L_A: 400	L_{down} = ft
V_u = 623 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4394	
	Ramp Volume, V_R: 1207	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4394	0.92	Level	6	0	0.971	1.00	4919
Ramp	1207	0.92	Level	6	0	0.971	1.00	1351
UpStream	623	0.92	Level	6	0	0.971	1.00	697
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 947.58 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)

V_{12} = 2896 pc/h

V_3 or V_{av34} = 2023 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2896 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6270	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4247	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 35.5 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.566 (Exibit 13-11)

S_R = 52.0 mph (Exhibit 13-11)

S_0 = 59.5 mph (Exhibit 13-11)

S = 54.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Existing (2017) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 3055 ft	Acceleration Lane Length, L_A: 450	L_{down} = ft
V_u = 411 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4145	
	Ramp Volume, V_R: 472	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4145	0.92	Level	6	0	0.971	1.00	4641
Ramp	472	0.92	Level	6	0	0.971	1.00	528
UpStream	411	0.92	Level	6	0	0.971	1.00	460
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.152 using Equation 0 (Exhibit 13-6)

V_{12} = 705 pc/h

V_3 or V_{av34} = 1968 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1856 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5169	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2384	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.332 (Exibit 13-11)

S_R = 57.4 mph (Exhibit 13-11)

S_0 = 61.8 mph (Exhibit 13-11)

S = 59.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

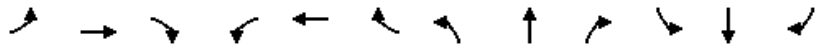
Copyright © 2014 University of Florida, All Rights Reserved

Interim Baseline (2035) Traffic Conditions

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	882	297	621	343	13	736
Future Volume (veh/h)	882	297	621	343	13	736
Number	1	16	8	18	7	4
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	1765	1765	1765	1800	1765	1765
Adj Flow Rate, veh/h	938	316	661	365	14	783
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1178	542	743	410	40	1532
Arrive On Green	0.36	0.36	0.36	0.36	0.02	0.46
Sat Flow, veh/h	3261	1500	2174	1152	1681	3441
Grp Volume(v), veh/h	938	316	531	495	14	783
Grp Sat Flow(s),veh/h/ln	1630	1500	1676	1561	1681	1676
Q Serve(g_s), s	18.5	12.2	21.4	21.4	0.6	11.8
Cycle Q Clear(g_c), s	18.5	12.2	21.4	21.4	0.6	11.8
Prop In Lane	1.00	1.00		0.74	1.00	
Lane Grp Cap(c), veh/h	1178	542	597	556	40	1532
V/C Ratio(X)	0.80	0.58	0.89	0.89	0.35	0.51
Avail Cap(c_a), veh/h	1345	619	609	567	376	2226
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.5	18.5	21.7	21.7	34.4	13.8
Incr Delay (d2), s/veh	3.6	1.8	14.9	15.8	5.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	10.5	12.4	11.7	0.3	5.5
LnGrp Delay(d),s/veh	24.0	20.3	36.6	37.5	39.5	14.0
LnGrp LOS	C	C	D	D	D	B
Approach Vol, veh/h	1254		1026			797
Approach Delay, s/veh	23.1		37.0			14.5
Approach LOS	C		D			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				38.7		32.8	7.2	31.5
Change Period (Y+Rc), s				6.0		7.0	5.5	6.0
Max Green Setting (Gmax), s				47.5		29.5	16.0	26.0
Max Q Clear Time (g_c+I1), s				13.8		20.5	2.6	23.4
Green Ext Time (p_c), s				14.0		5.4	0.0	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	2	226	0	0	0	0	419	499	77	523	0
Future Volume (veh/h)	184	2	226	0	0	0	0	419	499	77	523	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		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1765				0	1765	1765	1765	1765	0
Adj Flow Rate, veh/h	202	2	0				0	460	0	85	575	0
Adj No. of Lanes	0	1	1				0	2	1	1	2	0
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	286	3	257				0	904	404	178	1711	0
Arrive On Green	0.17	0.17	0.00				0.00	0.27	0.00	0.11	0.51	0.00
Sat Flow, veh/h	1665	16	1500				0	3441	1500	1681	3441	0
Grp Volume(v), veh/h	204	0	0				0	460	0	85	575	0
Grp Sat Flow(s),veh/h/ln	1681	0	1500				0	1676	1500	1681	1676	0
Q Serve(g_s), s	4.7	0.0	0.0				0.0	4.7	0.0	1.9	4.1	0.0
Cycle Q Clear(g_c), s	4.7	0.0	0.0				0.0	4.7	0.0	1.9	4.1	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	289	0	257				0	904	404	178	1711	0
V/C Ratio(X)	0.71	0.00	0.00				0.00	0.51	0.00	0.48	0.34	0.00
Avail Cap(c_a), veh/h	659	0	587				0	1395	624	350	2544	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.0	0.0	0.0				0.0	12.6	0.0	17.2	5.9	0.0
Incr Delay (d2), s/veh	5.4	0.0	0.0				0.0	0.4	0.0	2.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.0				0.0	2.2	0.0	1.0	1.9	0.0
LnGrp Delay(d),s/veh	21.3	0.0	0.0				0.0	13.1	0.0	19.2	6.0	0.0
LnGrp LOS	C							B		B	A	
Approach Vol, veh/h		204						460			660	
Approach Delay, s/veh		21.3						13.1			7.7	
Approach LOS		C						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		14.0		26.8			9.8	17.0
Change Period (Y+Rc), s		7.0		6.0			5.5	6.0
Max Green Setting (Gmax), s		16.0		31.0			8.5	17.0
Max Q Clear Time (g_c+I1), s		6.7		6.1			3.9	6.7
Green Ext Time (p_c), s		1.1		6.4			0.1	4.3

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	365	144	117	320	283	0	0	235	1870
Future Volume (vph)	0	0	0	365	144	117	320	283	0	0	235	1870
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.99	1.00	1.00			1.00	0.99
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1593	1640	1479	1676	3353			3353	1481
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1593	1640	1479	1676	3353			3353	1481
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	372	147	119	327	289	0	0	240	1908
RTOR Reduction (vph)	0	0	0	0	0	55	0	0	0	0	0	46
Lane Group Flow (vph)	0	0	0	257	262	64	327	289	0	0	240	1862
Confl. Peds. (#/hr)							1		1	1		1
Confl. Bikes (#/hr)						1						
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				1	1		3	8			4	
Permitted Phases						1						4
Actuated Green, G (s)				18.0	18.0	18.0	19.5	119.0			94.0	94.0
Effective Green, g (s)				18.0	18.0	18.0	19.5	119.0			94.0	94.0
Actuated g/C Ratio				0.12	0.12	0.12	0.13	0.79			0.63	0.63
Clearance Time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Vehicle Extension (s)				4.5	4.5	4.5	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				191	196	177	217	2660			2101	928
v/s Ratio Prot				c0.16	0.16		c0.20	0.09			0.07	
v/s Ratio Perm						0.04						c1.26
v/c Ratio				1.35	1.34	0.36	1.51	0.11			0.11	2.01
Uniform Delay, d1				66.0	66.0	60.7	65.2	3.5			11.3	28.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				186.2	181.9	2.2	250.6	0.0			0.0	456.6
Delay (s)				252.2	247.9	62.9	315.8	3.5			11.3	484.6
Level of Service				F	F	E	F	A			B	F
Approach Delay (s)		0.0			215.1			169.3			431.7	
Approach LOS		A			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	343.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	171.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	32.3
Intersection LOS	D

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	243	21	44	0	2	44	41	0	95	16	0	0	12	8	362
Future Vol, veh/h	0	243	21	44	0	2	44	41	0	95	16	0	0	12	8	362
Peak Hour Factor	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	374	32	68	0	3	68	63	0	146	25	0	0	18	12	557
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

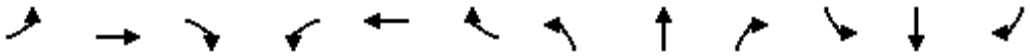
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	62.6	13.7	16.6	16.7
HCM LOS	F	B	C	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	79%	2%	100%	0%	0%
Vol Thru, %	0%	100%	7%	51%	0%	4%	0%
Vol Right, %	0%	0%	14%	47%	0%	96%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	16	308	87	12	185	185
LT Vol	95	0	243	2	12	0	0
Through Vol	0	16	21	44	0	8	0
RT Vol	0	0	44	41	0	177	185
Lane Flow Rate	146	25	474	134	18	285	284
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.374	0.059	0.977	0.288	0.041	0.533	0.528
Departure Headway (Hd)	9.2	8.677	7.422	7.737	7.929	6.723	6.692
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	390	411	488	462	450	533	537
Service Time	6.992	6.468	5.181	5.52	5.696	4.489	4.458
HCM Lane V/C Ratio	0.374	0.061	0.971	0.29	0.04	0.535	0.529
HCM Control Delay	17.4	12	62.6	13.7	11	17	16.8
HCM Lane LOS	C	B	F	B	B	C	C
HCM 95th-tile Q	1.7	0.2	12.6	1.2	0.1	3.1	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	422	4	20	7	2	34	11	286	3	8	355	154
Future Volume (veh/h)	422	4	20	7	2	34	11	286	3	8	355	154
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	586	6	28	10	3	47	15	397	4	11	493	214
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	616	100	465	15	5	71	30	953	10	11	614	265
Arrive On Green	0.37	0.37	0.37	0.06	0.06	0.06	0.02	0.28	0.28	0.01	0.27	0.27
Sat Flow, veh/h	1681	272	1268	256	77	1202	1681	3400	34	1681	2279	984
Grp Volume(v), veh/h	586	0	34	60	0	0	15	196	205	11	362	345
Grp Sat Flow(s),veh/h/ln	1681	0	1540	1534	0	0	1681	1676	1758	1681	1676	1587
Q Serve(g_s), s	26.1	0.0	1.1	2.9	0.0	0.0	0.7	7.3	7.3	0.5	15.5	15.6
Cycle Q Clear(g_c), s	26.1	0.0	1.1	2.9	0.0	0.0	0.7	7.3	7.3	0.5	15.5	15.6
Prop In Lane	1.00		0.82	0.17		0.78	1.00		0.02	1.00		0.62
Lane Grp Cap(c), veh/h	616	0	565	91	0	0	30	470	493	11	452	428
V/C Ratio(X)	0.95	0.00	0.06	0.66	0.00	0.00	0.50	0.42	0.42	0.96	0.80	0.81
Avail Cap(c_a), veh/h	777	0	712	478	0	0	109	542	568	74	507	480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.7	0.0	15.8	35.5	0.0	0.0	37.5	22.6	22.6	38.2	26.2	26.3
Incr Delay (d2), s/veh	17.4	0.0	0.0	3.0	0.0	0.0	4.7	0.6	0.6	65.2	8.1	8.9
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	15.0	0.0	0.5	1.3	0.0	0.0	0.4	3.4	3.6	0.4	8.2	7.9
LnGrp Delay(d),s/veh	41.1	0.0	15.8	38.5	0.0	0.0	42.2	23.2	23.1	103.5	34.3	35.2
LnGrp LOS	D		B	D			D	C	C	F	C	D
Approach Vol, veh/h		620			60			416			718	
Approach Delay, s/veh		39.7			38.5			23.8			35.8	
Approach LOS		D			D			C			D	

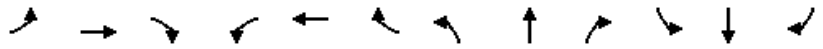
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	28.0		33.8	5.9	27.1		10.2
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	3.4	24.9		35.6	5.0	23.3		24.0
Max Q Clear Time (g_c+I1), s	2.5	9.3		28.1	2.7	17.6		4.9
Green Ext Time (p_c), s	0.0	5.8		0.1	0.0	3.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	34.5
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	317	186	212	274	805	821	125	567	177	269	252	461
Future Volume (vph)	317	186	212	274	805	821	125	567	177	269	252	461
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	6.0	6.0	5.5	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	3085		1676	3353	833	3252	3353	1480	3252	2999	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	3085		1676	3353	833	3252	3353	1480	3252	2999	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	369	216	247	319	936	955	145	659	206	313	293	536
RTOR Reduction (vph)	0	161	0	0	0	0	0	0	103	0	267	0
Lane Group Flow (vph)	369	302	0	319	936	955	145	659	103	313	562	0
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						Free			8			
Actuated Green, G (s)	27.1	34.8		26.7	34.4	124.6	8.1	26.6	26.6	12.5	31.0	
Effective Green, g (s)	27.1	34.8		26.7	34.4	124.6	8.1	26.6	26.6	12.5	31.0	
Actuated g/C Ratio	0.22	0.28		0.21	0.28	1.00	0.07	0.21	0.21	0.10	0.25	
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	6.0	6.0	5.5	6.0	
Vehicle Extension (s)	3.0	4.5		3.0	4.5		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	364	861		359	925	833	211	715	315	326	746	
v/s Ratio Prot	0.22	0.10		0.19	0.28		0.04	0.20		0.10	0.19	
v/s Ratio Perm						c1.15			0.07			
v/c Ratio	1.01	0.35		0.89	1.01	1.15	0.69	0.92	0.33	0.96	0.75	
Uniform Delay, d1	48.8	35.9		47.5	45.1	62.3	57.0	48.0	41.4	55.8	43.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	50.7	0.4		22.3	32.6	79.9	9.0	17.3	0.6	39.1	4.3	
Delay (s)	99.4	36.3		69.9	77.7	142.2	66.0	65.3	42.0	94.9	47.6	
Level of Service	F	D		E	E	F	E	E	D	F	D	
Approach Delay (s)		64.3			104.4			60.7			60.6	
Approach LOS		E			F			E			E	

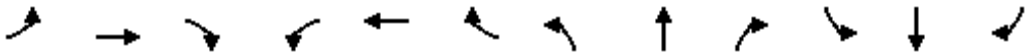
Intersection Summary			
HCM 2000 Control Delay	79.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	124.6	Sum of lost time (s)	24.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	339	0	675	0	0	0	0	1342	363	0	307	285
Future Volume (veh/h)	339	0	675	0	0	0	0	1342	363	0	307	285
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	373	0	742				0	1475	399	0	337	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	1333	0	613				0	1623	436	0	1439	644
Arrive On Green	0.41	0.00	0.41				0.00	0.43	0.43	0.00	0.43	0.00
Sat Flow, veh/h	3261	0	1500				0	3939	1015	0	3441	1500
Grp Volume(v), veh/h	373	0	742				0	1252	622	0	337	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1584	0	1676	1500
Q Serve(g_s), s	5.0	0.0	26.5				0.0	23.6	23.9	0.0	4.1	0.0
Cycle Q Clear(g_c), s	5.0	0.0	26.5				0.0	23.6	23.9	0.0	4.1	0.0
Prop In Lane	1.00		1.00				0.00		0.64	0.00		1.00
Lane Grp Cap(c), veh/h	1333	0	613				0	1379	680	0	1439	644
V/C Ratio(X)	0.28	0.00	1.21				0.00	0.91	0.92	0.00	0.23	0.00
Avail Cap(c_a), veh/h	1333	0	613				0	1387	684	0	1448	648
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	12.8	0.0	19.2				0.0	17.3	17.4	0.0	11.7	0.0
Incr Delay (d2), s/veh	0.1	0.0	109.2				0.0	9.0	17.0	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	29.3				0.0	12.0	13.6	0.0	1.9	0.0
LnGrp Delay(d),s/veh	12.9	0.0	128.3				0.0	26.3	34.4	0.0	11.8	0.0
LnGrp LOS	B		F					C	C		B	
Approach Vol, veh/h		1115						1874			337	
Approach Delay, s/veh		89.7						29.0			11.8	
Approach LOS		F						C			B	

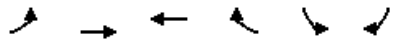
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		33.8		31.0		33.8		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		28.0		26.5		28.0		
Max Q Clear Time (g_c+I1), s		25.9		28.5		6.1		
Green Ext Time (p_c), s		1.9		0.0		15.6		

Intersection Summary	
HCM 2010 Ctrl Delay	47.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	451	93	307	101	534	333	0	0	1790	408
Future Volume (vph)	35	0	451	93	307	101	534	333	0	0	1790	408
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			*0.50	
Frpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.97	
Flt Protected	0.95		1.00		0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3252		1500		1744	1500	1676	4818			3418	
Flt Permitted	0.51		1.00		0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1753		1500		1744	1500	1676	4818			3418	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	38	0	485	100	330	109	574	358	0	0	1925	439
RTOR Reduction (vph)	0	0	449	0	0	66	0	0	0	0	14	0
Lane Group Flow (vph)	38	0	36	0	430	43	574	358	0	0	2350	0
Confl. Bikes (#/hr)												1
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	10.3		10.3		32.0	32.0	34.0	85.1			47.1	
Effective Green, g (s)	10.3		10.3		32.0	32.0	34.0	85.1			47.1	
Actuated g/C Ratio	0.07		0.07		0.23	0.23	0.24	0.61			0.34	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	128		110		397	341	405	2920			1146	
v/s Ratio Prot					c0.25		c0.34	0.07			c0.69	
v/s Ratio Perm	0.02		c0.02			0.03						
v/c Ratio	0.30		0.32		1.08	0.13	1.42	0.12			2.05	
Uniform Delay, d1	61.6		61.7		54.2	43.1	53.2	11.8			46.6	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.9		1.2		69.3	0.1	201.8	0.0			475.8	
Delay (s)	62.6		63.0		123.5	43.2	255.0	11.8			522.5	
Level of Service	E		E		F	D	F	B			F	
Approach Delay (s)		63.0			107.2			161.6			522.5	
Approach LOS		E			F			F			F	

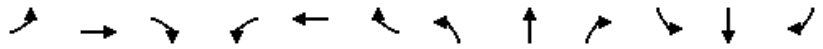
Intersection Summary			
HCM 2000 Control Delay	338.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	140.4	Sum of lost time (s)	17.0
Intersection Capacity Utilization	105.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	201	275	1417	428	256	601
Future Volume (veh/h)	201	275	1417	428	256	601
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	218	299	1540	465	278	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	317	2434	1903	1057	495	228
Arrive On Green	0.10	0.73	0.57	0.57	0.15	0.00
Sat Flow, veh/h	3261	3441	3441	1461	3261	1500
Grp Volume(v), veh/h	218	299	1540	465	278	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1461	1630	1500
Q Serve(g_s), s	4.2	1.8	24.0	8.6	5.2	0.0
Cycle Q Clear(g_c), s	4.2	1.8	24.0	8.6	5.2	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	317	2434	1903	1057	495	228
V/C Ratio(X)	0.69	0.12	0.81	0.44	0.56	0.00
Avail Cap(c_a), veh/h	498	2767	2050	1121	1395	642
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.6	2.7	11.3	3.8	25.7	0.0
Incr Delay (d2), s/veh	2.7	0.0	2.4	0.3	1.0	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	2.0	0.8	11.5	5.4	2.4	0.0
LnGrp Delay(d),s/veh	31.3	2.7	13.7	4.1	26.7	0.0
LnGrp LOS	C	A	B	A	C	
Approach Vol, veh/h		517	2005		278	
Approach Delay, s/veh		14.8	11.5		26.7	
Approach LOS		B	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				51.5		13.9	10.4	41.1
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				54.0		28.0	10.0	40.0
Max Q Clear Time (g_c+I1), s				3.8		7.2	6.2	26.0
Green Ext Time (p_c), s				27.0		0.9	0.2	11.1

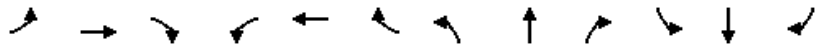
Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	318	166	327	1748	5	395	15	231	9	17	9
Future Volume (veh/h)	5	318	166	327	1748	5	395	15	231	9	17	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	5	338	177	348	1860	5	420	16	246	10	18	10
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	11	454	232	362	1448	4	296	700	592	20	247	137
Arrive On Green	0.01	0.21	0.21	0.22	0.42	0.42	0.18	0.40	0.40	0.01	0.23	0.23
Sat Flow, veh/h	1681	2130	1091	1681	3430	9	1681	1765	1492	1681	1063	591
Grp Volume(v), veh/h	5	264	251	348	909	956	420	16	246	10	0	28
Grp Sat Flow(s),veh/h/ln	1681	1676	1544	1681	1676	1763	1681	1765	1492	1681	0	1654
Q Serve(g_s), s	0.4	19.2	19.8	26.6	54.9	54.9	22.9	0.7	15.5	0.8	0.0	1.7
Cycle Q Clear(g_c), s	0.4	19.2	19.8	26.6	54.9	54.9	22.9	0.7	15.5	0.8	0.0	1.7
Prop In Lane	1.00		0.71	1.00		0.01	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	11	357	329	362	708	744	296	700	592	20	0	384
V/C Ratio(X)	0.47	0.74	0.76	0.96	1.28	1.29	1.42	0.02	0.42	0.51	0.00	0.07
Avail Cap(c_a), veh/h	65	406	374	362	708	744	296	700	592	65	0	384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	1.00	1.00	1.00	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	64.4	47.8	48.1	50.5	37.6	37.6	53.5	23.9	28.3	63.9	0.0	39.0
Incr Delay (d2), s/veh	28.3	5.2	6.7	37.1	138.5	138.5	206.8	0.1	2.1	19.0	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	9.4	9.1	16.1	52.6	55.3	27.6	0.4	6.7	0.5	0.0	0.8
LnGrp Delay(d),s/veh	92.7	53.0	54.8	87.6	176.1	176.1	260.4	23.9	30.4	82.9	0.0	39.3
LnGrp LOS	F	D	D	F	F	F	F	C	C	F		D
Approach Vol, veh/h		520			2213			682			38	
Approach Delay, s/veh		54.2			162.2			171.9			50.8	
Approach LOS		D			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	57.1	33.1	33.2	28.0	35.7	5.9	60.4
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	5.0	44.3	28.0	31.5	22.9	26.4	5.0	54.5
Max Q Clear Time (g_c+I1), s	2.4	17.5	28.6	21.8	24.9	3.7	2.4	56.9
Green Ext Time (p_c), s	0.0	0.7	0.0	5.9	0.0	0.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	146.6
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	411	46	18	1704	4	66	11	119	39	24	31
Future Volume (veh/h)	4	411	46	18	1704	4	66	11	119	39	24	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	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	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	419	47	18	1739	4	67	11	121	40	24	32
Adj No. of Lanes	1	1	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	889	100	20	1997	5	78	13	141	69	42	55
Arrive On Green	0.00	0.57	0.57	0.01	0.58	0.58	0.15	0.15	0.15	0.10	0.10	0.10
Sat Flow, veh/h	1681	1554	174	1681	3432	8	521	86	941	667	400	534
Grp Volume(v), veh/h	4	0	466	18	849	894	199	0	0	96	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1728	1681	1676	1763	1548	0	0	1602	0	0
Q Serve(g_s), s	0.2	0.0	15.6	1.1	42.3	42.4	12.4	0.0	0.0	5.6	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	15.6	1.1	42.3	42.4	12.4	0.0	0.0	5.6	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.00	0.34		0.61	0.42		0.33
Lane Grp Cap(c), veh/h	4	0	989	20	976	1026	232	0	0	166	0	0
V/C Ratio(X)	1.01	0.00	0.47	0.89	0.87	0.87	0.86	0.00	0.00	0.58	0.00	0.00
Avail Cap(c_a), veh/h	187	0	1069	187	1037	1091	251	0	0	260	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.2	0.0	12.4	48.6	17.5	17.5	40.9	0.0	0.0	42.1	0.0	0.0
Incr Delay (d2), s/veh	214.9	0.0	0.3	65.4	7.8	7.5	23.4	0.0	0.0	3.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.1	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	7.5	0.9	21.5	22.5	6.8	0.0	0.0	2.6	0.0	0.0
LnGrp Delay(d),s/veh	264.1	0.0	12.7	114.0	25.3	25.0	64.3	0.0	0.0	45.3	0.0	0.0
LnGrp LOS	F		B	F	C	C	E			D		
Approach Vol, veh/h		470			1761			199			96	
Approach Delay, s/veh		14.8			26.1			64.3			45.3	
Approach LOS		B			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		18.8	5.2	60.4		14.2	4.2	61.4
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	61.0		16.0	11.0	61.0
Max Q Clear Time (g_c+I1), s		14.4	3.1	17.6		7.6	2.2	44.4
Green Ext Time (p_c), s		0.2	0.0	25.8		0.3	0.0	13.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	196	1	41	0	0	0	0	65	14	5	111	0
Future Vol, veh/h	196	1	41	0	0	0	0	65	14	5	111	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	242	1	51	0	0	0	0	80	17	6	137	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	229	229	137	-	0	0	80	0	0
Stage 1	149	149	-	-	-	-	-	-	-
Stage 2	80	80	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	759	671	911	0	-	-	1518	-	0
Stage 1	879	774	-	0	-	-	-	-	0
Stage 2	943	828	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	756	0	911	-	-	-	1518	-	-
Mov Cap-2 Maneuver	756	0	-	-	-	-	-	-	-
Stage 1	875	0	-	-	-	-	-	-	-
Stage 2	943	0	-	-	-	-	-	-	-

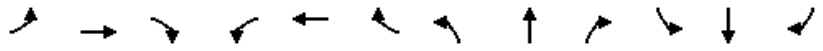
Approach	EB	NB	SB
HCM Control Delay, s	12.4	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	779	1518	-
HCM Lane V/C Ratio	-	-	0.377	0.004	-
HCM Control Delay (s)	-	-	12.4	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.8	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	21	240	116	643
Future Volume (Veh/h)	0	0	21	240	116	643
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	24	270	130	722
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	448	130	130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	448	130	130			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	559	920	1455			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	24	270	130	722
Volume Left	24	0	0	0
Volume Right	0	0	0	722
cSH	1455	1700	1700	1700
Volume to Capacity	0.02	0.16	0.08	0.42
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.6		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		



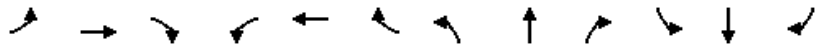
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	154	149	94	456	104	316	314	54	136	203	110
Future Volume (veh/h)	44	154	149	94	456	104	316	314	54	136	203	110
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		0.96	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	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	51	179	0	109	530	121	367	365	63	158	236	128
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	90	633	538	142	533	122	385	525	428	192	316	250
Arrive On Green	0.05	0.36	0.00	0.08	0.39	0.38	0.23	0.30	0.30	0.12	0.18	0.18
Sat Flow, veh/h	1681	1765	1500	1681	1380	315	1648	1731	1410	1648	1731	1370
Grp Volume(v), veh/h	51	179	0	109	0	651	367	365	63	158	236	128
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1695	1648	1731	1410	1648	1731	1370
Q Serve(g_s), s	3.5	8.4	0.0	7.4	0.0	44.6	25.6	21.7	3.8	10.9	15.0	9.8
Cycle Q Clear(g_c), s	3.5	8.4	0.0	7.4	0.0	44.6	25.6	21.7	3.8	10.9	15.0	9.8
Prop In Lane	1.00		1.00	1.00		0.19	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	633	538	142	0	655	385	525	428	192	316	250
V/C Ratio(X)	0.57	0.28	0.00	0.77	0.00	0.99	0.95	0.70	0.15	0.82	0.75	0.51
Avail Cap(c_a), veh/h	110	633	538	225	0	655	385	529	431	223	359	285
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.8	26.7	0.0	52.2	0.0	35.7	44.1	35.9	29.6	50.3	45.1	42.9
Incr Delay (d2), s/veh	5.5	0.2	0.0	8.3	0.0	33.7	34.0	3.9	0.2	19.2	7.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	4.2	0.0	3.8	0.0	26.9	15.3	10.9	1.5	6.0	7.9	3.8
LnGrp Delay(d),s/veh	59.3	26.9	0.0	60.6	0.0	69.4	78.1	39.8	29.8	69.5	52.4	44.6
LnGrp LOS	E	C		E		E	E	D	C	E	D	D
Approach Vol, veh/h		230			760			795			522	
Approach Delay, s/veh		34.1			68.1			56.7			55.6	
Approach LOS		C			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.2	25.7	10.3	49.4	17.5	39.3	13.9	45.8
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	26.6	* 24	7.0	* 44	15.2	34.6	15.0	36.0
Max Q Clear Time (g_c+I1), s	27.6	17.0	5.5	46.6	12.9	23.7	9.4	10.4
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.1	2.6	0.1	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	58.0
HCM 2010 LOS	E

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	667	54	65	1531	9	204	5	152	22	5	20
Future Volume (veh/h)	13	667	54	65	1531	9	204	5	152	22	5	20
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	15	776	63	76	1780	10	237	6	177	26	6	23
Adj No. of Lanes	1	2	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	1804	785	96	1955	11	267	328	279	58	20	76
Arrive On Green	0.02	0.54	0.54	0.06	0.57	0.57	0.16	0.19	0.19	0.03	0.06	0.06
Sat Flow, veh/h	1681	3353	1458	1681	3418	19	1681	1765	1500	1681	320	1228
Grp Volume(v), veh/h	15	776	63	76	872	918	237	6	177	26	0	29
Grp Sat Flow(s),veh/h/ln	1681	1676	1458	1681	1676	1761	1681	1765	1500	1681	0	1548
Q Serve(g_s), s	1.0	15.8	2.4	5.1	52.8	53.0	15.7	0.3	12.4	1.7	0.0	2.0
Cycle Q Clear(g_c), s	1.0	15.8	2.4	5.1	52.8	53.0	15.7	0.3	12.4	1.7	0.0	2.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	39	1804	785	96	959	1007	267	328	279	58	0	95
V/C Ratio(X)	0.38	0.43	0.08	0.79	0.91	0.91	0.89	0.02	0.64	0.45	0.00	0.30
Avail Cap(c_a), veh/h	103	1886	820	192	1032	1084	355	512	435	133	0	245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.8	15.8	12.7	53.0	21.7	21.8	46.9	37.8	42.8	53.9	0.0	51.1
Incr Delay (d2), s/veh	6.1	0.1	0.0	13.5	10.7	10.4	18.7	0.0	2.4	5.3	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	0.5	7.3	1.0	2.7	27.1	28.4	8.7	0.2	5.3	0.9	0.0	0.9
LnGrp Delay(d),s/veh	60.8	15.9	12.7	66.5	32.5	32.2	65.6	37.9	45.1	59.2	0.0	52.8
LnGrp LOS	E	B	B	E	C	C	E	D	D	E		D
Approach Vol, veh/h		854			1866			420			55	
Approach Delay, s/veh		16.4			33.7			56.6			55.8	
Approach LOS		B			C			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	67.2	23.1	12.0	7.6	71.1	8.9	26.1
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	13.0	64.0	24.0	18.0	7.0	70.0	9.0	33.0
Max Q Clear Time (g_c+I1), s	17.1	17.8	17.7	4.0	3.0	55.0	3.7	14.4
Green Ext Time (p_c), s	0.1	18.2	0.4	0.6	0.0	10.1	0.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	783	58	29	1328	277	173
Future Volume (veh/h)	783	58	29	1328	277	173
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	842	62	31	1428	298	186
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1425	105	80	1971	365	326
Arrive On Green	0.45	0.45	0.05	0.59	0.22	0.22
Sat Flow, veh/h	3246	232	1681	3441	1681	1500
Grp Volume(v), veh/h	447	457	31	1428	298	186
Grp Sat Flow(s),veh/h/ln	1676	1713	1681	1676	1681	1500
Q Serve(g_s), s	11.3	11.3	1.0	17.2	9.5	6.2
Cycle Q Clear(g_c), s	11.3	11.3	1.0	17.2	9.5	6.2
Prop In Lane		0.14	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	757	773	80	1971	365	326
V/C Ratio(X)	0.59	0.59	0.39	0.72	0.82	0.57
Avail Cap(c_a), veh/h	757	773	268	2259	477	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.6	11.6	26.1	8.3	21.0	19.7
Incr Delay (d2), s/veh	1.2	1.2	3.0	1.0	8.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	5.5	0.5	8.0	5.2	2.7
LnGrp Delay(d),s/veh	12.8	12.8	29.1	9.4	29.2	21.3
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	904			1459	484	
Approach Delay, s/veh	12.8			9.8	26.2	
Approach LOS	B			A	C	

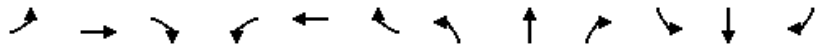
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.7	31.5				39.2		17.3
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	9.0	24.0				38.0		16.0
Max Q Clear Time (g_c+I1), s	3.0	13.3				19.2		11.5
Green Ext Time (p_c), s	0.0	9.2				13.9		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	13.5
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	902	54	125	1175	182	500
Future Volume (vph)	902	54	125	1175	182	500
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	3309		1676	3353	1554	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	3309		1676	3353	1554	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1037	62	144	1351	209	575
RTOR Reduction (vph)	3	0	0	0	66	0
Lane Group Flow (vph)	1096	0	144	1351	718	0
Confl. Peds. (#/hr)		14	14		1	1
Confl. Bikes (#/hr)		2				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	44.0		10.0	85.0	55.0	
Effective Green, g (s)	45.0		10.6	85.6	55.6	
Actuated g/C Ratio	0.30		0.07	0.57	0.37	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	992		118	1913	576	
v/s Ratio Prot	c0.33		c0.09	c0.40	c0.46	
v/s Ratio Perm						
v/c Ratio	1.11		1.22	0.71	1.25	
Uniform Delay, d1	52.5		69.7	23.2	47.2	
Progression Factor	1.00		1.28	0.54	1.00	
Incremental Delay, d2	61.9		151.4	1.1	124.9	
Delay (s)	114.4		240.9	13.7	172.1	
Level of Service	F		F	B	F	
Approach Delay (s)	114.4			35.6	172.1	
Approach LOS	F			D	F	

Intersection Summary			
HCM 2000 Control Delay	92.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.2
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)	409	435	670	292	1198	738	145	424	88	304	491	189
Future Volume (veh/h)	409	435	670	292	1198	738	145	424	88	304	491	189
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1731	1731	1800	1731	1731	1731
Adj Flow Rate, veh/h	454	483	744	324	1331	820	161	471	98	338	546	210
Adj No. of Lanes	2	2	1	1	2	1	1	2	0	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	426	901	375	363	1186	509	127	771	159	344	546	459
Arrive On Green	0.13	0.27	0.26	0.22	0.35	0.35	0.08	0.28	0.27	0.18	0.53	0.53
Sat Flow, veh/h	3261	3353	1456	1681	3353	1437	1648	2708	560	3198	1731	1454
Grp Volume(v), veh/h	454	483	744	324	1331	820	161	285	284	338	546	210
Grp Sat Flow(s),veh/h/ln	1630	1676	1456	1681	1676	1437	1648	1644	1623	1599	1731	1454
Q Serve(g_s), s	17.0	16.0	33.4	24.3	46.0	46.0	10.0	19.5	19.8	13.7	41.0	11.7
Cycle Q Clear(g_c), s	17.0	16.0	33.4	24.3	46.0	46.0	10.0	19.5	19.8	13.7	41.0	11.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	426	901	375	363	1186	509	127	468	462	344	546	459
V/C Ratio(X)	1.06	0.54	1.99	0.89	1.12	1.61	1.27	0.61	0.62	0.98	1.00	0.46
Avail Cap(c_a), veh/h	426	901	375	427	1186	509	127	468	462	344	546	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	0.99	0.99	0.99	0.09	0.09	0.09	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	56.5	40.6	48.3	49.5	42.0	42.0	60.0	40.2	40.6	53.2	30.8	23.8
Incr Delay (d2), s/veh	61.6	0.4	453.1	2.2	56.1	276.4	169.3	5.8	6.0	40.2	36.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	7.4	60.6	11.6	30.5	57.3	10.5	9.6	9.6	7.9	24.7	5.0
LnGrp Delay(d),s/veh	118.1	41.0	501.4	51.7	98.1	318.4	229.3	46.0	46.6	93.4	66.8	26.7
LnGrp LOS	F	D	F	D	F	F	F	D	D	F	F	C
Approach Vol, veh/h		1681			2475			730			1094	
Approach Delay, s/veh		265.6			165.0			86.7			67.3	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	41.0	32.1	38.9	14.0	45.0	21.0	50.0
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	12.9	35.5	31.9	28.5	8.9	39.5	15.9	44.5
Max Q Clear Time (g_c+I1), s	15.7	21.8	26.3	35.4	12.0	43.0	19.0	48.0
Green Ext Time (p_c), s	0.0	3.5	0.6	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	165.8
HCM 2010 LOS	F

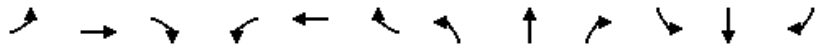
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	20	147	36	25	66	175	1381	15	16	801	258
Future Volume (vph)	154	20	147	36	25	66	175	1381	15	16	801	258
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1613	1466	1676	1574		1644	3282		1644	4205	
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1613	1466	1676	1574		1644	3282		1644	4205	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	164	21	156	38	27	70	186	1469	16	17	852	274
RTOR Reduction (vph)	0	0	138	0	66	0	0	0	0	0	34	0
Lane Group Flow (vph)	84	101	18	38	31	0	186	1485	0	17	1092	0
Confl. Peds. (#/hr)			7	7			7		6	6		7
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	13.7	13.7	13.7	7.1	7.1		18.5	86.5		2.3	70.3	
Effective Green, g (s)	14.8	14.8	14.8	8.2	8.2		19.6	87.6		3.4	71.4	
Actuated g/C Ratio	0.11	0.11	0.11	0.06	0.06		0.15	0.67		0.03	0.55	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	181	183	166	105	99		247	2211		42	2309	
v/s Ratio Prot	0.05	c0.06		c0.02	0.02		c0.11	c0.45		0.01	0.26	
v/s Ratio Perm			0.01									
v/c Ratio	0.46	0.55	0.11	0.36	0.32		0.75	0.67		0.40	0.47	
Uniform Delay, d1	53.9	54.5	51.7	58.4	58.2		52.9	12.6		62.3	17.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.96	1.17		1.13	0.57	
Incremental Delay, d2	0.7	2.0	0.1	0.8	0.7		1.1	0.1		2.1	0.6	
Delay (s)	54.6	56.5	51.8	59.2	58.9		52.0	14.9		72.8	10.8	
Level of Service	D	E	D	E	E		D	B		E	B	
Approach Delay (s)		53.9			59.0			19.0			11.8	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.6%	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 (vph)	220	273	352	0	0	288	0	1322	279	230	760	293
Future Volume (vph)	220	273	352	0	0	288	0	1322	279	230	760	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			0.88		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.98			1.00		1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3462	1550			2787		3471	1523	3367	3471	1505
Flt Permitted		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3462	1550			2787		3471	1523	3367	3471	1505
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	224	279	359	0	0	294	0	1349	285	235	776	299
RTOR Reduction (vph)	0	0	76	0	0	233	0	0	55	0	0	0
Lane Group Flow (vph)	0	503	283	0	0	61	0	1349	230	235	776	299
Confl. Peds. (#/hr)			10	10			22		4	4		22
Confl. Bikes (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		27.3	33.4			27.3		75.8	75.8	12.9	81.6	130.0
Effective Green, g (s)		26.9	32.6			26.8		75.3	75.3	11.9	81.1	130.0
Actuated g/C Ratio		0.21	0.25			0.21		0.58	0.58	0.09	0.62	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		716	453			574		2010	882	308	2165	1505
v/s Ratio Prot			0.03					c0.39		c0.07	0.22	
v/s Ratio Perm		0.15	0.16			0.02			0.15			0.20
v/c Ratio		0.70	0.63			0.11		0.67	0.26	0.76	0.36	0.20
Uniform Delay, d1		47.8	43.3			41.9		18.8	13.6	57.7	11.8	0.0
Progression Factor		1.00	1.00			1.00		0.70	0.40	0.98	1.19	1.00
Incremental Delay, d2		2.6	1.9			0.0		1.4	0.6	8.3	0.4	0.3
Delay (s)		50.4	45.2			41.9		14.7	6.1	64.8	14.5	0.3
Level of Service		D	D			D		B	A	E	B	A
Approach Delay (s)		48.2			41.9			13.2			20.2	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	79.0%	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)	0	0	0	341	277	152	766	851	340	127	596	165
Future Volume (veh/h)	0	0	0	341	277	152	766	851	340	127	596	165
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		0.97	1.00		0.96
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1765	1800	1731	1731	1800	1731	1731	1800
Adj Flow Rate, veh/h				363	295	162	815	905	362	135	634	176
Adj No. of Lanes				0	2	0	2	3	0	1	2	0
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	2	0	4	4	4	4	4	4
Cap, veh/h				391	342	192	871	1735	692	160	887	246
Arrive On Green				0.28	0.28	0.28	0.27	0.53	0.53	0.03	0.12	0.12
Sat Flow, veh/h				1412	1232	692	3198	3291	1313	1648	2521	699
Grp Volume(v), veh/h				436	0	384	815	866	401	135	413	397
Grp Sat Flow(s),veh/h/ln				1694	0	1642	1599	1575	1454	1648	1644	1575
Q Serve(g_s), s				32.5	0.0	28.7	32.4	23.3	23.4	10.6	31.5	31.6
Cycle Q Clear(g_c), s				32.5	0.0	28.7	32.4	23.3	23.4	10.6	31.5	31.6
Prop In Lane				0.83		0.42	1.00		0.90	1.00		0.44
Lane Grp Cap(c), veh/h				470	0	455	871	1661	767	160	579	555
V/C Ratio(X)				0.93	0.00	0.84	0.94	0.52	0.52	0.84	0.71	0.72
Avail Cap(c_a), veh/h				521	0	505	935	1661	767	241	579	555
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh				45.7	0.0	44.3	46.2	20.0	20.1	61.9	51.1	51.2
Incr Delay (d2), s/veh				21.5	0.0	11.1	15.1	1.2	2.5	10.1	7.3	7.7
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				18.0	0.0	14.4	16.1	10.4	9.9	5.3	15.5	15.0
LnGrp Delay(d),s/veh				67.2	0.0	55.5	61.3	21.2	22.7	72.1	58.5	58.9
LnGrp LOS				E		E	E	C	C	E	E	E
Approach Vol, veh/h					820			2082			945	
Approach Delay, s/veh					61.7			37.2			60.6	
Approach LOS					E			D			E	

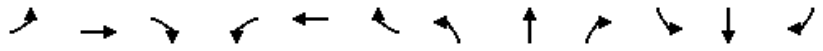
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	16.6	73.3			39.4	50.6		40.0
Change Period (Y+Rc), s	4.0	5.0			4.0	5.0		4.0
Max Green Setting (Gmax), s	19.0	58.0			38.0	39.0		40.0
Max Q Clear Time (g_c+I1), s	12.6	25.4			34.4	33.6		34.5
Green Ext Time (p_c), s	0.1	19.6			1.0	4.7		1.5

Intersection Summary		
HCM 2010 Ctrl Delay		48.2
HCM 2010 LOS		D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	232	378	644	527	47
Future Volume (veh/h)	32	232	378	644	527	47
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	33	242	394	671	549	49
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	295	263	411	2519	1476	131
Arrive On Green	0.18	0.18	0.49	1.00	0.16	0.16
Sat Flow, veh/h	1681	1500	1681	3441	3190	276
Grp Volume(v), veh/h	33	242	394	671	296	302
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1702
Q Serve(g_s), s	2.1	20.6	29.3	0.0	20.5	20.7
Cycle Q Clear(g_c), s	2.1	20.6	29.3	0.0	20.5	20.7
Prop In Lane	1.00	1.00	1.00			0.16
Lane Grp Cap(c), veh/h	295	263	411	2519	798	810
V/C Ratio(X)	0.11	0.92	0.96	0.27	0.37	0.37
Avail Cap(c_a), veh/h	349	312	646	2519	798	810
HCM Platoon Ratio	1.00	1.00	2.00	2.00	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.31	0.31
Uniform Delay (d), s/veh	45.1	52.7	32.5	0.0	37.4	37.4
Incr Delay (d2), s/veh	0.1	26.5	15.4	0.3	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	17.8	15.1	0.1	9.6	9.8
LnGrp Delay(d),s/veh	45.1	79.1	47.9	0.3	37.8	37.8
LnGrp LOS	D	E	D	A	D	D
Approach Vol, veh/h	275			1065	598	
Approach Delay, s/veh	75.1			17.9	37.8	
Approach LOS	E			B	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		103.2		26.8	35.8	67.3		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		93.5		27.0	50.0	39.5		
Max Q Clear Time (g_c+I1), s		2.0		22.6	31.3	22.7		
Green Ext Time (p_c), s		18.4		0.2	0.5	9.8		

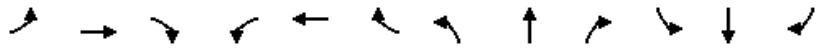
Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	763	3	4	2244	2	66	5	4	2	5	9
Future Volume (veh/h)	3	763	3	4	2244	2	66	5	4	2	5	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	942	4	5	2770	2	81	6	5	2	6	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	1632	7	11	1643	1	173	10	179	47	64	91
Arrive On Green	0.01	0.48	0.47	0.01	0.96	0.93	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1681	3424	15	1681	3438	2	794	83	1489	21	528	754
Grp Volume(v), veh/h	4	461	485	5	1350	1422	87	0	5	19	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1762	1681	1676	1764	877	0	1489	1302	0	0
Q Serve(g_s), s	0.2	17.9	17.9	0.3	43.0	43.0	0.2	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	17.9	17.9	0.3	43.0	43.0	9.6	0.0	0.3	9.5	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.93		1.00	0.11		0.58
Lane Grp Cap(c), veh/h	9	799	840	11	801	843	183	0	179	201	0	0
V/C Ratio(X)	0.45	0.58	0.58	0.46	1.69	1.69	0.48	0.00	0.03	0.09	0.00	0.00
Avail Cap(c_a), veh/h	187	801	842	187	801	843	404	0	414	446	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.60	0.60	0.60	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.6	17.0	17.0	44.3	2.0	2.0	39.0	0.0	34.9	35.3	0.0	0.0
Incr Delay (d2), s/veh	7.7	0.5	0.5	1.0	309.2	309.4	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	8.3	8.7	0.1	79.0	83.2	2.2	0.0	0.1	0.4	0.0	0.0
LnGrp Delay(d),s/veh	52.3	17.5	17.5	45.2	311.2	311.4	39.7	0.0	35.0	35.3	0.0	0.0
LnGrp LOS	D	B	B	D	F	F	D		C	D		
Approach Vol, veh/h		950			2777			92			19	
Approach Delay, s/veh		17.7			310.8			39.5			35.3	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.6	46.9		14.9	4.5	47.0		14.9
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	42.0		25.0	10.0	42.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	19.9		11.5	2.2	45.0		11.6
Green Ext Time (p_c), s	0.0	18.7		0.1	0.0	0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	230.4
HCM 2010 LOS	F



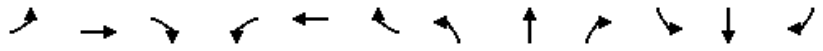
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	729	27	5	2070	12	83	1	45	24	5	16
Future Volume (veh/h)	3	729	27	5	2070	12	83	1	45	24	5	16
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	868	32	6	2464	14	99	1	54	29	6	19
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1528	56	18	1595	9	182	7	67	147	38	67
Arrive On Green	0.01	0.46	0.45	0.02	0.93	0.91	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1681	3298	122	1681	3418	19	907	58	521	671	298	526
Grp Volume(v), veh/h	4	441	459	6	1207	1271	154	0	0	54	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1743	1681	1676	1761	1486	0	0	1495	0	0
Q Serve(g_s), s	0.2	17.3	17.3	0.3	42.0	42.0	6.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	17.3	17.3	0.3	42.0	42.0	8.9	0.0	0.0	2.8	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.01	0.64		0.35	0.54		0.35
Lane Grp Cap(c), veh/h	12	777	808	18	782	822	256	0	0	253	0	0
V/C Ratio(X)	0.32	0.57	0.57	0.33	1.54	1.55	0.60	0.00	0.00	0.21	0.00	0.00
Avail Cap(c_a), veh/h	187	782	814	187	782	822	484	0	0	483	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.37	0.37	0.37	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	17.6	17.6	43.7	3.0	3.0	37.9	0.0	0.0	35.4	0.0	0.0
Incr Delay (d2), s/veh	13.4	0.9	0.9	3.8	246.8	248.2	2.3	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	8.2	8.5	0.2	66.7	70.8	3.9	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	57.8	18.5	18.5	47.5	249.8	251.2	40.2	0.0	0.0	35.8	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D			D		
Approach Vol, veh/h		904			2484			154			54	
Approach Delay, s/veh		18.7			250.0			40.2			35.8	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	45.7		15.5	4.7	46.0		15.5
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	41.0		26.0	10.0	41.0		26.0
Max Q Clear Time (g_c+I1), s	2.3	19.3		4.8	2.2	44.0		10.9
Green Ext Time (p_c), s	0.0	18.7		0.8	0.0	0.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	179.7
HCM 2010 LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	845	4	11	2026	25	29
Future Volume (vph)	845	4	11	2026	25	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3350		1676	3353	1588	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3350		1676	3353	1588	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	1018	5	13	2441	30	35
RTOR Reduction (vph)	0	0	0	0	31	0
Lane Group Flow (vph)	1023	0	13	2441	34	0
Confl. Peds. (#/hr)		2	2			1
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	63.5		1.5	70.0	9.0	
Effective Green, g (s)	65.5		2.5	72.0	10.0	
Actuated g/C Ratio	0.73		0.03	0.80	0.11	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2438		46	2682	176	
v/s Ratio Prot	0.31		0.01	c0.73	c0.02	
v/s Ratio Perm						
v/c Ratio	0.42		0.28	0.91	0.19	
Uniform Delay, d1	4.8		42.9	6.6	36.3	
Progression Factor	1.78		1.24	1.25	1.00	
Incremental Delay, d2	0.2		1.7	3.3	0.5	
Delay (s)	8.7		54.9	11.5	36.9	
Level of Service	A		D	B	D	
Approach Delay (s)	8.7			11.8	36.9	
Approach LOS	A			B	D	

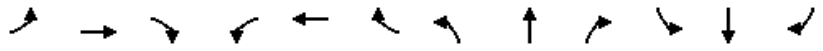
Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	746	12	10	1632	74	11	1	9	281	3	201
Future Volume (veh/h)	137	746	12	10	1632	74	11	1	9	281	3	201
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	147	802	13	11	1755	80	12	1	10	302	3	216
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	1811	29	22	1451	66	364	439	369	439	459	369
Arrive On Green	0.11	0.54	0.53	0.03	0.89	0.87	0.25	0.25	0.25	0.26	0.26	0.25
Sat Flow, veh/h	1681	3376	55	1681	3266	148	1148	1765	1484	1384	1765	1484
Grp Volume(v), veh/h	147	398	417	11	896	939	12	1	10	302	3	216
Grp Sat Flow(s),veh/h/ln	1681	1676	1755	1681	1676	1737	1148	1765	1484	1384	1765	1484
Q Serve(g_s), s	7.7	13.0	13.0	0.6	40.0	40.0	0.7	0.0	0.5	18.6	0.1	11.5
Cycle Q Clear(g_c), s	7.7	13.0	13.0	0.6	40.0	40.0	0.8	0.0	0.5	18.6	0.1	11.5
Prop In Lane	1.00		0.03	1.00		0.09	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	899	941	22	745	772	364	439	369	439	459	369
V/C Ratio(X)	0.83	0.44	0.44	0.49	1.20	1.22	0.03	0.00	0.03	0.69	0.01	0.58
Avail Cap(c_a), veh/h	187	899	941	187	745	772	436	549	462	525	569	462
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	12.7	12.7	43.5	5.0	5.1	25.7	25.4	25.6	31.5	24.7	29.7
Incr Delay (d2), s/veh	21.9	0.1	0.1	3.8	99.2	105.3	0.0	0.0	0.0	2.9	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	6.0	6.3	0.3	35.4	38.5	0.2	0.0	0.2	7.5	0.1	4.9
LnGrp Delay(d),s/veh	61.4	12.8	12.8	47.3	104.2	110.4	25.8	25.4	25.6	34.5	24.7	31.2
LnGrp LOS	E	B	B	D	F	F	C	C	C	C	C	C
Approach Vol, veh/h		962			1846			23			521	
Approach Delay, s/veh		20.2			107.0			25.7			33.1	
Approach LOS		C			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	52.3		26.4	13.5	44.0		26.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	39.0		28.0	10.0	39.0		28.0
Max Q Clear Time (g_c+I1), s	2.6	15.0		20.6	9.7	42.0		2.8
Green Ext Time (p_c), s	0.0	8.2		1.5	0.0	0.0		2.4

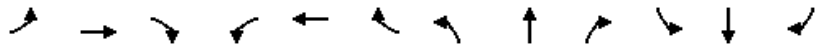
Intersection Summary		
HCM 2010 Ctrl Delay		70.0
HCM 2010 LOS		E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	977	40	2	1730	10	116	5	9	12	1	31
Future Volume (veh/h)	7	977	40	2	1730	10	116	5	9	12	1	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	7	987	40	2	1747	10	117	5	9	12	1	31
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	15	1370	56	5	1405	8	220	6	11	80	24	126
Arrive On Green	0.01	0.42	0.41	0.01	0.82	0.80	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1681	3282	133	1681	3418	20	1299	55	100	257	217	1130
Grp Volume(v), veh/h	7	504	523	2	856	901	131	0	0	44	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1739	1681	1676	1761	1454	0	0	1604	0	0
Q Serve(g_s), s	0.4	22.5	22.6	0.1	37.0	37.0	5.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	22.5	22.6	0.1	37.0	37.0	7.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.08	1.00		0.01	0.89		0.07	0.27		0.70
Lane Grp Cap(c), veh/h	15	700	726	5	689	724	238	0	0	230	0	0
V/C Ratio(X)	0.47	0.72	0.72	0.44	1.24	1.24	0.55	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	243	700	726	243	689	724	514	0	0	523	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.44	0.44	0.44	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	21.8	21.9	44.7	8.0	8.0	38.8	0.0	0.0	36.6	0.0	0.0
Incr Delay (d2), s/veh	7.0	2.9	2.8	10.5	114.7	115.2	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	10.9	11.3	0.1	37.3	39.3	3.2	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	51.4	24.8	24.7	55.2	122.7	123.2	39.6	0.0	0.0	36.7	0.0	0.0
LnGrp LOS	D	C	C	E	F	F	D			D		
Approach Vol, veh/h		1034			1759			131			44	
Approach Delay, s/veh		24.9			122.9			39.6			36.7	
Approach LOS		C			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	41.6		14.0	4.8	41.0		14.0
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	13.0	36.0		28.0	13.0	36.0		28.0
Max Q Clear Time (g_c+I2), s	2.1	24.6		4.3	2.4	39.0		9.8
Green Ext Time (p_c), s	0.0	7.9		0.3	0.0	0.0		0.2

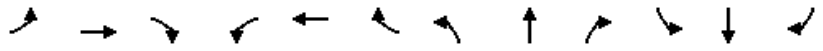
Intersection Summary	
HCM 2010 Ctrl Delay	83.8
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	941	56	1	1619	133	45	60	1	87	23	51
Future Volume (veh/h)	45	941	56	1	1619	133	45	60	1	87	23	51
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.97		0.96	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	47	980	58	1	1686	139	47	62	1	91	24	53
Adj No. of Lanes	0	2	0	0	2	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	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	939	74	40	1468	119	160	187	3	196	57	88
Arrive On Green	0.48	0.48	0.46	0.96	0.96	0.91	0.19	0.19	0.18	0.19	0.19	0.18
Sat Flow, veh/h	0	1964	155	0	3072	250	545	992	14	712	300	466
Grp Volume(v), veh/h	496	0	589	959	0	867	110	0	0	168	0	0
Grp Sat Flow(s),veh/h/ln	543	0	1576	1764	0	1559	1552	0	0	1478	0	0
Q Serve(g_s), s	0.0	0.0	28.1	6.5	0.0	43.0	0.0	0.0	0.0	3.6	0.0	0.0
Cycle Q Clear(g_c), s	43.0	0.0	28.1	43.0	0.0	43.0	5.3	0.0	0.0	8.8	0.0	0.0
Prop In Lane	0.09		0.10	0.00		0.16	0.43		0.01	0.54		0.32
Lane Grp Cap(c), veh/h	303	0	753	883	0	745	350	0	0	341	0	0
V/C Ratio(X)	1.63	0.00	0.78	1.09	0.00	1.16	0.31	0.00	0.00	0.49	0.00	0.00
Avail Cap(c_a), veh/h	303	0	753	883	0	745	721	0	0	681	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.00	0.91	0.35	0.00	0.35	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.6	0.0	19.7	3.0	0.0	2.3	31.7	0.0	0.0	33.2	0.0	0.0
Incr Delay (d2), s/veh	299.0	0.0	4.5	46.5	0.0	79.5	0.5	0.0	0.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	31.7	0.0	13.1	33.0	0.0	27.3	2.4	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	329.6	0.0	24.2	49.5	0.0	81.8	32.2	0.0	0.0	34.3	0.0	0.0
LnGrp LOS	F		C	F		F	C			C		
Approach Vol, veh/h		1085			1826			110			168	
Approach Delay, s/veh		163.8			64.8			32.2			34.3	
Approach LOS		F			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		47.0		21.0		47.0		21.0
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		41.0		38.0		41.0		38.0
Max Q Clear Time (g_c+I1), s		45.0		10.8		45.0		7.3
Green Ext Time (p_c), s		0.0		1.2		0.0		1.2

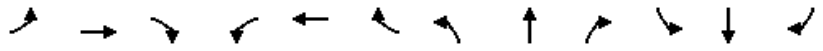
Intersection Summary	
HCM 2010 Ctrl Delay	95.7
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	889	83	38	1678	59	145	6	97	94	20	60
Future Volume (veh/h)	21	889	83	38	1678	59	145	6	97	94	20	60
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		0.99	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	22	936	87	40	1766	62	153	6	102	99	21	63
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	964	90	59	1065	37	184	213	170	124	33	98
Arrive On Green	0.02	0.31	0.30	0.04	0.32	0.31	0.11	0.12	0.12	0.07	0.09	0.08
Sat Flow, veh/h	1681	3099	288	1681	3301	115	1681	1765	1480	1681	384	1152
Grp Volume(v), veh/h	22	506	517	40	892	936	153	6	102	99	0	84
Grp Sat Flow(s),veh/h/ln	1681	1676	1711	1681	1676	1740	1681	1765	1480	1681	0	1535
Q Serve(g_s), s	1.2	26.8	26.8	2.1	29.0	29.0	8.0	0.3	5.9	5.2	0.0	4.8
Cycle Q Clear(g_c), s	1.2	26.8	26.8	2.1	29.0	29.0	8.0	0.3	5.9	5.2	0.0	4.8
Prop In Lane	1.00		0.17	1.00		0.07	1.00		1.00	1.00		0.75
Lane Grp Cap(c), veh/h	40	522	532	59	541	562	184	213	170	124	0	131
V/C Ratio(X)	0.56	0.97	0.97	0.68	1.65	1.67	0.83	0.03	0.60	0.80	0.00	0.64
Avail Cap(c_a), veh/h	205	522	532	205	541	562	205	471	387	205	0	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	0.72	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.5	30.6	30.7	42.9	30.5	30.5	39.3	34.9	37.8	41.0	0.0	40.0
Incr Delay (d2), s/veh	3.3	26.4	26.1	0.5	292.7	300.6	20.4	0.0	1.3	4.4	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	0.6	16.2	16.5	1.0	57.4	60.8	4.8	0.1	2.5	2.6	0.0	2.1
LnGrp Delay(d),s/veh	46.7	57.0	56.7	43.4	323.2	331.2	59.7	34.9	39.1	45.4	0.0	42.0
LnGrp LOS	D	E	E	D	F	F	E	C	D	D		D
Approach Vol, veh/h		1045			1868			261			183	
Approach Delay, s/veh		56.6			321.2			51.1			43.8	
Approach LOS		E			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	32.0	10.6	14.9	6.1	33.0	13.8	11.7
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	11.0	27.0	11.0	23.5	11.0	27.0	11.0	23.5
Max Q Clear Time (g_c+I1), s	4.1	28.8	7.2	7.9	3.2	31.0	10.0	6.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	202.7
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	463	615	51	20	797	126	164	445	55	162	275	789
Future Volume (veh/h)	463	615	51	20	797	126	164	445	55	162	275	789
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	509	676	56	22	876	138	180	489	60	178	302	867
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	261	1250	103	64	944	419	192	964	420	206	991	439
Arrive On Green	0.16	0.41	0.40	0.04	0.29	0.29	0.12	0.29	0.29	0.13	0.30	0.30
Sat Flow, veh/h	1648	3074	254	1648	3288	1460	1648	3288	1435	1648	3288	1458
Grp Volume(v), veh/h	509	361	371	22	876	138	180	489	60	178	302	867
Grp Sat Flow(s),veh/h/ln	1648	1644	1684	1648	1644	1460	1648	1644	1435	1648	1644	1458
Q Serve(g_s), s	19.0	20.1	20.1	1.6	31.1	8.9	13.0	14.8	3.7	12.7	8.5	36.2
Cycle Q Clear(g_c), s	19.0	20.1	20.1	1.6	31.1	8.9	13.0	14.8	3.7	12.7	8.5	36.2
Prop In Lane	1.00		0.15	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	669	685	64	944	419	192	964	420	206	991	439
V/C Ratio(X)	1.95	0.54	0.54	0.35	0.93	0.33	0.94	0.51	0.14	0.86	0.30	1.97
Avail Cap(c_a), veh/h	261	669	685	151	956	425	192	964	420	206	991	439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.34	0.34	0.34	0.92	0.92	0.92	0.85	0.85	0.85
Uniform Delay (d), s/veh	50.5	27.1	27.1	56.2	41.6	33.7	52.6	35.2	31.3	51.5	32.3	41.9
Incr Delay (d2), s/veh	439.2	0.7	0.7	1.1	6.0	0.2	44.5	0.4	0.1	25.9	0.7	445.0
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	40.5	9.2	9.5	0.7	14.9	3.6	8.3	6.8	1.5	7.3	4.0	68.8
LnGrp Delay(d),s/veh	489.7	27.8	27.9	57.3	47.6	33.8	97.1	35.6	31.4	77.4	32.9	486.9
LnGrp LOS	F	C	C	E	D	C	F	D	C	E	C	F
Approach Vol, veh/h		1241			1036			729			1347	
Approach Delay, s/veh		217.3			46.0			50.5			331.0	
Approach LOS		F			D			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	40.2	8.6	53.2	19.0	39.2	23.0	38.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	35.0	10.0	41.6	14.0	34.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	15.0	38.2	3.6	22.1	14.7	16.8	21.0	33.1
Green Ext Time (p_c), s	0.0	0.0	0.0	8.3	0.0	8.8	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	183.8
HCM 2010 LOS	F

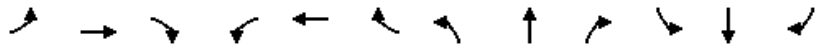
Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	504	1	422	0	0	0	0	872	324	283	933	0
Future Volume (vph)	504	1	422	0	0	0	0	872	324	283	933	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.98					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.94	0.85					0.96		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1535	1482					4753		1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1535	1482					4753		1736	3471	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	560	1	469	0	0	0	0	969	360	314	1037	0
RTOR Reduction (vph)	0	23	94	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	358	325	230	0	0	0	0	1276	0	314	1037	0
Confl. Peds. (#/hr)			3	3			9		1	1		9
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	28.4	28.4	28.4					51.1		23.5	78.6	
Effective Green, g (s)	28.5	28.5	28.5					51.2		22.5	78.7	
Actuated g/C Ratio	0.25	0.25	0.25					0.44		0.19	0.68	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	413	377	364					2097		336	2354	
v/s Ratio Prot	c0.21	0.21						c0.27		c0.18	0.30	
v/s Ratio Perm			0.16									
v/c Ratio	0.87	0.86	0.63					0.61		0.93	0.44	
Uniform Delay, d1	41.9	41.9	39.1					24.7		46.0	8.6	
Progression Factor	1.00	1.00	1.00					0.50		0.92	0.83	
Incremental Delay, d2	16.6	17.3	2.6					0.9		26.6	0.5	
Delay (s)	58.5	59.2	41.7					13.3		69.1	7.6	
Level of Service	E	E	D					B		E	A	
Approach Delay (s)		53.5			0.0			13.3			21.9	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



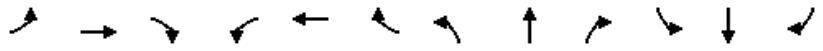
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	127	439	199	1039	138	98	916	158
Future Volume (veh/h)	0	0	0	300	127	439	199	1039	138	98	916	158
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		0.93	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1827	1900	1827	1827	1900	1827	1827	1827
Adj Flow Rate, veh/h				319	135	467	212	1105	147	104	974	0
Adj No. of Lanes				0	2	0	2	2	0	1	2	1
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	4	0	4	4	4	4	4	4
Cap, veh/h				375	159	467	997	1594	211	112	1012	452
Arrive On Green				0.51	0.51	0.50	0.20	0.35	0.35	0.13	0.58	0.00
Sat Flow, veh/h				1240	525	1542	3375	3051	405	1740	3471	1553
Grp Volume(v), veh/h				454	0	467	212	627	625	104	974	0
Grp Sat Flow(s),veh/h/ln				1765	0	1542	1688	1736	1720	1740	1736	1553
Q Serve(g_s), s				25.9	0.0	35.1	6.1	36.0	36.2	6.9	30.9	0.0
Cycle Q Clear(g_c), s				25.9	0.0	35.1	6.1	36.0	36.2	6.9	30.9	0.0
Prop In Lane				0.70		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h				534	0	467	997	907	899	112	1012	452
V/C Ratio(X)				0.85	0.00	1.00	0.21	0.69	0.70	0.92	0.96	0.00
Avail Cap(c_a), veh/h				534	0	467	997	907	899	112	1035	462
HCM Platoon Ratio				1.67	1.67	1.67	0.67	0.67	0.67	2.00	2.00	2.00
Upstream Filter(I)				0.67	0.00	0.67	0.69	0.69	0.69	0.81	0.81	0.00
Uniform Delay (d), s/veh				26.4	0.0	28.8	35.2	29.7	29.8	50.2	23.6	0.0
Incr Delay (d2), s/veh				8.5	0.0	34.4	0.0	3.0	3.1	53.4	17.9	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				13.8	0.0	19.1	2.8	18.1	18.0	5.0	16.9	0.0
LnGrp Delay(d),s/veh				35.0	0.0	63.2	35.3	32.7	32.8	103.6	41.5	0.0
LnGrp LOS				C		F	D	C	C	F	D	
Approach Vol, veh/h					921			1464			1078	
Approach Delay, s/veh					49.3			33.1			47.5	
Approach LOS					D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	12.0	65.0			38.8	38.2		39.0
Change Period (Y+Rc), s	4.0	4.5			4.5	* 4.5		4.0
Max Green Setting (Gmax), s	8.0	60.5			34.0	* 35		35.0
Max Q Clear Time (g_c+I1), s	8.9	38.2			8.1	32.9		37.1
Green Ext Time (p_c), s	0.0	6.9			7.2	0.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	336	19	58	1107	282	129	610	126	360	291	123
Future Volume (veh/h)	32	336	19	58	1107	282	129	610	126	360	291	123
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	34	357	20	62	1178	300	137	649	134	383	310	0
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	1112	62	81	1196	532	165	679	303	389	1125	503
Arrive On Green	0.04	0.34	0.34	0.05	0.36	0.36	0.10	0.20	0.20	0.23	0.34	0.00
Sat Flow, veh/h	1681	3226	180	1681	3353	1492	1681	3353	1498	1681	3353	1500
Grp Volume(v), veh/h	34	185	192	62	1178	300	137	649	134	383	310	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1729	1681	1676	1492	1681	1676	1498	1681	1676	1500
Q Serve(g_s), s	2.1	8.4	8.5	3.8	36.2	16.8	8.3	19.9	8.1	23.5	7.0	0.0
Cycle Q Clear(g_c), s	2.1	8.4	8.5	3.8	36.2	16.8	8.3	19.9	8.1	23.5	7.0	0.0
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	61	578	596	81	1196	532	165	679	303	389	1125	503
V/C Ratio(X)	0.56	0.32	0.32	0.77	0.99	0.56	0.83	0.96	0.44	0.99	0.28	0.00
Avail Cap(c_a), veh/h	162	598	617	162	1196	532	259	679	303	389	1125	503
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.2	25.0	25.1	48.8	33.1	26.9	45.9	40.9	36.2	39.7	25.2	0.0
Incr Delay (d2), s/veh	3.0	0.3	0.3	5.6	22.4	1.4	6.5	24.0	0.4	41.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.0	4.1	1.9	20.4	7.1	4.1	11.5	3.4	15.3	3.2	0.0
LnGrp Delay(d),s/veh	52.2	25.4	25.4	54.4	55.5	28.2	52.5	64.9	36.6	81.1	25.3	0.0
LnGrp LOS	D	C	C	D	E	C	D	E	D	F	C	
Approach Vol, veh/h		411			1540			920			693	
Approach Delay, s/veh		27.6			50.1			59.0			56.2	
Approach LOS		C			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	40.8	14.2	39.8	7.7	42.0	28.0	26.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	37.0	16.0	29.0	10.0	37.0	24.0	21.0
Max Q Clear Time (g_c+I1), s	5.8	10.5	10.3	9.0	4.1	38.2	25.5	21.9
Green Ext Time (p_c), s	0.0	14.0	0.1	4.5	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	51.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	369	45	29	954	221	216	729	77	218	224	108
Future Volume (veh/h)	23	369	45	29	954	221	216	729	77	218	224	108
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	24	393	48	31	1015	235	230	776	82	232	238	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	51	1284	156	60	1169	270	187	820	362	301	757	339
Arrive On Green	0.03	0.43	0.43	0.04	0.43	0.43	0.11	0.24	0.24	0.09	0.23	0.00
Sat Flow, veh/h	1681	3006	365	1681	2698	623	1681	3353	1481	3261	3353	1500
Grp Volume(v), veh/h	24	218	223	31	629	621	230	776	82	232	238	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1694	1681	1676	1645	1681	1676	1481	1630	1676	1500
Q Serve(g_s), s	1.3	7.7	7.8	1.6	30.7	30.9	10.0	20.5	4.0	6.3	5.3	0.0
Cycle Q Clear(g_c), s	1.3	7.7	7.8	1.6	30.7	30.9	10.0	20.5	4.0	6.3	5.3	0.0
Prop In Lane	1.00		0.22	1.00		0.38	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	51	716	724	60	726	712	187	820	362	301	757	339
V/C Ratio(X)	0.47	0.30	0.31	0.51	0.87	0.87	1.23	0.95	0.23	0.77	0.31	0.00
Avail Cap(c_a), veh/h	149	716	724	149	726	712	187	820	362	362	820	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.9	17.0	17.0	42.6	23.2	23.2	40.0	33.4	27.2	39.9	29.0	0.0
Incr Delay (d2), s/veh	2.6	1.1	1.1	2.5	11.1	11.7	141.9	19.5	0.1	6.4	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.8	3.9	0.8	16.4	16.3	12.0	11.7	1.6	3.1	2.5	0.0
LnGrp Delay(d),s/veh	45.5	18.1	18.1	45.1	34.2	34.9	181.9	52.9	27.3	46.3	29.1	0.0
LnGrp LOS	D	B	B	D	C	C	F	D	C	D	C	
Approach Vol, veh/h		465			1281			1088			470	
Approach Delay, s/veh		19.5			34.8			78.2			37.6	
Approach LOS		B			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	43.4	14.0	25.3	6.7	44.0	12.3	27.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	3.3	9.8	12.0	7.3	3.3	32.9	8.3	22.5
Green Ext Time (p_c), s	0.0	15.4	0.0	4.5	0.0	0.0	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	47.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	238	89	168	1275	36	59	113	12	86	575	913
Future Volume (vph)	141	238	89	168	1275	36	59	113	12	86	575	913
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.96		1.00	1.00			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	1.00
Satd. Flow (prot)	1676	3196		1676	3337			1722			1753	1477
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.99	1.00
Satd. Flow (perm)	1676	3196		1676	3337			1722			1753	1477
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	155	262	98	185	1401	40	65	124	13	95	632	1003
RTOR Reduction (vph)	0	24	0	0	1	0	0	2	0	0	0	241
Lane Group Flow (vph)	155	336	0	185	1440	0	0	200	0	0	727	762
Confl. Peds. (#/hr)	1					1	2					2
Confl. Bikes (#/hr)			2			2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	11.0	38.1		20.0	47.1			20.2			48.0	48.0
Effective Green, g (s)	11.0	38.1		20.0	47.1			20.2			48.0	48.0
Actuated g/C Ratio	0.08	0.26		0.14	0.32			0.14			0.33	0.33
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	126	832		229	1074			237			575	484
v/s Ratio Prot	c0.09	0.11		0.11	c0.43			c0.12			0.41	
v/s Ratio Perm												c0.52
v/c Ratio	1.23	0.40		0.81	1.34			0.85			1.26	1.57
Uniform Delay, d1	67.7	44.7		61.3	49.6			61.5			49.2	49.2
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	154.7	0.4		17.6	159.5			22.3			132.4	268.1
Delay (s)	222.3	45.1		78.9	209.1			83.9			181.6	317.2
Level of Service	F	D		E	F			F			F	F
Approach Delay (s)		98.5			194.3			83.9			260.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	204.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	146.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	121.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	43	201	65	758	1504
Future Vol, veh/h	52	43	201	65	758	1504
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	48	226	73	852	1690

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3655	262	0	0	299	0
Stage 1	262	-	-	-	-	-
Stage 2	3393	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 6	777	-	-	1262	-
Stage 1	782	-	-	-	-	-
Stage 2	~ 21	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	0	777	-	-	1262	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	4.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	777	1262	-
HCM Lane V/C Ratio	-	-	0.137	0.675	-
HCM Control Delay (s)	-	-	10.4	13.6	0
HCM Lane LOS	-	-	B	B	A
HCM 95th %tile Q(veh)	-	-	0.5	5.6	-

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	680	140	200	1892	157	233
Future Volume (veh/h)	680	140	200	1892	157	233
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	731	151	215	2034	169	251
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	951	408	703	2484	303	271
Arrive On Green	0.28	0.28	0.42	0.74	0.18	0.18
Sat Flow, veh/h	3441	1441	1681	3441	1681	1500
Grp Volume(v), veh/h	731	151	215	2034	169	251
Grp Sat Flow(s),veh/h/ln	1676	1441	1681	1676	1681	1500
Q Serve(g_s), s	28.0	11.7	12.0	55.9	12.8	23.1
Cycle Q Clear(g_c), s	28.0	11.7	12.0	55.9	12.8	23.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	951	408	703	2484	303	271
V/C Ratio(X)	0.77	0.37	0.31	0.82	0.56	0.93
Avail Cap(c_a), veh/h	1832	787	703	2484	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.0	40.1	27.2	11.9	52.3	56.5
Incr Delay (d2), s/veh	6.0	2.6	0.1	2.4	0.8	31.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.8	5.0	5.6	26.2	6.0	11.9
LnGrp Delay(d),s/veh	51.9	42.7	27.3	14.3	53.0	87.8
LnGrp LOS	D	D	C	B	D	F
Approach Vol, veh/h	882			2249	420	
Approach Delay, s/veh	50.3			15.6	73.8	
Approach LOS	D			B	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	64.0	45.2		30.8		109.2		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	21.0	* 77		27.5		101.5		
Max Q Clear Time (g_c+I1), s	14.0	30.0		25.1		57.9		
Green Ext Time (p_c), s	6.6	9.7		0.2		31.5		

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	775	23	11	1900	736	13	10	8	178	5	142
Future Volume (vph)	150	775	23	11	1900	736	13	10	8	178	5	142
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.96			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (prot)	1676	4791		1676	4587			1668			1683	1474
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (perm)	1676	4791		1676	4587			1668			1683	1474
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	170	881	26	12	2159	836	15	11	9	202	6	161
RTOR Reduction (vph)	0	1	0	0	35	0	0	8	0	0	0	152
Lane Group Flow (vph)	170	906	0	13	2960	0	0	27	0	0	208	9
Confl. Peds. (#/hr)	5		6	6		5	1					1
Confl. Bikes (#/hr)			2			4						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	custom
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												3
Actuated Green, G (s)	15.6	88.3		2.4	75.1			7.9			21.4	7.9
Effective Green, g (s)	15.6	88.3		2.4	75.1			7.9			21.4	7.9
Actuated g/C Ratio	0.11	0.63		0.02	0.54			0.06			0.15	0.06
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	186	3021		28	2460			94			257	83
v/s Ratio Prot	c0.10	0.19		0.01	c0.65			c0.02			c0.12	
v/s Ratio Perm												0.01
v/c Ratio	0.91	0.30		0.46	1.20			0.28			0.81	0.11
Uniform Delay, d1	61.5	11.8		68.2	32.5			63.3			57.3	62.7
Progression Factor	1.31	0.30		1.36	0.73			1.00			1.00	1.00
Incremental Delay, d2	39.9	0.2		2.2	93.6			0.6			16.0	0.2
Delay (s)	120.3	3.8		94.7	117.4			63.9			73.4	62.9
Level of Service	F	A		F	F			E			E	E
Approach Delay (s)		22.2			117.3			63.9			68.8	
Approach LOS		C			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	90.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
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 (vph)	110	660	232	577	1809	37	291	190	197	90	607	90
Future Volume (vph)	110	660	232	577	1809	37	291	190	197	90	607	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4597		3252	4801		1526	3147	1491	1676	3282	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4597		3252	4801		1526	3147	1491	1676	3282	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	725	255	634	1988	41	320	209	216	99	667	99
RTOR Reduction (vph)	0	44	0	0	1	0	0	0	136	0	8	0
Lane Group Flow (vph)	121	936	0	634	2028	0	173	356	80	99	758	0
Confl. Peds. (#/hr)	2		7	7		2	1		2	2		1
Confl. Bikes (#/hr)			2									
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	9.0	29.1		30.9	51.0		21.1	21.1	52.0	38.9	38.9	
Effective Green, g (s)	9.0	29.1		30.9	51.0		21.1	21.1	52.0	38.9	38.9	
Actuated g/C Ratio	0.06	0.21		0.22	0.36		0.15	0.15	0.37	0.28	0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	107	955		717	1748		229	474	553	465	911	
v/s Ratio Prot	0.07	0.20		c0.19	c0.42		c0.11	0.11	0.03	0.06	c0.23	
v/s Ratio Perm									0.02			
v/c Ratio	1.13	0.98		0.88	1.16		0.76	0.75	0.15	0.21	0.83	
Uniform Delay, d1	65.5	55.2		52.8	44.5		57.0	56.9	29.2	38.8	47.5	
Progression Factor	1.11	0.77		1.35	0.89		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	124.5	24.1		1.3	72.7		11.8	5.9	0.0	0.1	6.3	
Delay (s)	197.2	66.5		72.9	112.3		68.8	62.8	29.3	38.9	53.8	
Level of Service	F	E		E	F		E	E	C	D	D	
Approach Delay (s)		80.9			102.9			54.5			52.1	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	83.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.2%	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 (vph)	126	671	0	13	1858	47	3	0	0	125	1	866
Future Volume (vph)	126	671	0	13	1858	47	3	0	0	125	1	866
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00			0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (prot)	1676	4818		1676	4796		1676			1593	1598	1445
Flt Permitted	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (perm)	1676	4818		1676	4796		1676			1593	1598	1445
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	148	789	0	15	2186	55	4	0	0	147	1	1019
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	243
Lane Group Flow (vph)	148	789	0	15	2239	0	4	0	0	73	75	776
Confl. Peds. (#/hr)	3		9	9		3	17					17
Confl. Bikes (#/hr)						4						
Turn Type	Prot	NA		Prot	NA		Split			Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	14.7	79.6		2.9	68.3		6.0			31.5	31.5	31.5
Effective Green, g (s)	14.7	79.6		2.9	68.3		6.0			31.5	31.5	31.5
Actuated g/C Ratio	0.10	0.57		0.02	0.49		0.04			0.22	0.22	0.22
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	175	2739		34	2339		71			358	359	325
v/s Ratio Prot	c0.09	0.16		0.01	c0.47		c0.00			0.05	0.05	
v/s Ratio Perm												c0.54
v/c Ratio	0.85	0.29		0.44	0.96		0.06			0.20	0.21	2.39
Uniform Delay, d1	61.5	15.6		67.7	34.5		64.3			44.1	44.1	54.2
Progression Factor	0.79	0.57		1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	19.5	0.2		3.3	10.4		0.1			0.1	0.1	634.4
Delay (s)	67.9	9.0		71.0	44.9		64.4			44.2	44.2	688.7
Level of Service	E	A		E	D		E			D	D	F
Approach Delay (s)		18.3			45.1			64.4			607.0	
Approach LOS		B			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	189.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	115.2%	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)	110	245	336	663	618	77	80	360	163	59	1492	149
Future Volume (veh/h)	110	245	336	663	618	77	80	360	163	59	1492	149
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	116	258	354	698	651	81	84	379	172	62	1571	157
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	715	319	630	1074	134	102	1421	635	78	1371	605
Arrive On Green	0.05	0.21	0.21	0.19	0.36	0.36	0.06	0.42	0.42	0.05	0.41	0.41
Sat Flow, veh/h	3261	3353	1496	3261	3002	373	1681	3353	1498	1681	3353	1479
Grp Volume(v), veh/h	116	258	354	698	363	369	84	379	172	62	1571	157
Grp Sat Flow(s),veh/h/ln	1630	1676	1496	1630	1676	1698	1681	1676	1498	1681	1676	1479
Q Serve(g_s), s	5.3	9.8	32.0	29.0	26.6	26.7	7.4	11.0	11.2	5.5	61.4	10.5
Cycle Q Clear(g_c), s	5.3	9.8	32.0	29.0	26.6	26.7	7.4	11.0	11.2	5.5	61.4	10.5
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	159	715	319	630	600	608	102	1421	635	78	1371	605
V/C Ratio(X)	0.73	0.36	1.11	1.11	0.61	0.61	0.82	0.27	0.27	0.80	1.15	0.26
Avail Cap(c_a), veh/h	348	715	319	630	600	608	134	1421	635	134	1371	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	50.3	59.0	60.5	39.5	39.5	69.6	28.1	28.1	70.8	44.3	29.3
Incr Delay (d2), s/veh	2.4	0.1	83.1	68.9	1.3	1.3	19.9	0.5	1.1	6.8	74.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	4.6	20.6	19.1	12.5	12.7	4.0	5.2	4.8	2.7	42.6	4.4
LnGrp Delay(d),s/veh	72.8	50.4	142.1	129.4	40.7	40.8	89.5	28.5	29.2	77.7	118.9	29.6
LnGrp LOS	E	D	F	F	D	D	F	C	C	E	F	C
Approach Vol, veh/h		728			1430			635			1790	
Approach Delay, s/veh		98.6			84.0			36.8			109.6	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	69.1	11.3	58.7	13.1	66.9	33.0	37.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	12.0	58.5	16.0	45.0	12.0	58.5	29.0	32.0
Max Q Clear Time (g_c+I1), s	7.3	13.2	7.3	28.7	9.4	63.4	31.0	34.0
Green Ext Time (p_c), s	0.0	33.2	0.1	4.4	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	89.8
HCM 2010 LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	652	21	56	1335	169	63
Future Volume (veh/h)	652	21	56	1335	169	63
Number	2	12	1	6	3	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	709	23	61	1451	184	68
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1954	874	487	1954	253	226
Arrive On Green	0.58	0.58	0.58	0.58	0.15	0.15
Sat Flow, veh/h	3441	1500	721	3441	1681	1500
Grp Volume(v), veh/h	709	23	61	1451	184	68
Grp Sat Flow(s),veh/h/ln	1676	1500	721	1676	1681	1500
Q Serve(g_s), s	5.5	0.3	2.4	15.5	5.1	2.0
Cycle Q Clear(g_c), s	5.5	0.3	7.8	15.5	5.1	2.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1954	874	487	1954	253	226
V/C Ratio(X)	0.36	0.03	0.13	0.74	0.73	0.30
Avail Cap(c_a), veh/h	2132	954	526	2132	552	492
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.4	4.3	7.4	7.5	19.8	18.4
Incr Delay (d2), s/veh	0.1	0.0	0.1	1.3	4.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.1	0.5	7.4	2.6	0.9
LnGrp Delay(d),s/veh	5.5	4.3	7.6	8.8	23.7	19.2
LnGrp LOS	A	A	A	A	C	B
Approach Vol, veh/h	732			1512	252	
Approach Delay, s/veh	5.5			8.7	22.5	
Approach LOS	A			A	C	

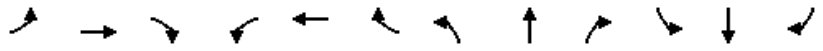
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		35.4				35.4		13.3
Change Period (Y+Rc), s		7.0				7.0		6.0
Max Green Setting (Gmax), s		31.0				31.0		16.0
Max Q Clear Time (g_c+I1), s		7.5				17.5		7.1
Green Ext Time (p_c), s		17.0				10.9		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	25	28	657	1453	61
Future Volume (veh/h)	11	25	28	657	1453	61
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	12	27	30	714	1579	66
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	43	38	114	1617	1617	1374
Arrive On Green	0.03	0.03	0.92	0.92	0.92	0.92
Sat Flow, veh/h	1681	1500	303	1765	1765	1500
Grp Volume(v), veh/h	12	27	30	714	1579	66
Grp Sat Flow(s),veh/h/ln	1681	1500	303	1765	1765	1500
Q Serve(g_s), s	1.0	2.4	12.0	7.8	97.5	0.5
Cycle Q Clear(g_c), s	1.0	2.4	109.5	7.8	97.5	0.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	43	38	114	1617	1617	1374
V/C Ratio(X)	0.28	0.71	0.26	0.44	0.98	0.05
Avail Cap(c_a), veh/h	197	175	116	1626	1626	1382
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	66.2	48.2	0.8	4.6	0.5
Incr Delay (d2), s/veh	3.5	21.5	1.2	0.2	17.0	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	0.5	1.2	1.0	3.7	51.5	0.2
LnGrp Delay(d),s/veh	69.0	87.7	49.4	1.0	21.6	0.5
LnGrp LOS	E	F	D	A	C	A
Approach Vol, veh/h	39			744	1645	
Approach Delay, s/veh	81.9			2.9	20.7	
Approach LOS	F			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		129.3		7.5		129.3		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		126.0		16.0		126.0		
Max Q Clear Time (g_c+I1), s		111.5		4.4		99.5		
Green Ext Time (p_c), s		13.8		0.0		24.5		

Intersection Summary	
HCM 2010 Ctrl Delay	16.3
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	688	1584	209	308	611	202	119	408	322	465	1786	264
Future Volume (veh/h)	688	1584	209	308	611	202	119	408	322	465	1786	264
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		0.88	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	732	1685	222	328	650	215	127	434	343	495	1900	281
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	391	742	291	369	719	283	148	759	344	514	1924	281
Arrive On Green	0.12	0.22	0.22	0.11	0.21	0.21	0.09	0.24	0.24	0.31	0.45	0.45
Sat Flow, veh/h	3261	3353	1314	3261	3353	1321	1681	3212	1456	1681	4237	619
Grp Volume(v), veh/h	732	1685	222	328	650	215	127	434	343	495	1434	747
Grp Sat Flow(s),veh/h/ln	1630	1676	1314	1630	1676	1321	1681	1606	1456	1681	1606	1644
Q Serve(g_s), s	18.0	33.2	23.7	14.9	28.3	22.9	11.2	17.9	35.3	43.5	66.1	68.1
Cycle Q Clear(g_c), s	18.0	33.2	23.7	14.9	28.3	22.9	11.2	17.9	35.3	43.5	66.1	68.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.38
Lane Grp Cap(c), veh/h	391	742	291	369	719	283	148	759	344	514	1458	747
V/C Ratio(X)	1.87	2.27	0.76	0.89	0.90	0.76	0.86	0.57	1.00	0.96	0.98	1.00
Avail Cap(c_a), veh/h	391	742	291	391	738	291	269	759	344	560	1458	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.0	58.4	54.7	65.6	57.4	55.3	67.5	50.6	57.2	51.2	40.4	41.0
Incr Delay (d2), s/veh	401.5	575.6	10.3	19.7	13.9	9.6	5.4	1.3	47.6	27.2	20.0	33.0
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	29.9	74.7	9.4	7.7	14.6	9.1	5.4	8.1	18.7	24.1	33.3	37.7
LnGrp Delay(d),s/veh	467.5	634.0	65.0	85.3	71.3	64.8	72.9	51.9	104.8	78.5	60.4	74.0
LnGrp LOS	F	F	E	F	E	E	E	D	F	E	E	F
Approach Vol, veh/h		2639			1193			904			2676	
Approach Delay, s/veh		540.0			74.0			74.9			67.5	
Approach LOS		F			E			E			E	

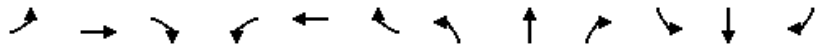
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.2	73.6	21.0	38.2	49.9	41.0	22.0	37.2
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	24.0	56.5	18.0	33.0	50.0	30.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	13.2	70.1	16.9	35.2	45.5	37.3	20.0	30.3
Green Ext Time (p_c), s	0.1	0.0	0.1	0.0	0.4	0.0	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	237.7
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	1347	175	78	1128	261	76	14	22	155	26	266
Future Volume (vph)	299	1347	175	78	1128	261	76	14	22	155	26	266
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	318	1433	186	83	1200	278	81	15	23	165	28	283
RTOR Reduction (vph)	0	0	73	0	0	90	0	0	21	0	0	217
Lane Group Flow (vph)	318	1433	113	83	1200	188	81	15	2	165	28	66
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1			8			1			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	15.1	67.0	67.0	8.0	59.9	59.9	6.6	7.5	7.5	10.0	10.4	25.5
Effective Green, g (s)	15.1	67.0	67.0	8.0	59.9	59.9	6.6	7.5	7.5	10.0	10.4	25.5
Actuated g/C Ratio	0.14	0.61	0.61	0.07	0.54	0.54	0.06	0.07	0.07	0.09	0.09	0.23
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	446	2934	902	236	2623	802	195	228	100	295	166	612
v/s Ratio Prot	c0.10	c0.30		0.03	0.25		0.02	0.00		c0.05	c0.02	0.01
v/s Ratio Perm			0.08			0.13			0.00			0.01
v/c Ratio	0.71	0.49	0.13	0.35	0.46	0.23	0.42	0.07	0.02	0.56	0.17	0.11
Uniform Delay, d1	45.4	12.0	9.1	48.5	15.2	13.1	49.8	48.0	47.8	47.9	45.8	33.3
Progression Factor	1.00	1.00	1.00	1.29	0.41	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.6	0.3	0.2	0.0	0.0	0.5	0.0	0.0	1.3	0.2	0.0
Delay (s)	49.8	12.5	9.4	62.9	6.2	3.1	50.4	48.0	47.8	49.2	46.0	33.3
Level of Service	D	B	A	E	A	A	D	D	D	D	D	C
Approach Delay (s)		18.4			8.6			49.6			39.6	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

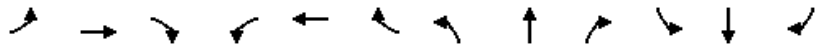
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	962	172	0	1077	120	524	492	239	120	328	244
Future Volume (veh/h)	86	962	172	0	1077	120	524	492	239	120	328	244
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	0	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	99	1106	0	0	1238	0	602	566	275	138	377	280
Adj No. of Lanes	2	3	1	0	3	0	2	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	169	2097	653	0	1650	0	608	727	353	166	826	368
Arrive On Green	0.05	0.44	0.00	0.00	0.34	0.00	0.19	0.33	0.33	0.10	0.25	0.25
Sat Flow, veh/h	3261	4818	1500	0	5135	0	3261	2179	1057	1681	3353	1495
Grp Volume(v), veh/h	99	1106	0	0	1238	0	602	435	406	138	377	280
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	0	1606	0	1630	1676	1559	1681	1676	1495
Q Serve(g_s), s	3.3	18.5	0.0	0.0	25.0	0.0	20.3	25.7	25.8	8.9	10.5	19.1
Cycle Q Clear(g_c), s	3.3	18.5	0.0	0.0	25.0	0.0	20.3	25.7	25.8	8.9	10.5	19.1
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.68	1.00		1.00
Lane Grp Cap(c), veh/h	169	2097	653	0	1650	0	608	560	520	166	826	368
V/C Ratio(X)	0.59	0.53	0.00	0.00	0.75	0.00	0.99	0.78	0.78	0.83	0.46	0.76
Avail Cap(c_a), veh/h	282	2097	653	0	1650	0	608	560	520	283	1006	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	22.8	0.0	0.0	32.0	0.0	44.7	33.0	33.0	48.6	35.2	38.4
Incr Delay (d2), s/veh	2.8	0.3	0.0	0.0	3.2	0.0	34.0	7.3	7.9	10.0	0.6	7.0
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	1.5	8.2	0.0	0.0	11.6	0.0	12.0	13.0	12.2	4.6	4.9	8.6
LnGrp Delay(d),s/veh	53.8	23.0	0.0	0.0	35.2	0.0	78.7	40.2	40.9	58.7	35.7	45.4
LnGrp LOS	D	C			D		E	D	D	E	D	D
Approach Vol, veh/h		1205			1238			1443			795	
Approach Delay, s/veh		25.6			35.2			56.5			43.1	
Approach LOS		C			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	10.2	42.7	25.0	32.1		52.9	15.4	41.7
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0		5.0	4.5	5.0
Max Green Setting (Gmax), s	9.5	28.0	20.5	33.0		42.0	18.5	35.0
Max Q Clear Time (g_c+I1), s	5.3	27.0	22.3	21.1		20.5	10.9	27.8
Green Ext Time (p_c), s	0.1	1.0	0.0	5.9		18.2	0.2	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	40.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	392	89	131	767	383	99	1390	96	63	793	36
Future Volume (veh/h)	144	392	89	131	767	383	99	1390	96	63	793	36
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	150	408	93	136	799	399	103	1448	100	66	826	38
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	1058	239	163	1280	560	127	1379	95	84	918	403
Arrive On Green	0.10	0.39	0.39	0.10	0.38	0.38	0.08	0.30	0.30	0.05	0.27	0.27
Sat Flow, veh/h	1681	2714	613	1681	3353	1467	1681	4596	317	1681	3353	1473
Grp Volume(v), veh/h	150	251	250	136	799	399	103	1012	536	66	826	38
Grp Sat Flow(s),veh/h/ln	1681	1676	1650	1681	1676	1467	1681	1606	1702	1681	1676	1473
Q Serve(g_s), s	9.6	11.8	12.0	8.7	21.3	25.4	6.6	33.0	33.0	4.3	26.1	2.1
Cycle Q Clear(g_c), s	9.6	11.8	12.0	8.7	21.3	25.4	6.6	33.0	33.0	4.3	26.1	2.1
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	176	654	643	163	1280	560	127	964	511	84	918	403
V/C Ratio(X)	0.85	0.38	0.39	0.84	0.62	0.71	0.81	1.05	1.05	0.79	0.90	0.09
Avail Cap(c_a), veh/h	183	654	643	244	1280	560	290	964	511	214	918	403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.35	0.35	0.35	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	24.1	24.1	48.8	27.6	28.9	50.0	38.5	38.5	51.7	38.5	29.8
Incr Delay (d2), s/veh	27.5	1.7	1.8	3.5	0.3	1.5	4.5	43.0	53.6	6.1	11.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	5.7	5.8	4.2	9.9	10.5	3.3	20.3	23.1	2.1	13.5	0.9
LnGrp Delay(d),s/veh	75.9	25.8	25.9	52.3	27.9	30.4	54.6	81.5	92.1	57.8	49.9	29.8
LnGrp LOS	E	C	C	D	C	C	D	F	F	E	D	C
Approach Vol, veh/h		651			1334			1651			930	
Approach Delay, s/veh		37.4			31.1			83.3			49.6	
Approach LOS		D			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.7	47.9	12.3	35.1	15.5	47.0	9.5	38.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	29.0	19.0	28.0	12.0	33.0	14.0	33.0
Max Q Clear Time (g_c+I1), s	10.7	14.0	8.6	28.1	11.6	27.4	6.3	35.0
Green Ext Time (p_c), s	0.1	8.6	0.1	0.0	0.0	3.1	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	140	0	0	1238	295	679	383	378	0	0	0
Future Volume (vph)	3	140	0	0	1238	295	679	383	378	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.99				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.97		1.00	0.95				
Flt Protected	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (prot)	1676	1765			3244		1442	4199				
Flt Permitted	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (perm)	1676	1765			3244		1442	4199				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	144	0	0	1276	304	700	395	390	0	0	0
RTOR Reduction (vph)	0	0	0	0	23	0	0	91	0	0	0	0
Lane Group Flow (vph)	3	144	0	0	1557	0	378	1016	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			16	16		
Confl. Bikes (#/hr)						1						1
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.2	34.7			29.5		44.8	44.8				
Effective Green, g (s)	1.2	34.7			29.5		44.8	44.8				
Actuated g/C Ratio	0.01	0.39			0.33		0.50	0.50				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	22	680			1063		717	2090				
v/s Ratio Prot	0.00	c0.08			c0.48		c0.26	0.24				
v/s Ratio Perm												
v/c Ratio	0.14	0.21			1.46		0.53	0.49				
Uniform Delay, d1	43.9	18.5			30.2		15.4	15.0				
Progression Factor	1.00	1.00			1.14		1.00	1.00				
Incremental Delay, d2	1.0	0.1			212.6		2.8	0.8				
Delay (s)	44.9	18.6			247.1		18.2	15.8				
Level of Service	D	B			F		B	B				
Approach Delay (s)		19.1			247.1			16.4			0.0	
Approach LOS		B			F			B			A	

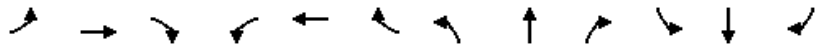
Intersection Summary			
HCM 2000 Control Delay	130.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	127	225	233	420	156	119	616	109	97	1879	776
Future Volume (vph)	160	127	225	233	420	156	119	616	109	97	1879	776
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	3002		1676	3353	1481	1676	4699		1676	4606	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	3002		1676	3353	1481	1676	4699		1676	4606	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	186	148	262	271	488	181	138	716	127	113	2185	902
RTOR Reduction (vph)	0	132	0	0	0	73	0	21	0	0	48	0
Lane Group Flow (vph)	186	278	0	271	488	108	138	822	0	113	3039	0
Confl. Peds. (#/hr)			2	2					1	1		
Confl. Bikes (#/hr)			1			1						
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	17.0	74.5		11.0	68.5	68.5	16.9	32.3		12.7	28.1	
Effective Green, g (s)	17.0	74.5		11.0	68.5	68.5	16.9	32.3		12.7	28.1	
Actuated g/C Ratio	0.11	0.50		0.07	0.46	0.46	0.11	0.22		0.08	0.19	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	189	1490		122	1531	676	188	1011		141	862	
v/s Ratio Prot	c0.11	0.09		c0.16	c0.15		c0.08	0.17		0.07	c0.66	
v/s Ratio Perm						0.07						
v/c Ratio	0.98	0.19		2.22	0.32	0.16	0.73	0.81		0.80	3.53	
Uniform Delay, d1	66.4	20.9		69.5	25.9	23.9	64.4	56.0		67.4	61.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.27	0.87		1.00	1.00	
Incremental Delay, d2	60.3	0.3		575.2	0.2	0.2	11.8	4.7		25.6	1139.4	
Delay (s)	126.7	21.2		644.7	26.1	24.0	93.4	53.5		93.0	1200.4	
Level of Service	F	C		F	C	C	F	D		F	F	
Approach Delay (s)		54.1			204.0			59.1			1161.3	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	699.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	120.1%	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)	155	454	38	1357	647	162	75	376	291	204	1551	543
Future Volume (veh/h)	155	454	38	1357	647	162	75	376	291	204	1551	543
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	168	493	0	1475	703	0	82	409	316	222	1686	590
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	935	291	456	1292	0	126	2058	631	268	2267	704
Arrive On Green	0.07	0.19	0.00	0.14	0.27	0.00	0.04	0.43	0.43	0.08	0.47	0.47
Sat Flow, veh/h	3261	4818	1500	3261	4976	0	3261	4818	1476	3261	4818	1495
Grp Volume(v), veh/h	168	493	0	1475	703	0	82	409	316	222	1686	590
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	0	1630	1606	1476	1630	1606	1495
Q Serve(g_s), s	7.6	13.8	0.0	21.0	18.8	0.0	3.7	8.0	23.4	10.1	42.8	51.8
Cycle Q Clear(g_c), s	7.6	13.8	0.0	21.0	18.8	0.0	3.7	8.0	23.4	10.1	42.8	51.8
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	935	291	456	1292	0	126	2058	631	268	2267	704
V/C Ratio(X)	0.78	0.53	0.00	3.23	0.54	0.00	0.65	0.20	0.50	0.83	0.74	0.84
Avail Cap(c_a), veh/h	761	1718	535	456	1292	0	304	2058	631	456	2267	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	69.0	54.3	0.0	64.5	47.0	0.0	71.1	26.9	31.3	67.8	32.3	34.7
Incr Delay (d2), s/veh	2.4	0.7	0.0	1009.8	0.6	0.0	2.1	0.1	0.9	0.2	0.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	6.2	0.0	73.5	8.4	0.0	1.7	3.5	9.7	4.5	18.9	21.6
LnGrp Delay(d),s/veh	71.4	54.9	0.0	1074.3	47.6	0.0	73.2	27.0	32.2	68.0	32.6	35.9
LnGrp LOS	E	D		F	D		E	C	C	E	C	D
Approach Vol, veh/h		661			2178			807			2498	
Approach Delay, s/veh		59.1			742.9			33.7			36.5	
Approach LOS		E			F			C			D	

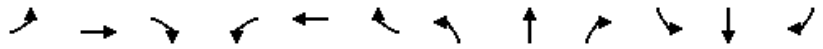
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	77.6	14.9	46.7	17.3	71.1	26.0	35.6
Change Period (Y+Rc), s	5.0	7.0	5.0	6.5	5.0	7.0	5.0	6.5
Max Green Setting (Gmax), s	14.0	38.0	35.0	39.5	21.0	31.0	21.0	53.5
Max Q Clear Time (g_c+I1), s	15.7	53.8	9.6	20.8	12.1	25.4	23.0	15.8
Green Ext Time (p_c), s	0.1	0.0	0.3	9.9	0.3	5.4	0.0	12.9

Intersection Summary	
HCM 2010 Ctrl Delay	289.0
HCM 2010 LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	337	147	1065	972	337	531
Future Volume (veh/h)	337	147	1065	972	337	531
Number	1	16	8	18	7	4
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	1765	1765	1765	1800	1765	1765
Adj Flow Rate, veh/h	351	153	1109	1012	351	553
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	352	162	1010	799	339	2700
Arrive On Green	0.11	0.11	0.57	0.57	0.20	0.81
Sat Flow, veh/h	3261	1500	1870	1410	1681	3441
Grp Volume(v), veh/h	351	153	1033	1088	351	553
Grp Sat Flow(s),veh/h/ln	1630	1500	1676	1516	1681	1676
Q Serve(g_s), s	16.1	15.2	85.0	85.0	30.3	5.8
Cycle Q Clear(g_c), s	16.1	15.2	85.0	85.0	30.3	5.8
Prop In Lane	1.00	1.00		0.93	1.00	
Lane Grp Cap(c), veh/h	352	162	950	859	339	2700
V/C Ratio(X)	1.00	0.94	1.09	1.27	1.03	0.20
Avail Cap(c_a), veh/h	352	162	950	859	339	2700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.9	66.5	32.5	32.5	59.8	3.4
Incr Delay (d2), s/veh	47.1	54.9	56.0	129.1	57.9	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	9.6	14.5	53.8	66.1	19.5	2.6
LnGrp Delay(d),s/veh	113.9	121.4	88.5	161.6	117.7	3.4
LnGrp LOS	F	F	F	F	F	A
Approach Vol, veh/h	504		2121			904
Approach Delay, s/veh	116.2		126.0			47.8
Approach LOS	F		F			D

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				126.8		23.2	35.8	91.0
Change Period (Y+Rc), s				6.0		7.0	5.5	6.0
Max Green Setting (Gmax), s				120.8		16.2	30.3	85.0
Max Q Clear Time (g_c+I1), s				7.8		18.1	32.3	87.0
Green Ext Time (p_c), s				55.8		0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	104.6
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	697	3	260	0	0	0	0	598	614	11	608	0
Future Volume (veh/h)	697	3	260	0	0	0	0	598	614	11	608	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		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1765				0	1765	1765	1765	1765	0
Adj Flow Rate, veh/h	704	3	0				0	604	0	11	614	0
Adj No. of Lanes	0	1	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	805	3	721				0	753	337	32	1092	0
Arrive On Green	0.48	0.48	0.00				0.00	0.22	0.00	0.02	0.33	0.00
Sat Flow, veh/h	1674	7	1500				0	3441	1500	1681	3441	0
Grp Volume(v), veh/h	707	0	0				0	604	0	11	614	0
Grp Sat Flow(s),veh/h/ln	1681	0	1500				0	1676	1500	1681	1676	0
Q Serve(g_s), s	25.3	0.0	0.0				0.0	11.4	0.0	0.4	10.2	0.0
Cycle Q Clear(g_c), s	25.3	0.0	0.0				0.0	11.4	0.0	0.4	10.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	808	0	721				0	753	337	32	1092	0
V/C Ratio(X)	0.87	0.00	0.00				0.00	0.80	0.00	0.34	0.56	0.00
Avail Cap(c_a), veh/h	926	0	826				0	799	357	213	1498	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.6	0.0	0.0				0.0	24.6	0.0	32.5	18.7	0.0
Incr Delay (d2), s/veh	9.4	0.0	0.0				0.0	5.6	0.0	6.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.7	0.0	0.0				0.0	5.9	0.0	0.3	4.8	0.0
LnGrp Delay(d),s/veh	25.0	0.0	0.0				0.0	30.3	0.0	38.5	19.1	0.0
LnGrp LOS	C							C		D	B	
Approach Vol, veh/h		707						604			625	
Approach Delay, s/veh		25.0						30.3			19.5	
Approach LOS		C						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		39.3		27.9			6.8	21.1
Change Period (Y+Rc), s		7.0		6.0			5.5	6.0
Max Green Setting (Gmax), s		37.0		30.0			8.5	16.0
Max Q Clear Time (g_c+I1), s		27.3		12.2			2.4	13.4
Green Ext Time (p_c), s		5.0		6.8			0.0	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
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	447	2	109	193	1102	0	0	172	284
Future Volume (vph)	0	0	0	447	2	109	193	1102	0	0	172	284
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1593	1597	1500	1676	3353			3353	1500
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1593	1597	1500	1676	3353			3353	1500
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	476	2	116	205	1172	0	0	183	302
RTOR Reduction (vph)	0	0	0	0	0	86	0	0	0	0	0	238
Lane Group Flow (vph)	0	0	0	238	240	30	205	1172	0	0	183	64
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				1	1		3	8			4	
Permitted Phases						1						4
Actuated Green, G (s)				13.8	13.8	13.8	9.3	26.0			11.2	11.2
Effective Green, g (s)				13.8	13.8	13.8	9.3	26.0			11.2	11.2
Actuated g/C Ratio				0.26	0.26	0.26	0.18	0.49			0.21	0.21
Clearance Time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Vehicle Extension (s)				4.5	4.5	4.5	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				416	417	392	295	1651			711	318
v/s Ratio Prot				0.15	c0.15		0.12	c0.35			0.05	
v/s Ratio Perm						0.02						0.04
v/c Ratio				0.57	0.58	0.08	0.69	0.71			0.26	0.20
Uniform Delay, d1				16.9	17.0	14.7	20.4	10.5			17.3	17.1
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				2.6	2.7	0.1	6.9	1.4			0.2	0.3
Delay (s)				19.6	19.6	14.8	27.4	11.9			17.5	17.4
Level of Service				B	B	B	C	B			B	B
Approach Delay (s)		0.0			18.7			14.2			17.5	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	18.5
Intersection Capacity Utilization	102.3%	ICU Level of Service	G
Analysis Period (min)	15		

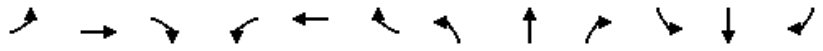
c Critical Lane Group

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	78	3	0	0	0	6	23	0	4	103	2	0	44	111	85
Future Vol, veh/h	0	78	3	0	0	0	6	23	0	4	103	2	0	44	111	85
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	104	4	0	0	0	8	31	0	5	137	3	0	59	148	113
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	10.3	8.3	9.9	8.7
HCM LOS	B	A	A	A

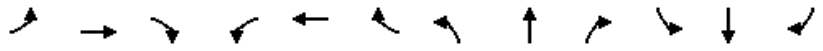
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	96%	0%	100%	0%	0%
Vol Thru, %	0%	98%	4%	21%	0%	93%	0%
Vol Right, %	0%	2%	0%	79%	0%	7%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	105	81	29	44	120	77
LT Vol	4	0	78	0	44	0	0
Through Vol	0	103	3	6	0	111	0
RT Vol	0	2	0	23	0	9	77
Lane Flow Rate	5	140	108	39	59	159	102
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.009	0.218	0.184	0.056	0.092	0.224	0.125
Departure Headway (Hd)	6.124	5.607	6.131	5.21	5.623	5.07	4.415
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	582	637	583	682	636	706	809
Service Time	3.889	3.372	3.895	2.983	3.368	2.814	2.16
HCM Lane V/C Ratio	0.009	0.22	0.185	0.057	0.093	0.225	0.126
HCM Control Delay	8.9	9.9	10.3	8.3	8.9	9.3	7.8
HCM Lane LOS	A	A	B	A	A	A	A
HCM 95th-tile Q	0	0.8	0.7	0.2	0.3	0.9	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	193	4	81	1	2	25	55	148	1	20	158	270
Future Volume (veh/h)	193	4	81	1	2	25	55	148	1	20	158	270
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	208	4	87	1	2	27	59	159	1	22	170	290
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	11	232	2	4	60	95	1106	7	23	471	420
Arrive On Green	0.16	0.16	0.16	0.04	0.04	0.04	0.06	0.32	0.32	0.01	0.28	0.28
Sat Flow, veh/h	1681	66	1441	51	101	1366	1681	3416	21	1681	1676	1495
Grp Volume(v), veh/h	208	0	91	30	0	0	59	78	82	22	170	290
Grp Sat Flow(s),veh/h/ln	1681	0	1507	1517	0	0	1681	1676	1761	1681	1676	1495
Q Serve(g_s), s	5.7	0.0	2.6	0.9	0.0	0.0	1.7	1.6	1.6	0.6	3.9	8.4
Cycle Q Clear(g_c), s	5.7	0.0	2.6	0.9	0.0	0.0	1.7	1.6	1.6	0.6	3.9	8.4
Prop In Lane	1.00		0.96	0.03		0.90	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	271	0	243	67	0	0	95	543	570	23	471	420
V/C Ratio(X)	0.77	0.00	0.38	0.45	0.00	0.00	0.62	0.14	0.14	0.94	0.36	0.69
Avail Cap(c_a), veh/h	834	0	748	753	0	0	226	836	878	202	811	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	18.1	22.5	0.0	0.0	22.3	11.6	11.6	23.8	13.9	15.5
Incr Delay (d2), s/veh	1.7	0.0	0.4	1.7	0.0	0.0	2.4	0.1	0.1	39.2	0.5	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	2.8	0.0	1.1	0.4	0.0	0.0	0.8	0.8	0.8	0.5	1.9	3.6
LnGrp Delay(d),s/veh	21.2	0.0	18.5	24.3	0.0	0.0	24.7	11.7	11.7	63.0	14.4	17.5
LnGrp LOS	C		B	C			C	B	B	E	B	B
Approach Vol, veh/h		299			30			219			482	
Approach Delay, s/veh		20.3			24.3			15.2			18.5	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	22.1		13.4	7.2	20.0		7.7
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	5.8	24.1		24.0	6.5	23.4		24.0
Max Q Clear Time (g_c+I1), s	2.6	3.6		7.7	3.7	10.4		2.9
Green Ext Time (p_c), s	0.0	3.5		0.1	0.0	3.0		0.0

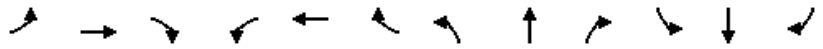
Intersection Summary	
HCM 2010 Ctrl Delay	18.5
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	764	793	132	126	419	196	116	156	139	605	309	521
Future Volume (veh/h)	764	793	132	126	419	196	116	156	139	605	309	521
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	813	844	140	134	446	0	123	166	148	644	329	554
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	551	1179	196	156	586	262	166	618	275	471	465	409
Arrive On Green	0.33	0.41	0.41	0.09	0.17	0.00	0.05	0.18	0.18	0.14	0.28	0.28
Sat Flow, veh/h	1681	2879	477	1681	3353	1500	3261	3353	1490	3261	1676	1474
Grp Volume(v), veh/h	813	492	492	134	446	0	123	166	148	644	329	554
Grp Sat Flow(s),veh/h/ln	1681	1676	1680	1681	1676	1500	1630	1676	1490	1630	1676	1474
Q Serve(g_s), s	46.5	34.8	34.8	11.2	18.0	0.0	5.3	6.0	12.8	20.5	25.0	39.4
Cycle Q Clear(g_c), s	46.5	34.8	34.8	11.2	18.0	0.0	5.3	6.0	12.8	20.5	25.0	39.4
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	551	687	688	156	586	262	166	618	275	471	465	409
V/C Ratio(X)	1.48	0.72	0.72	0.86	0.76	0.00	0.74	0.27	0.54	1.37	0.71	1.35
Avail Cap(c_a), veh/h	551	687	688	186	638	285	186	638	283	471	465	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	35.0	35.0	63.5	55.8	0.0	66.4	49.7	52.4	60.7	46.1	51.3
Incr Delay (d2), s/veh	224.1	4.1	4.1	27.7	5.8	0.0	12.9	0.2	1.9	178.6	4.9	174.4
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	55.8	16.9	16.9	6.4	8.8	0.0	2.7	2.8	5.4	20.9	12.2	35.9
LnGrp Delay(d),s/veh	271.8	39.1	39.1	91.2	61.6	0.0	79.3	49.9	54.3	239.3	50.9	225.7
LnGrp LOS	F	D	D	F	E		E	D	D	F	D	F
Approach Vol, veh/h		1797			580			437			1527	
Approach Delay, s/veh		144.4			68.4			59.7			193.8	
Approach LOS		F			E			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.7	65.1	12.7	45.4	52.0	31.8	26.0	32.1
Change Period (Y+Rc), s	5.5	7.0	5.5	6.0	5.5	7.0	5.5	6.0
Max Green Setting (Gmax), s	15.7	57.8	8.1	39.4	46.5	27.0	20.5	27.0
Max Q Clear Time (g_c+I1), s	13.2	36.8	7.3	41.4	48.5	20.0	22.5	14.8
Green Ext Time (p_c), s	0.1	13.4	0.0	0.0	0.0	4.8	0.0	5.7

Intersection Summary		
HCM 2010 Ctrl Delay		143.1
HCM 2010 LOS		F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	928	0	1042	0	0	0	0	979	137	0	393	222
Future Volume (veh/h)	928	0	1042	0	0	0	0	979	137	0	393	222
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	987	0	1109				0	1041	146	0	418	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	2103	0	968				0	1068	149	0	838	375
Arrive On Green	0.64	0.00	0.64				0.00	0.25	0.25	0.00	0.25	0.00
Sat Flow, veh/h	3261	0	1500				0	4429	598	0	3441	1500
Grp Volume(v), veh/h	987	0	1109				0	783	404	0	418	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1656	0	1676	1500
Q Serve(g_s), s	15.4	0.0	64.5				0.0	24.2	24.2	0.0	10.7	0.0
Cycle Q Clear(g_c), s	15.4	0.0	64.5				0.0	24.2	24.2	0.0	10.7	0.0
Prop In Lane	1.00		1.00				0.00		0.36	0.00		1.00
Lane Grp Cap(c), veh/h	2103	0	968				0	803	414	0	838	375
V/C Ratio(X)	0.47	0.00	1.15				0.00	0.97	0.98	0.00	0.50	0.00
Avail Cap(c_a), veh/h	2103	0	968				0	803	414	0	838	375
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	9.0	0.0	17.8				0.0	37.2	37.2	0.0	32.1	0.0
Incr Delay (d2), s/veh	0.2	0.0	78.1				0.0	25.5	38.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	0.0	47.3				0.0	13.5	15.4	0.0	5.0	0.0
LnGrp Delay(d),s/veh	9.2	0.0	95.9				0.0	62.7	75.2	0.0	32.6	0.0
LnGrp LOS	A		F					E	E		C	
Approach Vol, veh/h		2096						1187			418	
Approach Delay, s/veh		55.0						67.0			32.6	
Approach LOS		E						E			C	

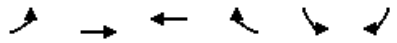
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		31.0		69.0		31.0		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		25.0		64.5		25.0		
Max Q Clear Time (g_c+I1), s		26.2		66.5		12.7		
Green Ext Time (p_c), s		0.0		0.0		7.6		

Intersection Summary	
HCM 2010 Ctrl Delay	56.3
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	502	0	261	105	83	240	138	888	0	0	783	66
Future Volume (vph)	502	0	261	105	83	240	138	888	0	0	783	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			0.86	
Frpb, ped/bikes	1.00		1.00		1.00	0.99	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.99	
Flt Protected	0.95		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3250		1500		1717	1481	1676	4818			5990	
Flt Permitted	0.64		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	2173		1500		1717	1481	1676	4818			5990	
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)	523	0	272	109	86	250	144	925	0	0	816	69
RTOR Reduction (vph)	0	0	199	0	0	85	0	0	0	0	13	0
Lane Group Flow (vph)	523	0	73	0	195	165	144	925	0	0	872	0
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	22.4		22.4		15.3	15.3	9.2	32.7			19.5	
Effective Green, g (s)	22.4		22.4		15.3	15.3	9.2	32.7			19.5	
Actuated g/C Ratio	0.27		0.27		0.18	0.18	0.11	0.39			0.23	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	583		402		314	271	184	1889			1400	
v/s Ratio Prot					c0.11		c0.09	0.19			c0.15	
v/s Ratio Perm	c0.24		0.05			0.11						
v/c Ratio	0.90		0.18		0.62	0.61	0.78	0.49			0.62	
Uniform Delay, d1	29.4		23.5		31.4	31.3	36.1	19.1			28.7	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	16.3		0.2		2.7	2.7	17.9	0.2			0.9	
Delay (s)	45.7		23.6		34.1	34.0	54.0	19.3			29.5	
Level of Service	D		C		C	C	D	B			C	
Approach Delay (s)		38.2			34.0			24.0			29.5	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	83.4	Sum of lost time (s)	17.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

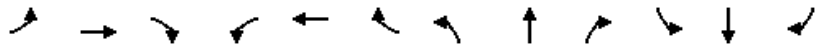
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	574	1050	465	253	259	376
Future Volume (veh/h)	574	1050	465	253	259	376
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	598	1094	484	264	270	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	783	2087	996	743	675	311
Arrive On Green	0.24	0.62	0.30	0.30	0.21	0.00
Sat Flow, veh/h	3261	3441	3441	1458	3261	1500
Grp Volume(v), veh/h	598	1094	484	264	270	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1458	1630	1500
Q Serve(g_s), s	8.0	8.6	5.6	5.1	3.4	0.0
Cycle Q Clear(g_c), s	8.0	8.6	5.6	5.1	3.4	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	783	2087	996	743	675	311
V/C Ratio(X)	0.76	0.52	0.49	0.36	0.40	0.00
Avail Cap(c_a), veh/h	1113	2575	1145	808	1113	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.6	5.0	13.5	7.0	16.1	0.0
Incr Delay (d2), s/veh	2.0	0.2	0.4	0.3	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	3.8	3.9	2.6	3.0	1.5	0.0
LnGrp Delay(d),s/veh	18.6	5.2	13.9	7.3	16.5	0.0
LnGrp LOS	B	A	B	A	B	
Approach Vol, veh/h		1692	748		270	
Approach Delay, s/veh		9.9	11.6		16.5	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				33.2		13.7	15.2	17.9
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				36.0		16.0	16.0	16.0
Max Q Clear Time (g_c+I1), s				10.6		5.4	10.0	7.6
Green Ext Time (p_c), s				13.9		0.7	1.3	6.3

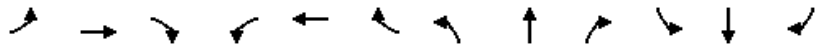
Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	876	296	220	358	19	348	31	557	30	18	29
Future Volume (veh/h)	27	876	296	220	358	19	348	31	557	30	18	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	28	903	305	227	369	20	359	32	574	31	19	30
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	781	263	206	1346	73	309	652	545	44	128	202
Arrive On Green	0.02	0.32	0.32	0.12	0.42	0.42	0.18	0.37	0.37	0.03	0.21	0.21
Sat Flow, veh/h	1681	2447	823	1681	3228	174	1681	1765	1474	1681	605	956
Grp Volume(v), veh/h	28	618	590	227	191	198	359	32	574	31	0	49
Grp Sat Flow(s),veh/h/ln	1681	1676	1594	1681	1676	1726	1681	1765	1474	1681	0	1561
Q Serve(g_s), s	2.1	41.5	41.5	15.9	9.7	9.8	23.9	1.5	48.0	2.4	0.0	3.3
Cycle Q Clear(g_c), s	2.1	41.5	41.5	15.9	9.7	9.8	23.9	1.5	48.0	2.4	0.0	3.3
Prop In Lane	1.00		0.52	1.00		0.10	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	41	535	509	206	699	720	309	652	545	44	0	330
V/C Ratio(X)	0.68	1.15	1.16	1.10	0.27	0.28	1.16	0.05	1.05	0.71	0.00	0.15
Avail Cap(c_a), veh/h	85	535	509	206	699	720	309	652	545	66	0	330
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	0.94	0.94	0.94	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.9	44.3	44.3	57.0	24.9	25.0	53.0	26.3	41.0	62.8	0.0	41.7
Incr Delay (d2), s/veh	15.6	86.6	89.8	93.5	0.1	0.1	101.2	0.1	52.4	19.2	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	32.0	30.9	12.7	4.5	4.7	19.8	0.8	27.4	1.3	0.0	1.5
LnGrp Delay(d),s/veh	78.5	130.8	134.1	150.5	25.0	25.1	154.3	26.5	93.4	82.1	0.0	42.7
LnGrp LOS	E	F	F	F	C	C	F	C	F	F		D
Approach Vol, veh/h		1236			616			965			80	
Approach Delay, s/veh		131.2			71.3			113.8			57.9	
Approach LOS		F			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	53.5	21.0	47.0	29.0	33.0	8.3	59.7
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	5.1	46.3	15.9	41.5	23.9	27.5	6.6	50.8
Max Q Clear Time (g_c+I1), s	11.4	50.0	17.9	43.5	25.9	5.3	4.1	11.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.7	0.0	9.6

Intersection Summary	
HCM 2010 Ctrl Delay	110.6
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1009	40	11	442	9	35	12	52	8	6	6
Future Volume (veh/h)	11	1009	40	11	442	9	35	12	52	8	6	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	11	1040	41	11	456	9	36	12	54	8	6	6
Adj No. of Lanes	1	1	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1160	46	12	2312	46	56	19	85	30	23	23
Arrive On Green	0.01	0.69	0.69	0.01	0.69	0.69	0.10	0.10	0.10	0.05	0.05	0.05
Sat Flow, veh/h	1681	1686	66	1681	3363	66	559	186	838	656	492	492
Grp Volume(v), veh/h	11	0	1081	11	227	238	102	0	0	20	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1753	1681	1676	1753	1583	0	0	1639	0	0
Q Serve(g_s), s	0.7	0.0	50.7	0.7	4.9	4.9	6.2	0.0	0.0	1.2	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	50.7	0.7	4.9	4.9	6.2	0.0	0.0	1.2	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.04	0.35		0.53	0.40		0.30
Lane Grp Cap(c), veh/h	12	0	1205	12	1153	1205	160	0	0	75	0	0
V/C Ratio(X)	0.93	0.00	0.90	0.93	0.20	0.20	0.64	0.00	0.00	0.27	0.00	0.00
Avail Cap(c_a), veh/h	183	0	1582	183	1513	1582	251	0	0	260	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	50.0	0.0	12.8	50.0	5.7	5.7	43.6	0.0	0.0	46.5	0.0	0.0
Incr Delay (d2), s/veh	104.1	0.0	5.8	104.1	0.1	0.1	4.2	0.0	0.0	1.9	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	0.6	0.0	26.0	0.6	2.3	2.4	2.9	0.0	0.0	0.6	0.0	0.0
LnGrp Delay(d),s/veh	154.1	0.0	18.6	154.1	5.8	5.8	47.7	0.0	0.0	48.3	0.0	0.0
LnGrp LOS	F		B	F	A	A	D			D		
Approach Vol, veh/h		1092			476			102			20	
Approach Delay, s/veh		20.0			9.2			47.7			48.3	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		14.2	4.7	73.3		8.6	4.7	73.3
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	91.0		16.0	11.0	91.0
Max Q Clear Time (g_c+I1), s		8.2	2.7	52.7		3.2	2.7	6.9
Green Ext Time (p_c), s		0.3	0.0	16.6		0.0	0.0	20.3

Intersection Summary		
HCM 2010 Ctrl Delay		19.0
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	312	0	43	0	0	0	0	116	14	5	63	0
Future Vol, veh/h	312	0	43	0	0	0	0	116	14	5	63	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	351	0	48	0	0	0	0	130	16	6	71	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	212	212	71	-	0	0	130	0	0
Stage 1	82	82	-	-	-	-	-	-	-
Stage 2	130	130	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	776	685	991	0	-	-	1455	-	0
Stage 1	941	827	-	0	-	-	-	-	0
Stage 2	896	789	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	773	0	991	-	-	-	1455	-	-
Mov Cap-2 Maneuver	773	0	-	-	-	-	-	-	-
Stage 1	937	0	-	-	-	-	-	-	-
Stage 2	896	0	-	-	-	-	-	-	-

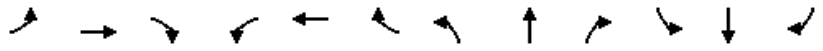
Approach	EB	NB	SB
HCM Control Delay, s	14	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	794	1455	-
HCM Lane V/C Ratio	-	-	0.502	0.004	-
HCM Control Delay (s)	-	-	14	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	2.9	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	35	393	68	190
Future Volume (Veh/h)	0	0	35	393	68	190
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	38	423	73	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	572	73	73			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	572	73	73			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	470	989	1527			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	38	423	73	204
Volume Left	38	0	0	0
Volume Right	0	0	0	204
cSH	1527	1700	1700	1700
Volume to Capacity	0.02	0.25	0.04	0.12
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	7.4	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.6		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	167	288	102	240	49	229	334	91	49	395	26
Future Volume (veh/h)	42	167	288	102	240	49	229	334	91	49	395	26
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	46	184	0	112	264	54	252	367	100	54	434	29
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	109	380	323	153	334	68	301	715	601	116	512	429
Arrive On Green	0.07	0.22	0.00	0.09	0.24	0.23	0.18	0.41	0.41	0.07	0.30	0.30
Sat Flow, veh/h	1681	1765	1500	1681	1413	289	1648	1731	1455	1648	1731	1449
Grp Volume(v), veh/h	46	184	0	112	0	318	252	367	100	54	434	29
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1703	1648	1731	1455	1648	1731	1449
Q Serve(g_s), s	2.0	7.0	0.0	4.9	0.0	13.4	11.3	12.0	3.3	2.4	18.0	1.1
Cycle Q Clear(g_c), s	2.0	7.0	0.0	4.9	0.0	13.4	11.3	12.0	3.3	2.4	18.0	1.1
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	109	380	323	153	0	402	301	715	601	116	512	429
V/C Ratio(X)	0.42	0.48	0.00	0.73	0.00	0.79	0.84	0.51	0.17	0.47	0.85	0.07
Avail Cap(c_a), veh/h	168	579	492	176	0	567	324	758	637	164	590	494
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	26.2	0.0	33.7	0.0	27.4	30.1	16.7	14.1	34.1	25.2	19.3
Incr Delay (d2), s/veh	2.6	1.0	0.0	12.4	0.0	5.0	16.5	0.6	0.1	2.9	9.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	3.5	0.0	2.8	0.0	6.8	6.5	5.8	1.3	1.2	10.0	0.4
LnGrp Delay(d),s/veh	36.8	27.2	0.0	46.2	0.0	32.4	46.6	17.2	14.2	36.9	35.2	19.3
LnGrp LOS	D	C		D		C	D	B	B	D	D	B
Approach Vol, veh/h		230			430			719			517	
Approach Delay, s/veh		29.1			36.0			27.1			34.5	
Approach LOS		C			D			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	17.9	27.0	9.0	22.4	9.4	35.5	10.9	20.4
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	14.4	* 25	7.0	* 25	7.0	32.4	7.4	24.0
Max Q Clear Time (g_c+I1), s	13.3	20.0	4.0	15.4	4.4	14.0	6.9	9.0
Green Ext Time (p_c), s	0.1	2.0	0.0	1.4	0.0	3.8	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	31.4
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	1258	164	150	641	4	82	5	90	8	8	6
Future Volume (veh/h)	16	1258	164	150	641	4	82	5	90	8	8	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	16	1297	169	155	661	4	85	5	93	8	8	6
Adj No. of Lanes	1	2	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	1505	664	189	1827	11	129	260	221	24	80	60
Arrive On Green	0.03	0.45	0.45	0.11	0.53	0.53	0.08	0.15	0.15	0.01	0.08	0.08
Sat Flow, veh/h	1681	3353	1478	1681	3416	21	1681	1765	1500	1681	938	703
Grp Volume(v), veh/h	16	1297	169	155	324	341	85	5	93	8	0	14
Grp Sat Flow(s),veh/h/ln	1681	1676	1478	1681	1676	1760	1681	1765	1500	1681	0	1641
Q Serve(g_s), s	0.7	26.4	5.4	6.8	8.5	8.5	3.7	0.2	4.3	0.4	0.0	0.6
Cycle Q Clear(g_c), s	0.7	26.4	5.4	6.8	8.5	8.5	3.7	0.2	4.3	0.4	0.0	0.6
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	44	1505	664	189	897	941	129	260	221	24	0	139
V/C Ratio(X)	0.36	0.86	0.25	0.82	0.36	0.36	0.66	0.02	0.42	0.33	0.00	0.10
Avail Cap(c_a), veh/h	155	1680	741	199	897	941	266	768	653	199	0	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.3	18.8	13.0	32.9	10.2	10.2	34.0	27.6	29.4	37.0	0.0	32.0
Incr Delay (d2), s/veh	4.9	4.1	0.1	22.4	0.1	0.1	5.6	0.0	1.3	7.8	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	12.9	2.2	4.4	3.9	4.1	1.9	0.1	1.9	0.2	0.0	0.3
LnGrp Delay(d),s/veh	41.1	22.8	13.1	55.3	10.3	10.3	39.6	27.7	30.6	44.9	0.0	32.3
LnGrp LOS	D	C	B	E	B	B	D	C	C	D		C
Approach Vol, veh/h		1482			820			183			22	
Approach Delay, s/veh		21.9			18.8			34.7			36.9	
Approach LOS		C			B			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	40.0	10.8	11.4	7.0	46.5	6.1	16.2
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	9.0	38.0	12.0	30.0	7.0	40.0	9.0	33.0
Max Q Clear Time (g_c+I1), s	10.8	28.4	5.7	2.6	2.7	10.5	2.4	6.3
Green Ext Time (p_c), s	0.0	5.7	0.1	0.4	0.0	10.6	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	22.0
HCM 2010 LOS	C

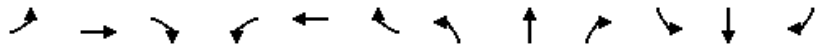
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1213	143	82	730	65	71
Future Volume (veh/h)	1213	143	82	730	65	71
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	1238	146	84	745	66	72
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1606	189	149	2368	179	160
Arrive On Green	0.53	0.53	0.09	0.71	0.11	0.11
Sat Flow, veh/h	3106	354	1681	3441	1681	1500
Grp Volume(v), veh/h	686	698	84	745	66	72
Grp Sat Flow(s),veh/h/ln	1676	1695	1681	1676	1681	1500
Q Serve(g_s), s	19.0	19.3	2.8	4.9	2.1	2.6
Cycle Q Clear(g_c), s	19.0	19.3	2.8	4.9	2.1	2.6
Prop In Lane		0.21	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	893	903	149	2368	179	160
V/C Ratio(X)	0.77	0.77	0.56	0.31	0.37	0.45
Avail Cap(c_a), veh/h	970	981	257	2738	457	408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	10.9	25.7	3.3	24.4	24.6
Incr Delay (d2), s/veh	3.5	3.6	3.3	0.1	1.3	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	9.8	1.4	2.2	1.1	1.2
LnGrp Delay(d),s/veh	14.4	14.5	29.0	3.3	25.7	26.6
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	1384			829	138	
Approach Delay, s/veh	14.5			5.9	26.2	
Approach LOS	B			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.2	37.3				47.5		11.3
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	9.0	34.0				48.0		16.0
Max Q Clear Time (g_c+I1), s	4.8	21.3				6.9		4.6
Green Ext Time (p_c), s	0.1	10.0				23.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1114	170	169	722	90	153
Future Volume (vph)	1114	170	169	722	90	153
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3259		1676	3353	1585	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3259		1676	3353	1585	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1137	173	172	737	92	156
RTOR Reduction (vph)	12	0	0	0	61	0
Lane Group Flow (vph)	1298	0	172	737	187	0
Confl. Peds. (#/hr)		15	15			
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	38.0		10.0	77.0	11.0	
Effective Green, g (s)	39.0		10.6	77.6	11.6	
Actuated g/C Ratio	0.40		0.11	0.79	0.12	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	1296		181	2655	187	
v/s Ratio Prot	c0.40		c0.10	c0.22	c0.12	
v/s Ratio Perm						
v/c Ratio	1.00		0.95	0.28	1.00	
Uniform Delay, d1	29.5		43.4	2.7	43.2	
Progression Factor	1.00		0.96	0.40	1.00	
Incremental Delay, d2	25.4		52.2	0.1	66.0	
Delay (s)	54.9		94.0	1.2	109.2	
Level of Service	D		F	A	F	
Approach Delay (s)	54.9			18.7	109.2	
Approach LOS	D			B	F	

Intersection Summary			
HCM 2000 Control Delay	47.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	74.2%	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)	377	798	194	43	328	262	328	456	228	737	392	453
Future Volume (veh/h)	377	798	194	43	328	262	328	456	228	737	392	453
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1731	1731	1800	1731	1731	1731
Adj Flow Rate, veh/h	401	849	206	46	349	279	349	485	243	784	417	482
Adj No. of Lanes	2	2	1	1	2	1	1	2	0	2	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	451	1040	443	72	719	313	382	546	272	853	506	429
Arrive On Green	0.14	0.31	0.30	0.04	0.21	0.21	0.23	0.26	0.25	0.18	0.20	0.20
Sat Flow, veh/h	3261	3353	1482	1681	3353	1462	1648	2124	1058	3198	1731	1465
Grp Volume(v), veh/h	401	849	206	46	349	279	349	375	353	784	417	482
Grp Sat Flow(s),veh/h/ln	1630	1676	1482	1681	1676	1462	1648	1644	1538	1599	1731	1465
Q Serve(g_s), s	15.7	30.4	14.7	3.5	11.9	24.1	26.8	28.5	28.8	31.3	30.0	38.0
Cycle Q Clear(g_c), s	15.7	30.4	14.7	3.5	11.9	24.1	26.8	28.5	28.8	31.3	30.0	38.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.69	1.00		1.00
Lane Grp Cap(c), veh/h	451	1040	443	72	719	313	382	423	396	853	506	429
V/C Ratio(X)	0.89	0.82	0.47	0.64	0.49	0.89	0.91	0.89	0.89	0.92	0.82	1.12
Avail Cap(c_a), veh/h	451	1040	443	83	735	320	393	423	396	861	506	429
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	0.97	0.97	0.97	0.98	0.98	0.98	1.00	1.00	1.00	0.60	0.60	0.60
Uniform Delay (d), s/veh	55.0	41.4	37.1	61.2	44.8	49.6	48.7	46.4	47.1	52.0	49.0	52.3
Incr Delay (d2), s/veh	18.6	4.8	0.4	12.4	0.3	23.9	25.1	22.9	24.9	9.7	9.0	73.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	14.7	6.1	1.9	5.5	11.8	14.9	15.6	15.0	15.0	15.6	24.1
LnGrp Delay(d),s/veh	73.6	46.2	37.5	73.6	45.0	73.5	73.8	69.4	72.0	61.7	58.0	125.7
LnGrp LOS	E	D	D	E	D	E	E	E	E	E	E	F
Approach Vol, veh/h		1456			674			1077			1683	
Approach Delay, s/veh		52.5			58.8			71.7			79.1	
Approach LOS		D			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	38.7	37.4	9.6	44.3	34.1	42.0	22.0	31.9
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	33.6	31.0	5.3	38.6	29.9	35.0	16.9	27.0
Max Q Clear Time (g_c+I1), s	33.3	30.8	5.5	32.4	28.8	40.0	17.7	26.1
Green Ext Time (p_c), s	0.3	0.1	0.0	3.1	0.2	0.0	0.0	0.2

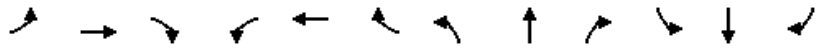
Intersection Summary	
HCM 2010 Ctrl Delay	66.8
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	493	19	271	17	9	82	56	1029	10	149	1294	400
Future Volume (vph)	493	19	271	17	9	82	56	1029	10	149	1294	400
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1602	1468	1676	1527		1644	3282		1644	4195	
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1602	1468	1676	1527		1644	3282		1644	4195	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	524	20	288	18	10	87	60	1095	11	159	1377	426
RTOR Reduction (vph)	0	0	116	0	82	0	0	1	0	0	37	0
Lane Group Flow (vph)	267	277	172	18	15	0	60	1105	0	159	1766	0
Confl. Peds. (#/hr)			6	6			11		11	11		11
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	25.7	25.7	25.7	6.2	6.2		6.4	62.4		15.3	71.3	
Effective Green, g (s)	26.8	26.8	26.8	7.3	7.3		7.5	63.5		16.4	72.4	
Actuated g/C Ratio	0.21	0.21	0.21	0.06	0.06		0.06	0.49		0.13	0.56	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	328	330	302	94	85		94	1603		207	2336	
v/s Ratio Prot	0.17	c0.17		c0.01	0.01		0.04	0.34		c0.10	c0.42	
v/s Ratio Perm			0.12									
v/c Ratio	0.81	0.84	0.57	0.19	0.18		0.64	0.69		0.77	0.76	
Uniform Delay, d1	49.2	49.5	46.4	58.5	58.5		59.9	25.6		55.0	22.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.37	0.34		1.10	0.62	
Incremental Delay, d2	13.6	16.2	1.5	0.4	0.4		6.4	1.5		1.4	0.2	
Delay (s)	62.8	65.7	47.9	58.9	58.8		88.5	10.3		61.9	13.8	
Level of Service	E	E	D	E	E		F	B		E	B	
Approach Delay (s)		58.6			58.8			14.3			17.7	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.9%	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 (vph)	99	438	940	0	0	652	0	1114	490	275	953	459
Future Volume (vph)	99	438	940	0	0	652	0	1114	490	275	953	459
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			0.88		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.98			0.99		1.00	0.98	1.00	1.00	0.95
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3507	1548			2751		3471	1523	3367	3471	1470
Flt Permitted		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3507	1548			2751		3471	1523	3367	3471	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	461	989	0	0	686	0	1173	516	289	1003	483
RTOR Reduction (vph)	0	0	8	0	0	395	0	0	36	0	0	0
Lane Group Flow (vph)	0	565	981	0	0	291	0	1173	480	289	1003	483
Confl. Peds. (#/hr)			38	38			68		4	4		68
Confl. Bikes (#/hr)			3			1						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		30.7	71.7			30.7		70.2	70.2	15.1	43.3	130.0
Effective Green, g (s)		30.3	70.9			30.2		69.7	69.7	14.1	42.8	130.0
Actuated g/C Ratio		0.23	0.55			0.23		0.54	0.54	0.11	0.33	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		817	908			639		1860	816	365	1142	1470
v/s Ratio Prot			c0.34					0.34		0.09	c0.29	
v/s Ratio Perm		0.16	0.30			0.11			0.32			0.33
v/c Ratio		0.69	1.08			0.46		0.63	0.59	0.79	0.88	0.33
Uniform Delay, d1		45.6	29.5			42.8		21.1	20.4	56.5	41.1	0.0
Progression Factor		1.00	1.00			1.00		0.81	0.78	0.96	0.94	1.00
Incremental Delay, d2		2.1	54.1			0.2		1.2	2.2	10.4	9.6	0.6
Delay (s)		47.6	83.7			43.0		18.2	18.2	64.4	48.4	0.6
Level of Service		D	F			D		B	B	E	D	A
Approach Delay (s)		70.6			43.0			18.2			38.0	
Approach LOS		E			D			B			D	

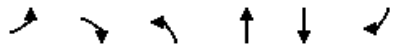
Intersection Summary			
HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	209	151	65	372	1169	685	88	705	133
Future Volume (veh/h)	0	0	0	209	151	65	372	1169	685	88	705	133
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		0.95	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1765	1800	1731	1731	1800	1731	1731	1800
Adj Flow Rate, veh/h				213	154	66	380	1193	699	90	719	136
Adj No. of Lanes				0	2	0	2	3	0	1	2	0
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	2	0	4	4	4	4	4	4
Cap, veh/h				246	194	84	436	2139	946	109	1676	317
Arrive On Green				0.16	0.16	0.16	0.14	0.68	0.68	0.13	1.00	1.00
Sat Flow, veh/h				1579	1240	536	3198	3150	1393	1648	2751	520
Grp Volume(v), veh/h				227	0	206	380	1193	699	90	430	425
Grp Sat Flow(s),veh/h/ln				1686	0	1669	1599	1575	1393	1648	1644	1627
Q Serve(g_s), s				17.1	0.0	15.4	15.1	25.4	42.1	6.9	0.0	0.0
Cycle Q Clear(g_c), s				17.1	0.0	15.4	15.1	25.4	42.1	6.9	0.0	0.0
Prop In Lane				0.94		0.32	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h				263	0	261	436	2139	946	109	1002	991
V/C Ratio(X)				0.86	0.00	0.79	0.87	0.56	0.74	0.82	0.43	0.43
Avail Cap(c_a), veh/h				441	0	436	566	2139	946	178	1002	991
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh				53.5	0.0	52.8	55.0	10.8	13.5	55.6	0.0	0.0
Incr Delay (d2), s/veh				7.3	0.0	4.0	9.6	1.1	5.2	6.6	1.3	1.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.5	0.0	7.4	7.3	11.2	17.5	3.3	0.4	0.4
LnGrp Delay(d),s/veh				60.8	0.0	56.8	64.6	11.8	18.7	62.2	1.3	1.4
LnGrp LOS				E		E	E	B	B	E	A	A
Approach Vol, veh/h					433			2272			945	
Approach Delay, s/veh					58.9			22.8			7.1	
Approach LOS					E			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	12.6	93.1			21.7	84.0		24.3
Change Period (Y+Rc), s	4.0	5.0			4.0	5.0		4.0
Max Green Setting (Gmax), s	14.0	69.0			23.0	60.0		34.0
Max Q Clear Time (g_c+I1), s	8.9	44.1			17.1	2.0		19.1
Green Ext Time (p_c), s	0.1	21.0			0.6	40.9		1.2

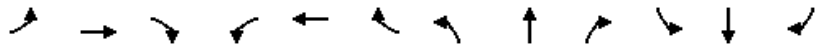
Intersection Summary		
HCM 2010 Ctrl Delay		23.0
HCM 2010 LOS		C



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	177	278	991	601	28
Future Volume (veh/h)	28	177	278	991	601	28
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	29	182	287	1022	620	29
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	229	205	307	2650	1878	88
Arrive On Green	0.14	0.14	0.37	1.00	1.00	1.00
Sat Flow, veh/h	1681	1500	1681	3441	3343	152
Grp Volume(v), veh/h	29	182	287	1022	319	330
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1731
Q Serve(g_s), s	2.0	15.5	21.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.0	15.5	21.4	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00			0.09
Lane Grp Cap(c), veh/h	229	205	307	2650	967	998
V/C Ratio(X)	0.13	0.89	0.93	0.39	0.33	0.33
Avail Cap(c_a), veh/h	375	335	543	2650	967	998
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.23	0.23
Uniform Delay (d), s/veh	49.3	55.2	40.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	9.5	8.6	0.4	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	12.7	10.6	0.2	0.1	0.1
LnGrp Delay(d),s/veh	49.4	64.6	49.0	0.4	0.2	0.2
LnGrp LOS	D	E	D	A	A	A
Approach Vol, veh/h	211			1309	649	
Approach Delay, s/veh	62.5			11.1	0.2	
Approach LOS	E			B	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		108.2		21.8	27.8	80.5		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		91.5		29.0	42.0	45.5		
Max Q Clear Time (g_c+I1), s		2.0		17.5	23.4	2.0		
Green Ext Time (p_c), s		31.1		0.3	0.4	23.5		

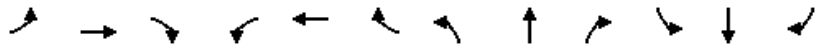
Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1699	23	1	593	2	18	5	3	5	5	7
Future Volume (veh/h)	7	1699	23	1	593	2	18	5	3	5	5	7
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	8	1847	25	1	645	2	20	5	3	5	5	8
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	1904	26	2	1899	6	97	9	43	48	10	13
Arrive On Green	0.01	0.56	0.55	0.00	1.00	1.00	0.03	0.03	0.03	0.03	0.03	0.03
Sat Flow, veh/h	1681	3386	46	1681	3429	11	1303	326	1490	211	341	442
Grp Volume(v), veh/h	8	912	960	1	315	332	25	0	3	18	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1755	1681	1676	1763	1628	0	1490	995	0	0
Q Serve(g_s), s	0.5	57.5	58.1	0.1	0.0	0.0	0.0	0.0	0.2	0.8	0.0	0.0
Cycle Q Clear(g_c), s	0.5	57.5	58.1	0.1	0.0	0.0	1.6	0.0	0.2	2.4	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.01	0.80		1.00	0.28		0.44
Lane Grp Cap(c), veh/h	17	943	987	2	929	976	106	0	43	71	0	0
V/C Ratio(X)	0.48	0.97	0.97	0.43	0.34	0.34	0.24	0.00	0.07	0.25	0.00	0.00
Avail Cap(c_a), veh/h	168	945	989	168	945	994	393	0	339	373	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.33	0.33	0.33	0.99	0.99	0.99	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	54.2	23.1	23.2	54.8	0.0	0.0	52.6	0.0	51.9	53.1	0.0	0.0
Incr Delay (d2), s/veh	2.7	10.4	10.7	41.0	1.0	0.9	0.4	0.0	0.2	0.7	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	0.3	29.1	30.9	0.1	0.3	0.3	0.8	0.0	0.1	0.6	0.0	0.0
LnGrp Delay(d),s/veh	56.8	33.5	34.0	95.8	1.0	0.9	53.0	0.0	52.2	53.8	0.0	0.0
LnGrp LOS	E	C	C	F	A	A	D		D	D		
Approach Vol, veh/h		1880			648			28			18	
Approach Delay, s/veh		33.8			1.1			52.9			53.8	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	65.9		7.2	5.1	64.9		7.2
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I1), s	2.1	60.1		4.4	2.5	2.0		3.6
Green Ext Time (p_c), s	0.0	0.8		0.0	0.0	14.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.9
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1492	129	31	496	8	60	5	39	11	5	14
Future Volume (veh/h)	17	1492	129	31	496	8	60	5	39	11	5	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	18	1571	136	33	522	8	63	5	41	12	5	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	1727	148	68	1914	29	124	13	51	83	40	69
Arrive On Green	0.03	0.55	0.54	0.05	0.75	0.74	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	1681	3125	268	1681	3380	52	790	139	560	418	434	752
Grp Volume(v), veh/h	18	837	870	33	259	271	109	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1717	1681	1676	1755	1488	0	0	1604	0	0
Q Serve(g_s), s	1.2	49.0	50.6	2.1	5.3	5.3	5.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.2	49.0	50.6	2.1	5.3	5.3	7.8	0.0	0.0	2.0	0.0	0.0
Prop In Lane	1.00		0.16	1.00		0.03	0.58		0.38	0.37		0.47
Lane Grp Cap(c), veh/h	45	927	949	68	949	994	187	0	0	191	0	0
V/C Ratio(X)	0.40	0.90	0.92	0.49	0.27	0.27	0.58	0.00	0.00	0.17	0.00	0.00
Avail Cap(c_a), veh/h	168	975	999	168	975	1021	357	0	0	365	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	0.72	0.99	0.99	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	52.6	22.0	22.4	50.9	6.5	6.6	48.9	0.0	0.0	46.3	0.0	0.0
Incr Delay (d2), s/veh	4.0	8.5	9.6	5.2	0.7	0.7	2.8	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	24.7	26.2	1.1	2.5	2.7	3.4	0.0	0.0	0.9	0.0	0.0
LnGrp Delay(d),s/veh	56.7	30.4	32.0	56.2	7.2	7.2	51.7	0.0	0.0	46.7	0.0	0.0
LnGrp LOS	E	C	C	E	A	A	D			D		
Approach Vol, veh/h		1725			563			109			32	
Approach Delay, s/veh		31.5			10.1			51.7			46.7	
Approach LOS		C			B			D			D	

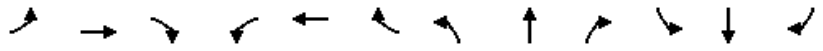
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.4	64.8		14.0	7.0	66.3		14.0
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	4.0	63.0		23.0	11.0	63.0		23.0
Max Q Clear Time (g_c+I1), s	4.1	52.6		4.0	3.2	7.3		9.8
Green Ext Time (p_c), s	0.0	7.2		0.5	0.0	16.7		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	27.6
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1497	29	18	537	16	14
Future Volume (vph)	1497	29	18	537	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.94	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3341		1676	3353	1598	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3341		1676	3353	1598	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1593	31	19	571	17	15
RTOR Reduction (vph)	1	0	0	0	14	0
Lane Group Flow (vph)	1623	0	19	571	18	0
Confl. Peds. (#/hr)		4	4			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	83.4		3.2	91.6	7.4	
Effective Green, g (s)	85.4		4.2	93.6	8.4	
Actuated g/C Ratio	0.78		0.04	0.85	0.08	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2593		63	2853	122	
v/s Ratio Prot	c0.49		c0.01	0.17	c0.01	
v/s Ratio Perm						
v/c Ratio	0.63		0.30	0.20	0.15	
Uniform Delay, d1	5.4		51.5	1.5	47.5	
Progression Factor	0.87		0.62	1.63	1.00	
Incremental Delay, d2	0.4		2.6	0.2	0.6	
Delay (s)	5.1		34.3	2.6	48.0	
Level of Service	A		C	A	D	
Approach Delay (s)	5.1			3.6	48.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

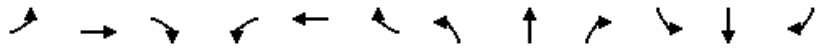
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	1355	11	6	503	106	13	4	12	70	3	62
Future Volume (veh/h)	140	1355	11	6	503	106	13	4	12	70	3	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	0.98		0.97	0.98		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	151	1457	12	6	541	114	14	4	13	75	3	67
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	1596	13	13	1037	218	186	167	139	204	184	139
Arrive On Green	0.10	0.47	0.46	0.02	0.75	0.73	0.09	0.09	0.09	0.10	0.10	0.09
Sat Flow, veh/h	1681	3407	28	1681	2758	579	1295	1765	1462	1359	1765	1462
Grp Volume(v), veh/h	151	717	752	6	328	327	14	4	13	75	3	67
Grp Sat Flow(s),veh/h/ln	1681	1676	1759	1681	1676	1661	1295	1765	1462	1359	1765	1462
Q Serve(g_s), s	9.8	43.7	43.7	0.4	8.8	9.0	1.1	0.2	0.9	5.8	0.2	4.8
Cycle Q Clear(g_c), s	9.8	43.7	43.7	0.4	8.8	9.0	1.3	0.2	0.9	6.0	0.2	4.8
Prop In Lane	1.00		0.02	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	785	824	13	630	624	186	167	139	204	184	139
V/C Ratio(X)	0.90	0.91	0.91	0.47	0.52	0.52	0.08	0.02	0.09	0.37	0.02	0.48
Avail Cap(c_a), veh/h	168	914	959	168	914	906	381	433	359	409	449	359
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.79	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	27.2	27.2	53.9	9.6	9.9	45.7	45.2	45.5	46.9	44.2	47.2
Incr Delay (d2), s/veh	34.6	9.2	8.9	9.4	3.0	3.1	0.2	0.1	0.3	1.1	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	22.1	23.2	0.2	4.3	4.6	0.4	0.1	0.4	2.2	0.1	2.0
LnGrp Delay(d),s/veh	83.5	36.4	36.1	63.4	12.6	13.0	45.9	45.2	45.8	48.1	44.3	49.8
LnGrp LOS	F	D	D	E	B	B	D	D	D	D	D	D
Approach Vol, veh/h		1620			661			31			145	
Approach Delay, s/veh		40.6			13.2			45.7			48.8	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	55.5		14.4	15.0	45.4		14.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	59.0		27.0	11.0	59.0		27.0
Max Q Clear Time (g_c+I1), s	12.4	45.7		8.0	11.8	11.0		3.3
Green Ext Time (p_c), s	0.0	4.8		0.6	0.0	5.9		0.7

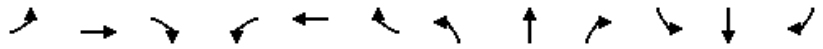
Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1332	75	7	562	10	41	1	3	11	5	14
Future Volume (veh/h)	10	1332	75	7	562	10	41	1	3	11	5	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	11	1417	80	7	598	11	44	1	3	12	5	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	1583	89	15	1637	30	123	1	4	66	17	33
Arrive On Green	0.01	0.49	0.48	0.02	0.97	0.95	0.04	0.04	0.04	0.04	0.04	0.04
Sat Flow, veh/h	1681	3227	182	1681	3367	62	1382	31	94	481	385	764
Grp Volume(v), veh/h	11	734	763	7	298	311	48	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1732	1681	1676	1752	1507	0	0	1630	0	0
Q Serve(g_s), s	0.7	43.7	44.1	0.5	0.8	0.9	1.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	43.7	44.1	0.5	0.8	0.9	3.3	0.0	0.0	2.1	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.04	0.92		0.06	0.37		0.47
Lane Grp Cap(c), veh/h	22	822	850	15	815	852	128	0	0	116	0	0
V/C Ratio(X)	0.50	0.89	0.90	0.48	0.37	0.37	0.37	0.00	0.00	0.28	0.00	0.00
Avail Cap(c_a), veh/h	168	945	976	168	945	988	383	0	0	388	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	0.98	0.98	0.98	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.9	25.4	25.6	53.8	0.8	0.8	51.8	0.0	0.0	51.3	0.0	0.0
Incr Delay (d2), s/veh	5.5	8.1	8.3	8.4	1.2	1.2	0.7	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	22.0	22.9	0.2	0.6	0.6	1.5	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	59.4	33.5	33.8	62.2	2.0	2.0	52.5	0.0	0.0	51.8	0.0	0.0
LnGrp LOS	E	C	C	E	A	A	D			D		
Approach Vol, veh/h		1508			616			48			32	
Approach Delay, s/veh		33.9			2.7			52.5			51.8	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	58.0		8.8	5.4	57.5		8.8
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I1), s	2.5	46.1		4.1	2.7	2.9		5.3
Green Ext Time (p_c), s	0.0	6.9		0.1	0.0	9.5		0.1

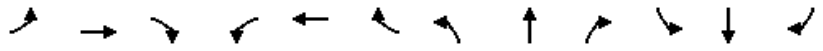
Intersection Summary	
HCM 2010 Ctrl Delay	25.8
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	1290	40	2	601	23	12	5	12	22	2	19
Future Volume (veh/h)	51	1290	40	2	601	23	12	5	12	22	2	19
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.98	0.98		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	52	1303	40	2	607	23	12	5	12	22	2	19
Adj No. of Lanes	0	2	0	0	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	76	1411	43	34	1438	56	77	31	43	91	14	44
Arrive On Green	0.46	0.46	0.44	0.92	0.92	0.89	0.07	0.07	0.06	0.07	0.07	0.06
Sat Flow, veh/h	89	3059	94	1	3118	121	449	454	637	614	214	655
Grp Volume(v), veh/h	717	0	678	331	0	301	29	0	0	43	0	0
Grp Sat Flow(s),veh/h/ln	1655	0	1587	1656	0	1584	1540	0	0	1483	0	0
Q Serve(g_s), s	32.8	0.0	44.3	1.9	0.0	2.7	0.0	0.0	0.0	1.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	0.0	44.3	46.1	0.0	2.7	1.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.07		0.06	0.01		0.08	0.41		0.41	0.51		0.44
Lane Grp Cap(c), veh/h	799	0	732	797	0	731	150	0	0	150	0	0
V/C Ratio(X)	0.90	0.00	0.93	0.42	0.00	0.41	0.19	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	802	0	736	801	0	735	731	0	0	715	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.00	0.83	0.96	0.00	0.96	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	27.7	0.0	27.9	2.5	0.0	2.5	48.9	0.0	0.0	49.3	0.0	0.0
Incr Delay (d2), s/veh	10.7	0.0	15.2	1.5	0.0	1.6	0.6	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.9	0.0	22.3	1.4	0.0	1.4	0.9	0.0	0.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	38.4	0.0	43.1	4.1	0.0	4.1	49.5	0.0	0.0	50.4	0.0	0.0
LnGrp LOS	D		D	A		A	D			D		
Approach Vol, veh/h		1395			632			29			43	
Approach Delay, s/veh		40.7			4.1			49.5			50.4	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		54.7		11.4		54.7		11.4
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		49.0		50.0		49.0		50.0
Max Q Clear Time (g_c+I1), s		47.0		4.9		48.1		3.9
Green Ext Time (p_c), s		1.3		0.3		0.6		0.3

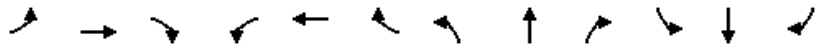
Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1209	140	104	584	78	84	19	77	66	14	19
Future Volume (veh/h)	20	1209	140	104	584	78	84	19	77	66	14	19
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		0.99	1.00		1.00	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	21	1246	144	107	602	80	87	20	79	68	14	20
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	1184	136	131	1331	177	109	143	113	86	43	62
Arrive On Green	0.02	0.39	0.38	0.08	0.45	0.44	0.06	0.08	0.08	0.05	0.07	0.06
Sat Flow, veh/h	1681	3029	349	1681	2975	395	1681	1765	1476	1681	643	918
Grp Volume(v), veh/h	21	688	702	107	339	343	87	20	79	68	0	34
Grp Sat Flow(s),veh/h/ln	1681	1676	1701	1681	1676	1693	1681	1765	1476	1681	0	1561
Q Serve(g_s), s	1.4	43.0	43.0	6.9	15.4	15.5	5.6	1.2	5.7	4.4	0.0	2.3
Cycle Q Clear(g_c), s	1.4	43.0	43.0	6.9	15.4	15.5	5.6	1.2	5.7	4.4	0.0	2.3
Prop In Lane	1.00		0.21	1.00		0.23	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	36	655	665	131	750	758	109	143	113	86	0	105
V/C Ratio(X)	0.58	1.05	1.06	0.81	0.45	0.45	0.80	0.14	0.70	0.79	0.00	0.32
Avail Cap(c_a), veh/h	199	655	665	199	750	758	199	401	329	199	0	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	0.78	0.78	0.78	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.3	33.5	33.6	49.9	21.0	21.1	50.7	47.0	49.6	51.6	0.0	49.0
Incr Delay (d2), s/veh	4.5	45.8	47.7	6.6	1.5	1.5	5.0	0.2	2.9	6.0	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	28.2	29.0	3.4	7.4	7.6	2.8	0.6	2.4	2.2	0.0	1.0
LnGrp Delay(d),s/veh	57.8	79.3	81.3	56.5	22.6	22.7	55.7	47.1	52.5	57.6	0.0	49.7
LnGrp LOS	E	F	F	E	C	C	E	D	D	E		D
Approach Vol, veh/h		1411			789			186			102	
Approach Delay, s/veh		80.0			27.2			53.4			54.9	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	47.0	9.6	12.9	6.4	53.2	11.1	11.4
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	13.0	42.0	13.0	24.5	13.0	42.0	13.0	24.5
Max Q Clear Time (g_c+I1), s	8.9	45.0	6.4	7.7	3.4	17.5	7.6	4.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	16.1	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	60.2
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	607	616	167	24	208	108	54	302	21	189	612	586
Future Volume (veh/h)	607	616	167	24	208	108	54	302	21	189	612	586
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	632	642	174	25	217	112	56	315	22	197	638	610
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	241	737	200	65	599	264	90	1364	598	216	1615	708
Arrive On Green	0.15	0.29	0.28	0.04	0.18	0.18	0.05	0.41	0.41	0.13	0.49	0.49
Sat Flow, veh/h	1648	2553	691	1648	3288	1447	1648	3288	1441	1648	3288	1441
Grp Volume(v), veh/h	632	413	403	25	217	112	56	315	22	197	638	610
Grp Sat Flow(s),veh/h/ln	1648	1644	1600	1648	1644	1447	1648	1644	1441	1648	1644	1441
Q Serve(g_s), s	19.0	31.0	31.1	1.9	7.5	8.9	4.3	8.1	1.2	15.3	15.9	48.6
Cycle Q Clear(g_c), s	19.0	31.0	31.1	1.9	7.5	8.9	4.3	8.1	1.2	15.3	15.9	48.6
Prop In Lane	1.00		0.43	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	241	475	462	65	599	264	90	1364	598	216	1615	708
V/C Ratio(X)	2.62	0.87	0.87	0.38	0.36	0.42	0.62	0.23	0.04	0.91	0.40	0.86
Avail Cap(c_a), veh/h	241	539	524	139	883	388	178	1364	598	216	1615	708
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.71	0.71	0.71	0.34	0.34	0.34	0.92	0.92	0.92	0.66	0.66	0.66
Uniform Delay (d), s/veh	55.5	43.9	44.2	60.9	46.5	47.1	60.2	24.6	22.6	55.8	20.9	29.2
Incr Delay (d2), s/veh	739.0	9.8	10.2	1.2	0.1	0.4	6.4	0.1	0.0	28.9	0.5	9.1
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	58.1	15.4	15.1	0.9	3.4	3.6	2.1	3.7	0.5	8.7	7.3	21.0
LnGrp Delay(d),s/veh	794.5	53.7	54.4	62.1	46.7	47.5	66.6	24.7	22.6	84.6	21.4	38.3
LnGrp LOS	F	D	D	E	D	D	E	C	C	F	C	D
Approach Vol, veh/h		1448			354			393			1445	
Approach Delay, s/veh		377.2			48.0			30.6			37.1	
Approach LOS		F			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	67.8	9.2	41.9	21.0	57.9	23.0	28.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	45.0	10.0	41.6	16.0	42.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	10.3	50.6	3.9	33.1	17.3	10.1	21.0	10.9
Green Ext Time (p_c), s	0.1	0.0	0.0	3.4	0.0	9.6	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	172.8
HCM 2010 LOS	F

Notes

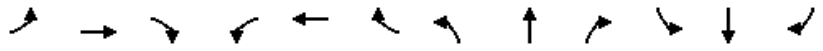
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	456	1	499	0	0	0	0	707	389	379	968	0
Future Volume (vph)	456	1	499	0	0	0	0	707	389	379	968	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.99					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.93	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1529	1485					4678		1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1529	1485					4678		1736	3471	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	480	1	525	0	0	0	0	744	409	399	1019	0
RTOR Reduction (vph)	0	32	36	0	0	0	0	61	0	0	0	0
Lane Group Flow (vph)	302	294	342	0	0	0	0	1092	0	399	1019	0
Confl. Peds. (#/hr)			1	1			30		1	1		30
Confl. Bikes (#/hr)									4			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	34.4	34.4	34.4					59.6		13.0	76.6	
Effective Green, g (s)	34.5	34.5	34.5					59.7		12.0	76.7	
Actuated g/C Ratio	0.29	0.29	0.29					0.50		0.10	0.64	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	483	439	426					2327		173	2218	
v/s Ratio Prot	0.18	0.19						0.23		c0.23	c0.29	
v/s Ratio Perm			c0.23									
v/c Ratio	0.63	0.67	0.80					0.47		2.31	0.46	
Uniform Delay, d1	37.1	37.7	39.6					19.8		54.0	11.1	
Progression Factor	1.00	1.00	1.00					1.00		1.38	0.18	
Incremental Delay, d2	1.8	3.0	10.0					0.7		600.4	0.5	
Delay (s)	39.0	40.7	49.6					20.4		674.7	2.4	
Level of Service	D	D	D					C		F	A	
Approach Delay (s)		43.5			0.0			20.4			191.6	
Approach LOS		D			A			C			F	

Intersection Summary			
HCM 2000 Control Delay	94.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	73.0%	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 (vph)	0	0	0	233	227	384	294	765	104	115	1114	430
Future Volume (vph)	0	0	0	233	227	384	294	765	104	115	1114	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.9		4.0	4.4		4.5	4.4	4.0
Lane Util. Factor					0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	1.00
Frt					0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)					3190		3367	3399		1736	3471	1527
Flt Permitted					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)					3190		3367	3399		1736	3471	1527
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	248	241	409	313	814	111	122	1185	457
RTOR Reduction (vph)	0	0	0	0	127	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	771	0	313	917	0	122	1185	457
Confl. Peds. (#/hr)							13		1	1		13
Confl. Bikes (#/hr)									2			3
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA		Prot	NA		Prot	NA	Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases												Free
Actuated Green, G (s)					29.0		15.1	65.7		12.8	63.4	120.0
Effective Green, g (s)					29.1		15.1	65.8		12.3	63.5	120.0
Actuated g/C Ratio					0.24		0.13	0.55		0.10	0.53	1.00
Clearance Time (s)					4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)					2.5		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)					773		423	1863		177	1836	1527
v/s Ratio Prot					c0.24		c0.09	0.27		0.07	c0.34	
v/s Ratio Perm												0.30
v/c Ratio					1.00		0.74	0.49		0.69	0.65	0.30
Uniform Delay, d1					45.4		50.6	16.8		52.0	20.2	0.0
Progression Factor					1.00		1.03	1.08		1.00	1.00	1.00
Incremental Delay, d2					31.6		5.3	0.8		8.6	1.8	0.5
Delay (s)					77.1		57.5	19.0		60.6	22.0	0.5
Level of Service					E		E	B		E	C	A
Approach Delay (s)		0.0			77.1			28.8			19.1	
Approach LOS		A			E			C			B	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	74.9%	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)	68	1396	96	141	518	498	60	310	128	400	658	45
Future Volume (veh/h)	68	1396	96	141	518	498	60	310	128	400	658	45
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	70	1439	99	145	534	513	62	320	132	412	678	0
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	1421	97	146	1615	710	78	358	158	403	1007	451
Arrive On Green	0.05	0.45	0.45	0.09	0.48	0.48	0.05	0.11	0.11	0.24	0.30	0.00
Sat Flow, veh/h	1681	3181	218	1681	3353	1475	1681	3353	1483	1681	3353	1500
Grp Volume(v), veh/h	70	756	782	145	534	513	62	320	132	412	678	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1722	1681	1676	1475	1681	1676	1483	1681	1676	1500
Q Serve(g_s), s	6.2	67.0	67.0	12.9	14.7	41.5	5.5	14.1	13.1	36.0	26.6	0.0
Cycle Q Clear(g_c), s	6.2	67.0	67.0	12.9	14.7	41.5	5.5	14.1	13.1	36.0	26.6	0.0
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	87	749	769	146	1615	710	78	358	158	403	1007	451
V/C Ratio(X)	0.80	1.01	1.02	1.00	0.33	0.72	0.80	0.89	0.83	1.02	0.67	0.00
Avail Cap(c_a), veh/h	146	749	769	146	1615	710	134	358	158	403	1007	451
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	70.4	41.5	41.5	68.5	24.0	30.9	70.8	66.2	65.7	57.0	46.0	0.0
Incr Delay (d2), s/veh	6.4	35.1	36.9	73.1	0.1	3.6	6.8	23.2	28.8	50.4	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	38.3	39.7	9.0	6.9	17.5	2.7	7.7	6.6	22.3	12.5	0.0
LnGrp Delay(d),s/veh	76.8	76.6	78.4	141.6	24.1	34.5	77.7	89.3	94.5	107.4	47.5	0.0
LnGrp LOS	E	F	F	F	C	C	E	F	F	F	D	
Approach Vol, veh/h		1608			1192			514			1090	
Approach Delay, s/veh		77.5			42.9			89.2			70.1	
Approach LOS		E			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	72.0	10.9	50.1	11.8	77.2	40.0	21.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	67.0	12.0	40.0	13.0	67.0	36.0	16.0
Max Q Clear Time (g_c+I1), s	14.9	69.0	7.5	28.6	8.2	43.5	38.0	16.1
Green Ext Time (p_c), s	0.0	0.0	0.0	3.9	0.0	17.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	67.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	951	135	88	461	159	33	172	69	284	565	40
Future Volume (veh/h)	114	951	135	88	461	159	33	172	69	284	565	40
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	131	1093	155	101	530	183	38	198	79	326	649	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	149	1355	192	126	1093	376	69	515	231	362	751	336
Arrive On Green	0.09	0.46	0.46	0.07	0.45	0.45	0.04	0.15	0.15	0.11	0.22	0.00
Sat Flow, veh/h	1681	2944	417	1681	2450	842	1681	3353	1500	3261	3353	1500
Grp Volume(v), veh/h	131	621	627	101	362	351	38	198	79	326	649	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1684	1681	1676	1615	1681	1676	1500	1630	1676	1500
Q Serve(g_s), s	6.9	28.6	28.8	5.3	13.7	13.8	2.0	4.8	4.2	8.9	16.8	0.0
Cycle Q Clear(g_c), s	6.9	28.6	28.8	5.3	13.7	13.8	2.0	4.8	4.2	8.9	16.8	0.0
Prop In Lane	1.00		0.25	1.00		0.52	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	149	772	775	126	748	721	69	515	231	362	751	336
V/C Ratio(X)	0.88	0.81	0.81	0.80	0.48	0.49	0.55	0.38	0.34	0.90	0.86	0.00
Avail Cap(c_a), veh/h	149	772	775	149	748	721	187	820	367	362	820	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.5	20.8	20.9	41.0	17.6	17.6	42.4	34.3	34.0	39.5	33.6	0.0
Incr Delay (d2), s/veh	39.0	8.8	8.9	19.2	0.7	0.7	2.6	0.2	0.3	23.8	8.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	15.0	15.1	3.1	6.5	6.3	1.0	2.2	1.8	5.2	8.6	0.0
LnGrp Delay(d),s/veh	79.5	29.6	29.7	60.2	18.3	18.4	44.9	34.4	34.4	63.3	41.9	0.0
LnGrp LOS	E	C	C	E	B	B	D	C	C	E	D	
Approach Vol, veh/h		1379			814			315			975	
Approach Delay, s/veh		34.4			23.5			35.7			49.1	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	46.4	7.7	25.2	12.0	45.2	14.0	18.8
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	17.3	30.8	4.0	18.8	8.9	15.8	10.9	6.8
Green Ext Time (p_c), s	0.0	1.1	0.0	1.4	0.0	13.2	0.0	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	36.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	724	867	71	27	405	88	79	342	42	78	185	363
Future Volume (vph)	724	867	71	27	405	88	79	342	42	78	185	363
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1676	3309		1676	3263			1728			1739	1474
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (perm)	1676	3309		1676	3263			1728			1739	1474
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	762	913	75	28	426	93	83	360	44	82	195	382
RTOR Reduction (vph)	0	4	0	0	13	0	0	2	0	0	0	322
Lane Group Flow (vph)	762	984	0	28	506	0	0	485	0	0	277	60
Confl. Peds. (#/hr)			1	1			3					3
Confl. Bikes (#/hr)			1									
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	50.0	70.2		4.8	25.0			33.0			24.0	24.0
Effective Green, g (s)	50.0	70.2		4.8	25.0			33.0			24.0	24.0
Actuated g/C Ratio	0.33	0.46		0.03	0.16			0.22			0.16	0.16
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	551	1528		52	536			375			274	232
v/s Ratio Prot	c0.45	0.30		0.02	c0.16			c0.28			c0.16	
v/s Ratio Perm												0.04
v/c Ratio	1.38	0.64		0.54	0.94			1.29			1.01	0.26
Uniform Delay, d1	51.0	31.3		72.5	62.8			59.5			64.0	56.2
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	183.4	1.1		5.3	25.8			150.2			57.2	0.2
Delay (s)	234.4	32.4		77.8	88.7			209.7			121.2	56.4
Level of Service	F	C		E	F			F			F	E
Approach Delay (s)		120.3			88.1			209.7			83.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	120.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	152.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	281.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	549	1087	74	27	542
Future Vol, veh/h	48	549	1087	74	27	542
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	590	1169	80	29	583

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1850	1209	0	0	1248	0
Stage 1	1209	-	-	-	-	-
Stage 2	641	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	82	~ 223	-	-	558	-
Stage 1	283	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	76	~ 223	-	-	558	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	283	-	-	-	-	-
Stage 2	485	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 1096.4	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	193	558	-
HCM Lane V/C Ratio	-	-	3.326	0.052	-
HCM Control Delay (s)	-	-	$ 1096.4	11.8	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	60.1	0.2	-

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1736	205	123	955	224	153
Future Volume (veh/h)	1736	205	123	955	224	153
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.99	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	1827	216	129	1005	236	161
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1951	865	244	2570	261	233
Arrive On Green	0.58	0.58	0.15	0.77	0.16	0.16
Sat Flow, veh/h	3441	1487	1681	3441	1681	1500
Grp Volume(v), veh/h	1827	216	129	1005	236	161
Grp Sat Flow(s),veh/h/ln	1676	1487	1681	1676	1681	1500
Q Serve(g_s), s	70.1	9.9	9.9	14.0	19.3	14.2
Cycle Q Clear(g_c), s	70.1	9.9	9.9	14.0	19.3	14.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1951	865	244	2570	261	233
V/C Ratio(X)	0.94	0.25	0.53	0.39	0.91	0.69
Avail Cap(c_a), veh/h	1976	876	244	2570	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	14.3	55.4	5.5	58.1	56.0
Incr Delay (d2), s/veh	10.0	0.7	1.1	0.1	21.1	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	34.9	4.2	4.7	6.5	10.5	6.1
LnGrp Delay(d),s/veh	36.9	15.0	56.5	5.6	79.2	58.8
LnGrp LOS	D	B	E	A	E	E
Approach Vol, veh/h	2043			1134	397	
Approach Delay, s/veh	34.6			11.4	70.9	
Approach LOS	C			B	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	25.8	87.0		27.2		112.8		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	15.0	* 83		27.5		101.5		
Max Q Clear Time (g_c+I1), s	11.9	72.1		21.3		16.0		
Green Ext Time (p_c), s	2.1	9.4		0.4		13.5		

Intersection Summary	
HCM 2010 Ctrl Delay	31.3
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	1760	6	9	964	164	13	3	8	617	1	92
Future Volume (vph)	128	1760	6	9	964	164	13	3	8	617	1	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	1676	4815		1676	4700			1641			1681	1473
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (perm)	1676	4815		1676	4700			1641			1681	1473
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	1796	6	9	984	167	13	3	8	630	1	94
RTOR Reduction (vph)	0	0	0	0	12	0	0	8	0	0	0	75
Lane Group Flow (vph)	131	1802	0	9	1139	0	0	16	0	0	631	19
Confl. Peds. (#/hr)	3					3	4					4
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	15.3	85.8		1.4	71.9			4.3			28.5	28.5
Effective Green, g (s)	15.3	85.8		1.4	71.9			4.3			28.5	28.5
Actuated g/C Ratio	0.11	0.61		0.01	0.51			0.03			0.20	0.20
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	183	2950		16	2413			50			342	299
v/s Ratio Prot	c0.08	c0.37		0.01	0.24			c0.01			c0.38	
v/s Ratio Perm												0.01
v/c Ratio	0.72	0.61		0.56	0.47			0.32			1.85	0.06
Uniform Delay, d1	60.2	16.8		69.0	21.9			66.4			55.8	45.0
Progression Factor	1.40	0.38		1.03	0.89			1.00			1.00	1.00
Incremental Delay, d2	5.8	0.5		16.9	0.1			1.4			391.4	0.0
Delay (s)	90.3	6.8		87.8	19.5			67.8			447.2	45.0
Level of Service	F	A		F	B			E			F	D
Approach Delay (s)		12.5			20.0			67.8			395.0	
Approach LOS		B			B			E			F	

Intersection Summary			
HCM 2000 Control Delay	87.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.3%	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 (vph)	171	1665	224	344	853	83	353	559	508	177	364	97
Future Volume (vph)	171	1665	224	344	853	83	353	559	508	177	364	97
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4718		3252	4741		1526	3197	1488	1676	3232	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4718		3252	4741		1526	3197	1488	1676	3232	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	1771	238	366	907	88	376	595	540	188	387	103
RTOR Reduction (vph)	0	12	0	0	8	0	0	0	95	0	18	0
Lane Group Flow (vph)	182	1997	0	366	987	0	316	655	445	188	472	0
Confl. Peds. (#/hr)	9		7	7		9	7		1	1		7
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	18.2	46.0		19.0	46.8		30.0	30.0	49.0	25.0	25.0	
Effective Green, g (s)	18.2	46.0		19.0	46.8		30.0	30.0	49.0	25.0	25.0	
Actuated g/C Ratio	0.13	0.33		0.14	0.33		0.21	0.21	0.35	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	217	1550		441	1584		327	685	520	299	577	
v/s Ratio Prot	0.11	c0.42		0.11	0.21		c0.21	0.20	c0.12	0.11	c0.15	
v/s Ratio Perm									0.18			
v/c Ratio	0.84	1.29		0.83	0.62		0.97	0.96	0.86	0.63	0.82	
Uniform Delay, d1	59.5	47.0		58.9	39.2		54.5	54.4	42.2	53.2	55.3	
Progression Factor	1.05	1.01		1.29	1.19		1.03	1.03	1.46	1.00	1.00	
Incremental Delay, d2	10.7	131.8		9.5	0.7		8.5	3.9	1.3	3.0	8.4	
Delay (s)	73.0	179.2		85.3	47.4		64.5	59.9	62.9	56.2	63.7	
Level of Service	E	F		F	D		E	E	E	E	E	
Approach Delay (s)		170.3			57.6			61.9			61.6	
Approach LOS		F			E			E			E	

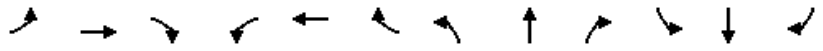
Intersection Summary			
HCM 2000 Control Delay	102.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	353	2072	4	67	1092	121	35	17	24	223	7	172
Future Volume (vph)	353	2072	4	67	1092	121	35	17	24	223	7	172
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1676	4816		1676	4718		1676	1596		1593	1601	1436
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	1676	4816		1676	4718		1676	1596		1593	1601	1436
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)	368	2158	4	70	1138	126	36	18	25	232	7	179
RTOR Reduction (vph)	0	0	0	0	8	0	0	24	0	0	0	152
Lane Group Flow (vph)	368	2162	0	70	1256	0	36	19	0	118	121	27
Confl. Peds. (#/hr)	17		11	11		17	21					21
Confl. Bikes (#/hr)			3			1			1			
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	35.4	82.7		8.5	56.3		7.8	7.8		21.0	21.0	21.0
Effective Green, g (s)	35.4	82.7		8.5	56.3		7.8	7.8		21.0	21.0	21.0
Actuated g/C Ratio	0.25	0.59		0.06	0.40		0.06	0.06		0.15	0.15	0.15
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	423	2844		101	1897		93	88		238	240	215
v/s Ratio Prot	c0.22	c0.45		0.04	0.27		c0.02	0.01		0.07	c0.08	
v/s Ratio Perm												0.02
v/c Ratio	0.87	0.76		0.69	0.66		0.39	0.22		0.50	0.50	0.12
Uniform Delay, d1	50.1	21.3		64.5	34.1		63.8	63.2		54.6	54.7	51.5
Progression Factor	0.67	1.20		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.9	0.2		15.3	1.0		1.0	0.5		0.6	0.6	0.1
Delay (s)	35.6	25.6		79.8	35.1		64.8	63.7		55.2	55.3	51.6
Level of Service	D	C		E	D		E	E		E	E	D
Approach Delay (s)		27.1			37.4			64.2			53.7	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.2%	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)	333	693	145	246	295	99	269	1574	820	104	627	170
Future Volume (veh/h)	333	693	145	246	295	99	269	1574	820	104	627	170
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	370	770	161	273	328	110	299	1749	911	116	697	189
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	811	356	316	590	194	168	1497	656	138	1438	639
Arrive On Green	0.10	0.24	0.24	0.10	0.24	0.24	0.10	0.45	0.45	0.08	0.43	0.43
Sat Flow, veh/h	3261	3353	1472	3261	2468	812	1681	3353	1469	1681	3353	1491
Grp Volume(v), veh/h	370	770	161	273	221	217	299	1749	911	116	697	189
Grp Sat Flow(s),veh/h/ln	1630	1676	1472	1630	1676	1604	1681	1676	1469	1681	1676	1491
Q Serve(g_s), s	14.0	31.6	13.0	11.6	16.2	16.7	14.0	62.5	62.5	9.5	21.0	11.6
Cycle Q Clear(g_c), s	14.0	31.6	13.0	11.6	16.2	16.7	14.0	62.5	62.5	9.5	21.0	11.6
Prop In Lane	1.00		1.00	1.00		0.51	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	811	356	316	401	383	168	1497	656	138	1438	639
V/C Ratio(X)	1.13	0.95	0.45	0.86	0.55	0.57	1.78	1.17	1.39	0.84	0.48	0.30
Avail Cap(c_a), veh/h	326	814	357	326	407	390	168	1497	656	408	1438	639
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	52.2	45.2	62.3	46.7	46.9	63.0	38.7	38.7	63.3	28.8	26.1
Incr Delay (d2), s/veh	91.5	19.9	0.3	19.2	0.9	1.1	373.5	83.2	184.4	5.1	0.4	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	10.4	16.9	5.3	6.0	7.6	7.5	23.9	46.2	58.8	4.6	9.8	4.8
LnGrp Delay(d),s/veh	154.5	72.1	45.5	81.5	47.6	48.0	436.5	122.0	223.1	68.4	29.2	26.5
LnGrp LOS	F	E	D	F	D	D	F	F	F	E	C	C
Approach Vol, veh/h		1301			711			2959			1002	
Approach Delay, s/veh		92.3			60.7			184.9			33.2	
Approach LOS		F			E			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.5	68.0	18.0	38.5	18.0	65.5	17.6	38.9
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	34.0	39.5	14.0	34.0	14.0	59.5	14.0	34.0
Max Q Clear Time (g_c+I1), s	11.5	64.5	16.0	18.7	16.0	23.0	13.6	33.6
Green Ext Time (p_c), s	0.1	0.0	0.0	5.1	0.0	18.7	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	124.5
HCM 2010 LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1606	142	94	962	55	83
Future Volume (veh/h)	1606	142	94	962	55	83
Number	2	12	1	6	3	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	1746	154	102	1046	60	90
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2530	1132	205	2530	141	126
Arrive On Green	0.75	0.75	0.75	0.75	0.08	0.08
Sat Flow, veh/h	3441	1500	236	3441	1681	1500
Grp Volume(v), veh/h	1746	154	102	1046	60	90
Grp Sat Flow(s),veh/h/ln	1676	1500	236	1676	1681	1500
Q Serve(g_s), s	21.5	2.3	31.3	9.0	2.7	4.7
Cycle Q Clear(g_c), s	21.5	2.3	52.7	9.0	2.7	4.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2530	1132	205	2530	141	126
V/C Ratio(X)	0.69	0.14	0.50	0.41	0.43	0.72
Avail Cap(c_a), veh/h	2540	1136	205	2540	334	298
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	2.7	18.6	3.5	35.0	36.0
Incr Delay (d2), s/veh	0.8	0.1	1.9	0.1	2.0	7.3
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	0.9	2.1	4.1	1.3	2.2
LnGrp Delay(d),s/veh	5.9	2.8	20.4	3.6	37.1	43.3
LnGrp LOS	A	A	C	A	D	D
Approach Vol, veh/h	1900			1148	150	
Approach Delay, s/veh	5.6			5.1	40.8	
Approach LOS	A			A	D	

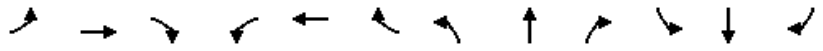
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		67.8				67.8		12.8
Change Period (Y+Rc), s		7.0				7.0		6.0
Max Green Setting (Gmax), s		61.0				61.0		16.0
Max Q Clear Time (g_c+I1), s		23.5				54.7		6.7
Green Ext Time (p_c), s		32.4				6.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	7.1
HCM 2010 LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	71	44	67	1012	629	41
Future Volume (veh/h)	71	44	67	1012	629	41
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	77	48	73	1100	684	45
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	123	109	594	1368	1368	1162
Arrive On Green	0.07	0.07	0.77	0.77	0.77	0.77
Sat Flow, veh/h	1681	1500	723	1765	1765	1500
Grp Volume(v), veh/h	77	48	73	1100	684	45
Grp Sat Flow(s),veh/h/ln	1681	1500	723	1765	1765	1500
Q Serve(g_s), s	2.3	1.6	2.2	19.6	7.5	0.4
Cycle Q Clear(g_c), s	2.3	1.6	9.7	19.6	7.5	0.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	123	109	594	1368	1368	1162
V/C Ratio(X)	0.63	0.44	0.12	0.80	0.50	0.04
Avail Cap(c_a), veh/h	511	456	735	1712	1712	1455
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.7	23.3	3.9	3.5	2.2	1.4
Incr Delay (d2), s/veh	5.2	2.8	0.1	2.3	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	1.3	0.8	0.4	9.7	3.5	0.2
LnGrp Delay(d),s/veh	28.9	26.1	4.0	5.9	2.5	1.4
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	125			1173	729	
Approach Delay, s/veh	27.8			5.7	2.4	
Approach LOS	C			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		44.7		7.8		44.7		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		51.0		16.0		51.0		
Max Q Clear Time (g_c+I1), s		21.6		4.3		9.5		
Green Ext Time (p_c), s		19.2		0.2		23.7		

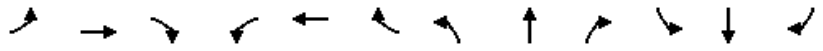
Intersection Summary	
HCM 2010 Ctrl Delay	5.9
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	502	131	412	1280	713	289	1741	236	449	951	414
Future Volume (veh/h)	395	502	131	412	1280	713	289	1741	236	449	951	414
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	429	546	142	448	1391	775	314	1892	257	488	1034	450
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	419	695	298	419	695	297	335	1331	179	372	1091	475
Arrive On Green	0.13	0.21	0.21	0.13	0.21	0.21	0.20	0.31	0.31	0.22	0.33	0.33
Sat Flow, veh/h	3261	3353	1436	3261	3353	1433	1681	4284	575	1681	3280	1428
Grp Volume(v), veh/h	429	546	142	448	1391	775	314	1413	736	488	1012	472
Grp Sat Flow(s),veh/h/ln	1630	1676	1436	1630	1676	1433	1681	1606	1647	1681	1606	1496
Q Serve(g_s), s	18.0	21.6	12.2	18.0	29.0	29.0	25.8	43.5	43.5	31.0	43.0	43.0
Cycle Q Clear(g_c), s	18.0	21.6	12.2	18.0	29.0	29.0	25.8	43.5	43.5	31.0	43.0	43.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	1.00		0.95
Lane Grp Cap(c), veh/h	419	695	298	419	695	297	335	998	512	372	1069	498
V/C Ratio(X)	1.02	0.79	0.48	1.07	2.00	2.61	0.94	1.42	1.44	1.31	0.95	0.95
Avail Cap(c_a), veh/h	419	695	298	419	695	297	372	998	512	372	1069	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.0	52.6	48.8	61.0	55.5	55.5	55.2	48.3	48.3	54.5	45.5	45.5
Incr Delay (d2), s/veh	50.0	5.5	0.4	63.5	456.4	734.3	28.4	193.2	207.8	158.1	17.5	29.2
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	11.0	10.5	4.9	11.8	57.4	72.0	14.6	46.0	49.3	30.7	21.7	21.9
LnGrp Delay(d),s/veh	111.0	58.0	49.3	124.5	511.9	789.8	83.6	241.5	256.1	212.6	63.0	74.7
LnGrp LOS	F	E	D	F	F	F	F	F	F	F	E	E
Approach Vol, veh/h		1117			2614			2463			1972	
Approach Delay, s/veh		77.3			527.9			225.7			102.8	
Approach LOS		E			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.9	52.1	22.0	34.0	35.0	49.0	22.0	34.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	31.0	43.5	18.0	29.0	31.0	43.5	18.0	29.0
Max Q Clear Time (g_c+I1), s	27.8	45.0	20.0	23.6	33.0	45.5	20.0	31.0
Green Ext Time (p_c), s	0.2	0.0	0.0	4.4	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	272.5
HCM 2010 LOS	F



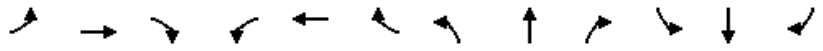
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	457	1651	140	85	1225	374	257	103	136	436	59	532
Future Volume (veh/h)	457	1651	140	85	1225	374	257	103	136	436	59	532
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	476	1720	0	89	1276	0	268	107	0	454	61	554
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	1	2
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	530	2455	764	226	2005	624	319	464	207	503	344	935
Arrive On Green	0.16	0.51	0.00	0.07	0.42	0.00	0.10	0.14	0.00	0.15	0.19	0.19
Sat Flow, veh/h	3261	4818	1500	3261	4818	1500	3261	3353	1500	3261	1765	2595
Grp Volume(v), veh/h	476	1720	0	89	1276	0	268	107	0	454	61	554
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	1500	1630	1676	1500	1630	1765	1298
Q Serve(g_s), s	20.0	38.1	0.0	3.7	29.5	0.0	11.3	4.0	0.0	19.2	4.0	24.4
Cycle Q Clear(g_c), s	20.0	38.1	0.0	3.7	29.5	0.0	11.3	4.0	0.0	19.2	4.0	24.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	530	2455	764	226	2005	624	319	464	207	503	344	935
V/C Ratio(X)	0.90	0.70	0.00	0.39	0.64	0.00	0.84	0.23	0.00	0.90	0.18	0.59
Avail Cap(c_a), veh/h	745	2455	764	303	2005	624	606	730	327	606	378	985
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.50	0.50	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.5	26.2	0.0	62.4	32.5	0.0	62.1	53.7	0.0	58.1	47.0	36.7
Incr Delay (d2), s/veh	8.4	1.7	0.0	0.2	0.3	0.0	2.3	0.1	0.0	13.6	0.1	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	9.7	17.3	0.0	1.7	13.0	0.0	5.2	1.8	0.0	9.6	2.0	8.8
LnGrp Delay(d),s/veh	65.9	27.9	0.0	62.6	32.7	0.0	64.4	53.8	0.0	71.7	47.1	37.3
LnGrp LOS	E	C		E	C		E	D		E	D	D
Approach Vol, veh/h		2196			1365			375			1069	
Approach Delay, s/veh		36.1			34.7			61.3			52.5	
Approach LOS		D			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	76.3	17.7	32.3	26.8	63.3	25.6	24.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	* 5
Max Green Setting (Gmax), s	13.0	53.0	26.0	30.0	32.0	34.0	26.0	* 31
Max Q Clear Time (g_c+I1), s	15.7	40.1	13.3	26.4	22.0	31.5	21.2	6.0
Green Ext Time (p_c), s	0.1	10.6	0.4	0.9	0.7	2.4	0.5	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.1
HCM 2010 LOS	D

Notes

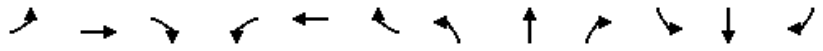
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	1815	705	0	765	257	478	658	320	131	468	162
Future Volume (veh/h)	297	1815	705	0	765	257	478	658	320	131	468	162
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	0	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	323	1973	0	0	832	0	520	715	348	142	509	176
Adj No. of Lanes	2	3	1	0	3	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	367	2148	669	0	1425	0	575	729	354	168	862	379
Arrive On Green	0.11	0.45	0.00	0.00	0.30	0.00	0.18	0.33	0.33	0.10	0.26	0.26
Sat Flow, veh/h	3261	4818	1500	0	5135	0	3261	2187	1063	1681	3353	1476
Grp Volume(v), veh/h	323	1973	0	0	832	0	520	548	515	142	509	176
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	0	1606	0	1630	1676	1574	1681	1676	1476
Q Serve(g_s), s	11.7	46.1	0.0	0.0	17.6	0.0	18.8	38.9	38.9	10.0	16.0	12.1
Cycle Q Clear(g_c), s	11.7	46.1	0.0	0.0	17.6	0.0	18.8	38.9	38.9	10.0	16.0	12.1
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.68	1.00		1.00
Lane Grp Cap(c), veh/h	367	2148	669	0	1425	0	575	559	525	168	862	379
V/C Ratio(X)	0.88	0.92	0.00	0.00	0.58	0.00	0.90	0.98	0.98	0.85	0.59	0.46
Avail Cap(c_a), veh/h	367	2148	669	0	1425	0	611	559	525	217	922	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.65	0.65	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	31.2	0.0	0.0	36.0	0.0	48.4	39.6	39.6	53.1	39.0	37.6
Incr Delay (d2), s/veh	15.0	4.8	0.0	0.0	1.8	0.0	16.5	33.1	34.5	21.8	1.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	21.2	0.0	0.0	8.0	0.0	9.8	23.1	21.9	5.6	7.5	5.1
LnGrp Delay(d),s/veh	67.5	36.0	0.0	0.0	37.7	0.0	64.9	72.7	74.2	74.9	40.2	38.9
LnGrp LOS	E	D			D		E	E	E	E	D	D
Approach Vol, veh/h		2296			832			1583			827	
Approach Delay, s/veh		40.5			37.7			70.6			45.9	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	18.0	40.5	25.7	35.8		58.5	16.5	45.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0		5.0	4.5	5.0
Max Green Setting (Gmax), s	13.5	32.0	22.5	33.0		50.0	15.5	40.0
Max Q Clear Time (g_c+I1), s	13.7	19.6	20.8	18.0		48.1	12.0	40.9
Green Ext Time (p_c), s	0.0	11.9	0.4	11.4		1.9	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.5
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	701	176	116	336	353	138	1353	241	234	1143	35
Future Volume (veh/h)	262	701	176	116	336	353	138	1353	241	234	1143	35
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		0.98	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	276	738	185	122	354	372	145	1424	254	246	1203	37
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	831	208	140	1057	462	170	1182	210	273	1174	514
Arrive On Green	0.08	0.32	0.32	0.08	0.32	0.32	0.10	0.29	0.29	0.16	0.35	0.35
Sat Flow, veh/h	1681	2635	660	1681	3353	1467	1681	4087	728	1681	3353	1469
Grp Volume(v), veh/h	276	469	454	122	354	372	145	1119	559	246	1203	37
Grp Sat Flow(s),veh/h/ln	1681	1676	1619	1681	1676	1467	1681	1606	1603	1681	1676	1469
Q Serve(g_s), s	10.0	32.0	32.0	8.6	9.7	27.9	10.2	34.7	34.7	17.2	42.0	2.0
Cycle Q Clear(g_c), s	10.0	32.0	32.0	8.6	9.7	27.9	10.2	34.7	34.7	17.2	42.0	2.0
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	140	528	510	140	1057	462	170	929	463	273	1174	514
V/C Ratio(X)	1.97	0.89	0.89	0.87	0.33	0.80	0.85	1.20	1.21	0.90	1.03	0.07
Avail Cap(c_a), veh/h	140	528	510	140	1057	462	252	929	463	392	1174	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	39.1	39.1	54.4	31.5	37.7	53.0	42.7	42.7	49.3	39.0	26.0
Incr Delay (d2), s/veh	461.5	19.5	20.1	38.0	0.2	9.5	11.2	102.3	112.0	14.4	32.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.6	17.6	17.1	5.5	4.5	12.5	5.2	28.5	29.7	9.1	24.7	0.8
LnGrp Delay(d),s/veh	516.5	58.6	59.2	92.4	31.6	47.2	64.3	145.0	154.7	63.7	71.8	26.0
LnGrp LOS	F	E	E	F	C	D	E	F	F	E	F	C
Approach Vol, veh/h		1199			848			1823			1486	
Approach Delay, s/veh		164.2			47.2			141.5			69.4	
Approach LOS		F			D			F			E	

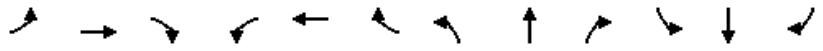
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	42.8	16.2	47.0	14.0	42.8	23.5	39.7
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	32.0	18.0	42.0	10.0	32.0	28.0	32.0
Max Q Clear Time (g_c+I1), s	11.6	34.0	12.2	44.0	12.0	29.9	19.2	36.7
Green Ext Time (p_c), s	0.0	0.0	0.1	0.0	0.0	1.6	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	111.7
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	143	0	0	441	118	396	1257	15	0	0	0
Future Volume (vph)	10	143	0	0	441	118	396	1257	15	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.97		1.00	1.00				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1676	1765			3233		1442	4536				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1676	1765			3233		1442	4536				
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)	11	155	0	0	479	128	430	1366	16	0	0	0
RTOR Reduction (vph)	0	0	0	0	31	0	0	1	0	0	0	0
Lane Group Flow (vph)	11	155	0	0	576	0	387	1424	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			23	23		
Confl. Bikes (#/hr)			3			1			1			
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.3	26.1			20.8		53.4	53.4				
Effective Green, g (s)	1.3	26.1			20.8		53.4	53.4				
Actuated g/C Ratio	0.01	0.29			0.23		0.59	0.59				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	24	511			747		855	2691				
v/s Ratio Prot	0.01	c0.09			c0.18		0.27	c0.31				
v/s Ratio Perm												
v/c Ratio	0.46	0.30			0.77		0.45	0.53				
Uniform Delay, d1	44.0	24.9			32.4		10.2	10.8				
Progression Factor	1.00	1.00			1.61		1.00	1.00				
Incremental Delay, d2	5.0	0.1			4.1		1.7	0.7				
Delay (s)	49.0	25.0			56.2		11.9	11.6				
Level of Service	D	C			E		B	B				
Approach Delay (s)		26.6			56.2			11.7			0.0	
Approach LOS		C			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	51.6%	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 (veh/h)	314	218	132	197	146	85	169	2013	411	137	790	185
Future Volume (veh/h)	314	218	132	197	146	85	169	2013	411	137	790	185
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	324	225	136	203	151	88	174	2075	424	141	814	191
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	924	536	123	1338	596	196	998	197	163	890	207
Arrive On Green	0.13	0.45	0.45	0.07	0.40	0.40	0.12	0.25	0.25	0.10	0.23	0.23
Sat Flow, veh/h	1681	2042	1186	1681	3353	1494	1681	4034	797	1681	3902	909
Grp Volume(v), veh/h	324	183	178	203	151	88	174	1637	862	141	669	336
Grp Sat Flow(s),veh/h/ln	1681	1676	1551	1681	1676	1494	1681	1606	1619	1681	1606	1599
Q Serve(g_s), s	19.0	10.1	10.6	11.0	4.3	5.6	15.3	37.1	37.1	12.4	30.5	30.8
Cycle Q Clear(g_c), s	19.0	10.1	10.6	11.0	4.3	5.6	15.3	37.1	37.1	12.4	30.5	30.8
Prop In Lane	1.00		0.76	1.00		1.00	1.00		0.49	1.00		0.57
Lane Grp Cap(c), veh/h	213	758	702	123	1338	596	196	795	401	163	732	364
V/C Ratio(X)	1.52	0.24	0.25	1.65	0.11	0.15	0.89	2.06	2.15	0.87	0.91	0.92
Avail Cap(c_a), veh/h	213	758	702	123	1338	596	314	795	401	403	824	410
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.09	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.5	25.3	25.4	69.5	28.4	28.8	65.3	56.4	56.4	66.8	56.5	56.6
Incr Delay (d2), s/veh	257.4	0.8	0.9	324.5	0.1	0.2	1.2	477.3	518.1	5.3	12.8	23.4
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	24.0	4.8	4.7	16.2	2.0	2.4	7.2	69.1	74.3	6.0	14.9	16.0
LnGrp Delay(d),s/veh	322.9	26.0	26.3	394.0	28.4	28.9	66.5	533.8	574.5	72.1	69.2	80.0
LnGrp LOS	F	C	C	F	C	C	E	F	F	E	E	E
Approach Vol, veh/h		685			442			2673			1146	
Approach Delay, s/veh		166.5			196.4			516.5			72.7	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	73.9	21.5	39.7	23.0	65.9	18.5	42.6
Change Period (Y+Rc), s	4.0	6.0	4.0	5.5	4.0	6.0	4.0	5.5
Max Green Setting (Gmax), s	11.0	53.0	28.0	38.5	19.0	45.0	36.0	30.5
Max Q Clear Time (g_c+I1), s	13.0	12.6	17.3	32.8	21.0	7.6	14.4	39.1
Green Ext Time (p_c), s	0.0	5.5	0.2	1.4	0.0	5.5	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	336.6
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	505	776	70	421	562	220	192	1718	867	369	453	209
Future Volume (vph)	505	776	70	421	562	220	192	1718	867	369	453	209
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.5	6.5	5.0	6.5		5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1459	3252	4590		3252	4818	1471	3252	4818	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1459	3252	4590		3252	4818	1471	3252	4818	1468
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	537	826	74	448	598	234	204	1828	922	393	482	222
RTOR Reduction (vph)	0	0	57	0	48	0	0	0	343	0	0	144
Lane Group Flow (vph)	537	826	17	448	784	0	204	1828	579	393	482	78
Confl. Peds. (#/hr)	5		10	10		5	6		4	4		6
Confl. Bikes (#/hr)			2						2			
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8						6			2
Actuated Green, G (s)	28.3	34.7	34.7	25.5	31.9		13.8	46.0	46.0	20.3	52.5	52.5
Effective Green, g (s)	28.3	34.7	34.7	25.5	31.9		13.8	46.0	46.0	20.3	52.5	52.5
Actuated g/C Ratio	0.19	0.23	0.23	0.17	0.21		0.09	0.31	0.31	0.14	0.35	0.35
Clearance Time (s)	5.0	6.5	6.5	5.0	6.5		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	613	1114	337	552	976		299	1477	451	440	1686	513
v/s Ratio Prot	c0.17	c0.17		0.14	c0.17		0.06	0.38		c0.12	0.10	
v/s Ratio Perm			0.01						c0.39			0.05
v/c Ratio	0.88	0.74	0.05	0.81	0.80		0.68	1.24	1.28	0.89	0.29	0.15
Uniform Delay, d1	59.1	53.5	44.8	59.9	56.1		66.0	52.0	52.0	63.8	35.2	33.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.51	0.79	1.85
Incremental Delay, d2	12.9	2.9	0.1	8.4	5.1		5.0	112.9	143.6	9.5	0.2	0.3
Delay (s)	72.1	56.4	44.9	68.3	61.2		71.0	164.9	195.6	106.0	27.9	62.2
Level of Service	E	E	D	E	E		E	F	F	F	C	E
Approach Delay (s)		61.6			63.7			168.0			62.8	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	108.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	23.5
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Long-term	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	1707	272	9600	2000	0.15	0.14	69.2	-	6.2	-	A

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1435	7200	0.15	71.7	6.3	A

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	2111	676	9600	2000	0.12	0.34	69.6	-	7.6	-	A

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2321	2326	1.34	12.9	45.0	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2163	7200	0.37	66.5	9.6	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2710	4197	0.66	57.1	12.2	B

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	1982	1731	9600	2000	0.26	0.87	57.2	55.9	8.7	12.9	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	47.0	11.3	11.3	3.2	F

Facility Overall Results

Space Mean Speed, mi/h	47.0	Density, veh/mi/ln	11.3
Average Travel Time, min	3.2	Density, pc/mi/ln	11.3

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Long-term	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	6046	6300	1.04	41.2	48.9	F

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	6277	6944	0.90	59.0	26.6	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5363	8400	0.75	18.9	71.0	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5668	6885	0.99	24.0	59.1	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3756	6300	0.84	14.8	84.9	F

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3700	207	6300	2000	0.87	0.10	12.5	62.8	98.4	26.7	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4445	1025	4774	2000	1.36	0.51	66.1	63.7	22.4	24.1	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	24.7	59.8	59.4	5.4	F

Facility Overall Results

Space Mean Speed, mi/h	24.7	Density, veh/mi/ln	59.4
Average Travel Time, min	5.4	Density, pc/mi/ln	59.8

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Cumulative	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	4
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	4
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	4
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	4
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	5992	201	8400	2000	0.95	0.10	17.3	60.5	86.6	27.9	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5596	559	8400	2000	0.88	0.28	16.2	-	86.5	-	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4927	6300	1.09	23.6	69.6	F

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5812	1269	8400	2000	0.82	0.63	17.1	-	85.0	-	F

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5762	526	6300	2000	1.28	0.26	36.8	59.5	52.2	43.3	F

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5142	6300	1.20	26.1	65.7	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5866	724	6300	2000	1.20	0.36	63.6	-	30.7	-	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5750	8400	0.98	21.4	67.2	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4879	6279	1.47	21.8	74.8	F

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5866	1629	6300	2000	1.47	0.81	61.3	-	31.9	-	F

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7380	1514	8400	2000	1.29	0.76	65.0	-	28.4	-	F

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7380	1790	10500	2000	1.17	0.90	63.8	55.7	23.1	27.9	F

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5590	4002	10500	4000	1.00	1.00	46.7	-	45.0	-	F

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1588	9600	0.70	69.8	5.3	A

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1737	149	9600	2000	0.72	0.07	70.5	66.2	6.2	7.2	A

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1802	1802	1.39	10.0	45.0	F

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2126	9600	0.76	67.2	7.1	A

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1237	1237	2.29	6.9	45.0	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	25.1	44.9	44.7	17.1	F

Facility Overall Results

Space Mean Speed, mi/h	25.1	Density, veh/mi/ln	44.7
Average Travel Time, min	17.1	Density, pc/mi/ln	44.9

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak
Analysis Year	Long-term	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	4
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	4
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	4
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	4
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	4
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	5
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	5
8	Basic	Basic	Lane Drop to Port Chicago On	1680	5
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	5
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	3326	582	8400	2000	0.40	0.29	68.4	59.4	12.2	12.3	B
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2612		8400		0.31		71.3		9.2		A
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2901		7413		0.39		63.6		11.4		B
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2190	542	9600	2000	0.23	0.27	67.5	59.5	8.1	7.9	A
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1674		9600		0.17		70.5		5.9		A
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2843		5956		0.48		56.3		10.1		B
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2787		12000		0.23		70.5		7.9		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2787		12000		0.23		70.5		7.9		A
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3236		9142		0.35		65.7		9.9		A
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2782		7176		0.39		69.2		13.4		B
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3440		5045		0.68		61.8		13.9		B
Segment 12: Basic															

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2343		7200		0.33		70.5		11.1		B

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2642	299	7200	2000	0.37	0.15	68.4	65.8	12.9	13.7	B

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3046	418	7200	2000	0.37	0.21	75.4	-	11.6	-	B

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3026	370	9600	2000	0.32	0.19	69.4	60.0	10.9	10.2	B

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2674	303	9600	2000	0.28	0.15	75.4	-	8.9	-	A

Segment 17: Basic

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2386		7200		0.33		71.3		11.2		B

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3207	821	7200	2000	0.33	0.41	75.4	-	10.5	-	A

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3168	0	9600	2000	0.33	0.00	71.7	61.1	11.0	8.9	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.5	10.8	10.7	6.8	A

Facility Overall Results

Space Mean Speed, mi/h	67.5	Density, veh/mi/ln	10.7

Average Travel Time, min	6.8	Density, pc/mi/ln	10.8

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	6590	1072	8400	2000	0.68	0.54	66.7	-	24.7	-	C

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4537	6300	0.70	30.5	49.7	F

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4582	351	8400	2000	0.53	0.18	13.5	-	85.1	-	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5041	7049	0.81	15.2	83.2	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4227	6300	0.83	16.8	83.8	F

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4132	7494	0.74	10.1	102.7	F

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	3754	899	4032	2000	1.27	0.45	66.8	58.4	14.1	15.5	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	22.6	58.5	58.4	6.6	F

Facility Overall Results

Space Mean Speed, mi/h	22.6	Density, veh/mi/ln	58.4
Average Travel Time, min	6.6	Density, pc/mi/ln	58.5

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	4327	6300	0.69	67.9	21.2	C

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4502	7364	0.61	62.4	18.0	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4183	8400	0.50	71.6	14.6	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4606	5722	0.80	54.1	21.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3338	6300	0.53	71.1	15.7	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3506	168	6300	2000	0.56	0.08	67.9	65.4	17.2	17.4	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4338	832	6300	2000	0.69	0.42	66.5	64.1	21.7	23.0	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.8	18.3	18.1	2.0	C

Facility Overall Results

Space Mean Speed, mi/h	65.8	Density, veh/mi/ln	18.1
Average Travel Time, min	2.0	Density, pc/mi/ln	18.3

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	4
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	4
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	4
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	4
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	4079	438	8400	2000	0.49	0.22	69.5	59.8	14.7	14.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3466	1134	8400	2000	0.41	0.57	75.2	-	11.5	-	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2386	6300	0.38	71.7	11.1	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3075	689	8400	2000	0.28	0.34	75.4	-	7.9	-	A

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3042	450	6300	2000	0.48	0.23	65.0	59.8	15.6	15.7	B

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2614	6300	0.41	70.5	12.4	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3540	926	6300	2000	0.41	0.46	75.2	-	11.6	-	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4093	8400	0.42	75.2	11.6	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3480	6279	0.55	68.4	17.0	B

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3983	503	6300	2000	0.55	0.25	72.8	-	15.9	-	B

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4905	946	8400	2000	0.47	0.47	74.5	-	13.3	-	B

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4860	322	10500	2000	0.46	0.16	69.9	60.1	13.9	15.0	B

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4553	2762	10500	4000	0.43	0.69	75.0	-	12.1	-	B

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1924	9600	0.20	70.0	6.9	A

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2457	533	9600	2000	0.26	0.27	69.9	66.0	8.8	10.5	B

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2963	8259	0.36	63.9	11.6	B

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2680	9600	0.28	70.9	9.4	A

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3300	9385	0.35	66.7	12.4	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	71.1	11.6	11.6	6.0	B

Facility Overall Results

Space Mean Speed, mi/h	71.1	Density, veh/mi/ln	11.6
Average Travel Time, min	6.0	Density, pc/mi/ln	11.6

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	4
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	4
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	4
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	4
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	4
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	5
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	5
8	Basic	Basic	Lane Drop to Port Chicago On	1680	5
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	5
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	5575	174	8400	2000	0.87	0.09	23.8	60.6	58.5	25.4	F
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		4848		8400		0.81		12.7		95.4		F
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		4960		7717		0.97		14.6		84.8		F
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4613	305	8400	2000	0.88	0.15	11.7	60.2	98.4	26.2	F
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3581		8400		0.84		7.6		118.5		F
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1000		1074		5.21		4.8		45.0		F
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2538		10500		0.90		63.2		6.7		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2538		10500		0.90		69.9		6.7		A
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1305		1305		2.59		5.8		45.0		F
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2336		6279		1.47		69.1		10.3		F
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		745		745		4.15		4.1		45.0		F
Segment 12: Basic															

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	991	6300	1.26	70.4	4.4	F

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1224	233	6300	2000	1.29	0.12	68.9	66.2	5.9	6.9	F

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1273	49	6300	2000	1.29	0.02	69.5	-	6.1	-	F

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1273	987	8400	2000	0.97	0.49	60.4	58.1	5.3	6.6	A

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	685	685	8400	2000	0.86	0.34	59.0	-	2.9	-	A

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	0	6300	1.05	70.0	0.0	F

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1264	1264	6300	2000	1.05	0.63	66.1	-	6.4	-	F

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1264	0	8400	2000	0.93	0.00	71.7	61.1	4.4	1.8	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	14.1	41.1	40.6	32.7	F

Facility Overall Results

Space Mean Speed, mi/h	14.1	Density, veh/mi/ln	40.6

Average Travel Time, min	32.7	Density, pc/mi/ln	41.1

Copyright © 2019 University of Florida. All Rights Reserved.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = 578 veh/h
	Freeway Volume, V_F: 2148	
	Ramp Volume, V_R: 412	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2148	0.92	Level	6	0	0.971	1.00	2405
Ramp	412	0.92	Level	6	0	0.971	1.00	461
UpStream								
DownStream	578	0.92	Level	6	0	0.971	1.00	647

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1309 pc/h

V_3 or V_{av34} 548 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2405	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1944	Exhibit 13-8	9400	No
V_R	461	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1309	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 8.3 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.469 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 60.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 5:56 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	650
Freeway Volume, V_F	5321
Ramp Volume, V_R	191
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1155 ft
V_D = 532 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5321	0.92	Level	5	0	0.976	1.00	5928
Ramp	191	0.92	Level	5	0	0.976	1.00	213
UpStream								
DownStream	532	0.92	Level	5	0	0.976	1.00	593

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = 673.06 (Equation 13-12 or 13-13)
P_{FD} = 0.602 using Equation 9 (Exhibit 13-7)
V_{12} = 3653 pc/h
V_3 or V_{av34} 2275 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5928	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	5715	Exhibit 13-8	7050	No
V_R	213	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3653	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 29.8 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.447 (Exhibit 13-12)
S_R= 54.7 mph (Exhibit 13-12)
S_0= 66.3 mph (Exhibit 13-12)
S = 58.7 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 5	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 3420 ft	Acceleration Lane Length, L_A: 485	L_{down} = ft
V_u = 412 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1736	
	Ramp Volume, V_R: 578	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1736	0.92	Level	6	0	0.971	1.00	1944
Ramp	578	0.92	Level	6	0	0.971	1.00	647
UpStream	412	0.92	Level	6	0	0.971	1.00	461
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.291 using Equation 0 (Exhibit 13-6)

V_{12} = 442 pc/h

V_3 or V_{av34} = 537 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 606 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2164	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1253	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 11.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.301 (Exibit 13-11)

S_R = 58.1 mph (Exhibit 13-11)

S_0 = 65.0 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1265 ft
V_u = veh/h	Deceleration Lane Length L_D: 320	V_D = 1208 veh/h
	Freeway Volume, V_F: 5130	
	Ramp Volume, V_R: 532	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5130	0.92	Level	5	0	0.976	1.00	5715
Ramp	532	0.92	Level	5	0	0.976	1.00	593
UpStream								
DownStream	1208	0.92	Level	5	0	0.976	1.00	1346

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2826 pc/h

V_3 or V_{av34} 1444 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5715	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5122	Exhibit 13-8	9400	No
V_R	593	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2826	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 25.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.481 (Exhibit 13-12)

S_R= 53.9 mph (Exhibit 13-12)

S_0= 69.6 mph (Exhibit 13-12)

S = 60.8 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 5:58 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1360 ft
V_u = veh/h	Deceleration Lane Length L_D: 475	V_D = 285 veh/h
	Freeway Volume, V_F: 2479	
	Ramp Volume, V_R: 1051	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2479	0.92	Level	6	0	0.971	1.00	2775
Ramp	1051	0.92	Level	6	0	0.971	1.00	1177
UpStream								
DownStream	285	0.92	Level	6	0	0.971	1.00	319

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1874 pc/h

V_3 or V_{av34} 450 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2775	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1598	Exhibit 13-8	9400	No
V_R	1177	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1874	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.534 (Exhibit 13-12)

S_R= 52.7 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 57.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1265 ft	Acceleration Lane Length, L_A: 415	L_{down} = ft
V_u = 532 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4598	
	Ramp Volume, V_R: 1208	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4598	0.92	Level	5	0	0.976	1.00	5123
Ramp	1208	0.92	Level	5	0	0.976	1.00	1346
UpStream	532	0.92	Level	5	0	0.976	1.00	593
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 996.83 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)

V_{12} = 3018 pc/h

V_3 or V_{av34} = 2105 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3018 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6469	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4364	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 36.3 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.598 (Exibit 13-11)

S_R = 51.2 mph (Exhibit 13-11)

S_0 = 59.2 mph (Exhibit 13-11)

S = 53.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 398 veh/h
	Freeway Volume, V_F: 1462	
	Ramp Volume, V_R: 285	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1462	0.92	Level	6	0	0.971	1.00	1637
Ramp	285	0.92	Level	6	0	0.971	1.00	319
UpStream								
DownStream	398	0.92	Level	6	0	0.971	1.00	446

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.321 using Equation 0 (Exhibit 13-6)

V_{12} = 526 pc/h

V_3 or V_{av34} = 555 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 654 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1956	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	973	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 10.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.300 (Exibit 13-11)

S_R= 58.1 mph (Exhibit 13-11)

S_0= 65.0 mph (Exhibit 13-11)

S = 61.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1520 ft
V_u = veh/h	Deceleration Lane Length L_D: 685	V_D = 689 veh/h
	Freeway Volume, V_F: 5835	
	Ramp Volume, V_R: 501	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5835	0.92	Level	6	0	0.971	1.00	6533
Ramp	501	0.92	Level	6	0	0.971	1.00	561
UpStream								
DownStream	689	0.92	Level	6	0	0.971	1.00	771

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.571 using Equation 9 (Exhibit 13-7)

V_{12} = 3970 pc/h

V_3 or V_{av34} 2563 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6533	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	5972	Exhibit 13-8	7050	No
V_R	561	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3970	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 32.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.478 (Exhibit 13-12)

S_R= 54.0 mph (Exhibit 13-12)

S_0= 65.2 mph (Exhibit 13-12)

S = 57.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 6:01 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1300 ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1000
Deceleration Lane Length L_D	
Freeway Volume, V_F	1747
Ramp Volume, V_R	398
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1747	0.92	Level	6	0	0.971	1.00	1956
Ramp	398	0.92	Level	6	0	0.971	1.00	446
UpStream		0.92	Level	6	0	0.971	1.00	287
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.481 using Equation 0 (Exhibit 13-6)
V_{12} = 940 pc/h
V_3 or V_{av34} = 508 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 940 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2402	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1386	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 9.8 (pc/mi/ln)
LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.267 (Exibit 13-11)
S_R = 58.9 mph (Exhibit 13-11)
S_0 = 65.0 mph (Exhibit 13-11)
S = 61.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 380	L_{down} = 1270 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 1625 veh/h
	Freeway Volume, V_F: 5334	
	Ramp Volume, V_R: 689	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5334	0.92	Level	6	0	0.971	1.00	5972
Ramp	689	0.92	Level	6	0	0.971	1.00	771
UpStream								
DownStream	1625	0.92	Level	6	0	0.971	1.00	1819

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.588 using Equation 3 (Exhibit 13-6)

V_{12} = 3512 pc/h

V_3 or V_{av34} = 2460 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3512 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6743	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4283	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 36.1 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.577 (Exibit 13-11)

S_R = 51.7 mph (Exhibit 13-11)

S_0 = 57.5 mph (Exhibit 13-11)

S = 53.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1410 ft
V_u = veh/h	Deceleration Lane Length L_D: 570	V_D = 288 veh/h
	Freeway Volume, V_F: 2033	
	Ramp Volume, V_R: 352	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2033	0.92	Level	6	0	0.971	1.00	2276
Ramp	352	0.92	Level	6	0	0.971	1.00	394
UpStream								
DownStream	288	0.92	Level	6	0	0.971	1.00	322

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1215 pc/h

V_3 or V_{av34} 530 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2276	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1882	Exhibit 13-8	9400	No
V_R	394	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1215	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 9.6 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.463 (Exhibit 13-12)

S_R= 54.3 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 61.1 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 6:03 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1270 ft
V_u = 689 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	950
Deceleration Lane Length L_D	
Freeway Volume, V_F	6023
Ramp Volume, V_R	1625
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6023	0.92	Level	6	0	0.971	1.00	6743
Ramp	1625	0.92	Level	6	0	0.971	1.00	1819
UpStream	689	0.92	Level	6	0	0.971	1.00	771
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.604 using Equation 3 (Exhibit 13-6)
V_{12} = 4073 pc/h
V_3 or V_{av34} = 2670 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 4073 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8562	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5892	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = 44.6 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.667 (Exibit 13-11)
S_R = 26.7 mph (Exhibit 13-11)
S_0 = 56.3 mph (Exhibit 13-11)
S = 31.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	285
Freeway Volume, V_F	1681
Ramp Volume, V_R	288
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1310 ft
V_D = 782 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1681	0.92	Level	6	0	0.971	1.00	1882
Ramp	288	0.92	Level	6	0	0.971	1.00	322
UpStream								
DownStream	782	0.92	Level	6	0	0.971	1.00	875

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 1002 pc/h
V_3 or V_{av34} 440 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1882	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1560	Exhibit 13-8	9400	No
V_R	322	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1002	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 10.3 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.457 (Exhibit 13-12)
S_R= 54.5 mph (Exhibit 13-12)
S_0= 71.3 mph (Exhibit 13-12)
S = 61.2 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3055 ft
V_u = veh/h	Deceleration Lane Length L_D: 700	V_D = 1551 veh/h
	Freeway Volume, V_F: 7786	
	Ramp Volume, V_R: 626	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7786	0.92	Level	6	0	0.971	1.00	8717
Ramp	626	0.92	Level	6	0	0.971	1.00	701
UpStream								
DownStream	1551	0.92	Level	6	0	0.971	1.00	1736

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 4196 pc/h

V_3 or V_{av34} 2260 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8717	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	8016	Exhibit 13-8	9400	No
V_R	701	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4196	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 34.0 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.491 (Exhibit 13-12)

S_R= 53.7 mph (Exhibit 13-12)

S_0= 66.4 mph (Exhibit 13-12)

S = 59.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 6:05 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1310 ft
V_u = 288 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	1393
Ramp Volume, V_R	782
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1393	0.92	Level	6	0	0.971	1.00	1560
Ramp	782	0.92	Level	6	0	0.971	1.00	875
UpStream	288	0.92	Level	6	0	0.971	1.00	322
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.236 using Equation 0 (Exhibit 13-6)
V_{12} = 368 pc/h
V_3 or V_{av34} = 596 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 624 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2435	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1499	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = 14.3 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.310 (Exibit 13-11)
S_R = 57.9 mph (Exhibit 13-11)
S_0 = 65.0 mph (Exhibit 13-11)
S = 60.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 3055 ft	Acceleration Lane Length, L_A: 450	L_{down} = ft
V_u = 626 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 7160	
	Ramp Volume, V_R: 1551	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7160	0.92	Level	6	0	0.971	1.00	8016
Ramp	1551	0.92	Level	6	0	0.971	1.00	1736
UpStream	626	0.92	Level	6	0	0.971	1.00	701
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1714.93 (Equation 13-6 or 13-7)

P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)

V_{12} = 4730 pc/h

V_3 or V_{av34} = 3286 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 5316 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9752	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	7052	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 56.9 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 4.795 (Exibit 13-11)

S_R = -45.3 mph (Exhibit 13-11)

S_0 = 56.1 mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = 628 veh/h
	Freeway Volume, V_F: 8911	
	Ramp Volume, V_R: 960	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	8911	0.92	Level	6	0	0.971	1.00	9976
Ramp	960	0.92	Level	6	0	0.971	1.00	1075
UpStream								
DownStream	628	0.92	Grade	6	0	0.971	1.00	703

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 4956 pc/h

V_3 or V_{av34} 2510 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	9976	Exhibit 13-8	9400	Yes
$V_{FO} = V_F - V_R$	8901	Exhibit 13-8	9400	No
V_R	1075	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4956	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 39.7 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.525 (Exhibit 13-12)

S_R= 52.9 mph (Exhibit 13-12)

S_0= 65.4 mph (Exhibit 13-12)

S = 58.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1155 ft
V_u = veh/h	Deceleration Lane Length L_D: 650	V_D = 1080 veh/h
	Freeway Volume, V_F: 3883	
	Ramp Volume, V_R: 417	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3883	0.92	Level	5	0	0.976	1.00	4326
Ramp	417	0.92	Level	5	0	0.976	1.00	465
UpStream								
DownStream	1080	0.92	Level	5	0	0.976	1.00	1203

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2148 pc/h

V_3 or V_{av34} 1089 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4326	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3861	Exhibit 13-8	9400	No
V_R	465	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2148	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.470 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 71.0 mph (Exhibit 13-12)

S = 61.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3420 ft
V_u = 960 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	485
Deceleration Lane Length L_D	
Freeway Volume, V_F	7951
Ramp Volume, V_R	628
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7951	0.92	Level	6	0	0.971	1.00	8902
Ramp	628	0.92	Level	6	0	0.971	1.00	703
UpStream	960	0.92	Level	6	0	0.971	1.00	1075
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.130 using Equation 0 (Exhibit 13-6)
V_{12} = 1157 pc/h
V_3 or V_{av34} = 3872 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 3560 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9605	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4263	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 35.4 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 0.564 (Exibit 13-11)
S_R = 52.0 mph (Exhibit 13-11)
S_0 = 56.2 mph (Exhibit 13-11)
S = 54.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	320
Freeway Volume, V_F	3466
Ramp Volume, V_R	1080
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1265 ft
V_D = 656 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3466	0.92	Level	5	0	0.976	1.00	3862
Ramp	1080	0.92	Level	5	0	0.976	1.00	1203
UpStream								
DownStream	656	0.92	Level	5	0	0.976	1.00	731

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2362 pc/h
V_3 or V_{av34} 750 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3862	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2659	Exhibit 13-8	9400	No
V_R	1203	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2362	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 21.7 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.536 (Exhibit 13-12)
S_R= 52.7 mph (Exhibit 13-12)
S_0= 71.3 mph (Exhibit 13-12)
S = 58.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1360 ft
V_u = veh/h	Deceleration Lane Length L_D: 475	V_D = 222 veh/h
	Freeway Volume, V_F: 7611	
	Ramp Volume, V_R: 1973	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7611	0.92	Level	6	0	0.971	1.00	8521
Ramp	1973	0.92	Level	6	0	0.971	1.00	2209
UpStream								
DownStream	222	0.92	Level	6	0	0.971	1.00	249

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 4961 pc/h

V_3 or V_{av34} 1780 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8521	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	6312	Exhibit 13-8	9400	No
V_R	2209	Exhibit 13-10	2000	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4961	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 42.6 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.627 (Exhibit 13-12)

S_R= 50.6 mph (Exhibit 13-12)

S_0= 68.3 mph (Exhibit 13-12)

S = 56.7 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 6:10 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1265 ft	Acceleration Lane Length, L_A: 415	L_{down} = ft
V_u = 1080 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2386	
	Ramp Volume, V_R: 656	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2386	0.92	Level	5	0	0.976	1.00	2658
Ramp	656	0.92	Level	5	0	0.976	1.00	731
UpStream	1080	0.92	Level	5	0	0.976	1.00	1203
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.126 using Equation 0 (Exhibit 13-6)

V_{12} = 336 pc/h

V_3 or V_{av34} = 1161 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1063 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3389	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1794	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.315 (Exibit 13-11)

S_R = 57.7 mph (Exhibit 13-11)

S_0 = 63.9 mph (Exhibit 13-11)

S = 60.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 47 veh/h
	Freeway Volume, V_F: 5638	
	Ramp Volume, V_R: 222	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5638	0.92	Level	6	0	0.971	1.00	6312
Ramp	222	0.92	Level	6	0	0.971	1.00	249
UpStream								
DownStream	47	0.92	Level	6	0	0.971	1.00	53

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)

V_{12} = 3725 pc/h

V_3 or V_{av34} = 2587 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3725 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6561	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3974	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 33.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.497 (Exibit 13-11)

S_R = 53.6 mph (Exhibit 13-11)

S_0 = 56.7 mph (Exhibit 13-11)

S = 54.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	685
Freeway Volume, V_F	4159
Ramp Volume, V_R	428
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1520 ft
V_D = 882 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4159	0.92	Level	6	0	0.971	1.00	4656
Ramp	428	0.92	Level	6	0	0.971	1.00	479
UpStream								
DownStream	882	0.92	Level	6	0	0.971	1.00	987

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2300 pc/h
V_3 or V_{av34} 1178 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4656	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4177	Exhibit 13-8	9400	No
V_R	479	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2300	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 17.9 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.471 (Exhibit 13-12)
S_R= 54.2 mph (Exhibit 13-12)
S_0= 70.6 mph (Exhibit 13-12)
S = 61.4 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1300 ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = 222 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 5860	
	Ramp Volume, V_R: 47	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5860	0.92	Level	6	0	0.971	1.00	6561
Ramp	47	0.92	Level	6	0	0.971	1.00	53
UpStream	222	0.92	Level	6	0	0.971	1.00	249
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.605 using Equation 3 (Exhibit 13-6)

V_{12} = 3973 pc/h

V_3 or V_{av34} = 2588 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3973 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6614	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4026	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 30.6 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.470 (Exibit 13-11)

S_R = 54.2 mph (Exhibit 13-11)

S_0 = 56.7 mph (Exhibit 13-11)

S = 55.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 380	L_{down} = 1270 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 542 veh/h
	Freeway Volume, V_F: 3731	
	Ramp Volume, V_R: 882	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3731	0.92	Level	6	0	0.971	1.00	4177
Ramp	882	0.92	Level	6	0	0.971	1.00	987
UpStream								
DownStream	542	0.92	Level	6	0	0.971	1.00	607

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.094 using Equation 0 (Exhibit 13-6)

V_{12} = 394 pc/h

V_3 or V_{av34} = 1891 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1670 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5164	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2657	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 23.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.350 (Exibit 13-11)

S_R= 57.0 mph (Exhibit 13-11)

S_0= 62.3 mph (Exhibit 13-11)

S = 59.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1410 ft
V_u = veh/h	Deceleration Lane Length L_D: 570	V_D = 652 veh/h
	Freeway Volume, V_F: 6004	
	Ramp Volume, V_R: 940	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6004	0.92	Level	6	0	0.971	1.00	6722
Ramp	940	0.92	Level	6	0	0.971	1.00	1052
UpStream								
DownStream	652	0.92	Level	6	0	0.971	1.00	730

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3524 pc/h

V_3 or V_{av34} 1599 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6722	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5670	Exhibit 13-8	9400	No
V_R	1052	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3524	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 29.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.523 (Exhibit 13-12)

S_R= 53.0 mph (Exhibit 13-12)

S_0= 69.0 mph (Exhibit 13-12)

S = 59.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1270 ft	Acceleration Lane Length, L_A: 950	L_{down} = ft
V_u = 882 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4613	
	Ramp Volume, V_R: 542	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4613	0.92	Level	6	0	0.971	1.00	5165
Ramp	542	0.92	Level	6	0	0.971	1.00	607
UpStream	882	0.92	Level	6	0	0.971	1.00	987
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.142 using Equation 0 (Exhibit 13-6)

V_{12} = 733 pc/h

V_3 or V_{av34} = 2216 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2066 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5772	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2673	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.311 (Exibit 13-11)

S_R = 57.8 mph (Exhibit 13-11)

S_0 = 61.2 mph (Exhibit 13-11)

S = 59.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1310 ft
V_u = veh/h	Deceleration Lane Length L_D: 285	V_D = 1203 veh/h
	Freeway Volume, V_F: 5064	
	Ramp Volume, V_R: 652	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5064	0.92	Level	6	0	0.971	1.00	5669
Ramp	652	0.92	Level	6	0	0.971	1.00	730
UpStream								
DownStream	1203	0.92	Level	6	0	0.971	1.00	1347

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2883 pc/h

V_3 or V_{av34} 1393 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5669	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4939	Exhibit 13-8	9400	No
V_R	730	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2883	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.494 (Exhibit 13-12)

S_R= 53.6 mph (Exhibit 13-12)

S_0= 69.8 mph (Exhibit 13-12)

S = 60.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	700
Freeway Volume, V_F	5322
Ramp Volume, V_R	558
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 3055 ft
V_D = 479 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5322	0.92	Level	6	0	0.971	1.00	5958
Ramp	558	0.92	Level	6	0	0.971	1.00	625
UpStream								
DownStream	479	0.92	Level	6	0	0.971	1.00	536

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2561 pc/h
V_3 or V_{av34} 1252 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5065	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4440	Exhibit 13-8	9400	No
V_R	625	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2561	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.0 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.484 (Exhibit 13-12)
S_R= 53.9 mph (Exhibit 13-12)
S_0= 70.3 mph (Exhibit 13-12)
S = 60.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1310 ft
V_u = 652 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	4412
Ramp Volume, V_R	1203
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4412	0.92	Level	6	0	0.971	1.00	4940
Ramp	1203	0.92	Level	6	0	0.971	1.00	1347
UpStream	652	0.92	Level	6	0	0.971	1.00	730
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = 951.22 (Equation 13-6 or 13-7)
P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)
V_{12} = 2908 pc/h
V_3 or V_{av34} = 2032 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 2908 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6287	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4255	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = 35.5 (pc/mi/ln)
LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.568 (Exibit 13-11)
S_R = 51.9 mph (Exhibit 13-11)
S_0 = 59.5 mph (Exhibit 13-11)
S = 54.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035)

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3055 ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	450
Deceleration Lane Length L_D	
Freeway Volume, V_F	4764
Ramp Volume, V_R	479
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4764	0.92	Level	6	0	0.971	1.00	5334
Ramp	479	0.92	Level	6	0	0.971	1.00	536
UpStream		0.92	Level	6	0	0.971	1.00	730
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.151 using Equation 0 (Exhibit 13-6)
V_{12} = 804 pc/h
V_3 or V_{av34} = 2265 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 2133 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5870	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2669	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.2 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.346 (Exibit 13-11)
S_R = 57.0 mph (Exhibit 13-11)
S_0 = 61.0 mph (Exhibit 13-11)
S = 59.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

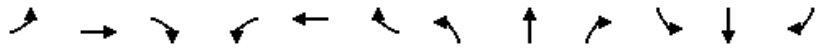
Copyright © 2014 University of Florida, All Rights Reserved

Interim Baseline (2035) Plus Project Traffic Conditions

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	930	344	621	359	29	736
Future Volume (veh/h)	930	344	621	359	29	736
Number	1	16	8	18	7	4
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	1765	1765	1765	1800	1765	1765
Adj Flow Rate, veh/h	989	366	661	382	31	783
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1186	546	707	409	75	1552
Arrive On Green	0.36	0.36	0.35	0.35	0.04	0.46
Sat Flow, veh/h	3261	1500	2137	1183	1681	3441
Grp Volume(v), veh/h	989	366	541	502	31	783
Grp Sat Flow(s),veh/h/ln	1630	1500	1676	1556	1681	1676
Q Serve(g_s), s	20.8	15.4	23.4	23.4	1.3	12.3
Cycle Q Clear(g_c), s	20.8	15.4	23.4	23.4	1.3	12.3
Prop In Lane	1.00	1.00		0.76	1.00	
Lane Grp Cap(c), veh/h	1186	546	579	537	75	1552
V/C Ratio(X)	0.83	0.67	0.93	0.93	0.42	0.50
Avail Cap(c_a), veh/h	1281	590	581	539	358	2122
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.8	20.1	23.7	23.8	34.9	14.1
Incr Delay (d2), s/veh	5.1	3.4	22.4	23.7	3.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.2	13.0	14.4	13.6	0.7	5.7
LnGrp Delay(d),s/veh	26.9	23.5	46.2	47.5	38.6	14.4
LnGrp LOS	C	C	D	D	D	B
Approach Vol, veh/h	1355		1043			814
Approach Delay, s/veh	26.0		46.8			15.3
Approach LOS	C		D			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				40.7		34.3	8.8	31.9
Change Period (Y+Rc), s				6.0		7.0	5.5	6.0
Max Green Setting (Gmax), s				47.5		29.5	16.0	26.0
Max Q Clear Time (g_c+I1), s				14.3		22.8	3.3	25.4
Green Ext Time (p_c), s				14.2		4.5	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	189	2	242	0	0	0	0	466	499	77	523	0
Future Volume (veh/h)	189	2	242	0	0	0	0	466	499	77	523	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		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1765				0	1765	1765	1765	1765	0
Adj Flow Rate, veh/h	208	2	0				0	512	0	85	575	0
Adj No. of Lanes	0	1	1				0	2	1	1	2	0
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	292	3	263				0	936	419	176	1727	0
Arrive On Green	0.18	0.18	0.00				0.00	0.28	0.00	0.10	0.52	0.00
Sat Flow, veh/h	1665	16	1500				0	3441	1500	1681	3441	0
Grp Volume(v), veh/h	210	0	0				0	512	0	85	575	0
Grp Sat Flow(s),veh/h/ln	1681	0	1500				0	1676	1500	1681	1676	0
Q Serve(g_s), s	4.9	0.0	0.0				0.0	5.5	0.0	2.0	4.2	0.0
Cycle Q Clear(g_c), s	4.9	0.0	0.0				0.0	5.5	0.0	2.0	4.2	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	295	0	263				0	936	419	176	1727	0
V/C Ratio(X)	0.71	0.00	0.00				0.00	0.55	0.00	0.48	0.33	0.00
Avail Cap(c_a), veh/h	640	0	571				0	1357	607	340	2474	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.3	0.0	0.0				0.0	12.9	0.0	17.7	6.0	0.0
Incr Delay (d2), s/veh	5.4	0.0	0.0				0.0	0.5	0.0	2.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.0				0.0	2.6	0.0	1.0	1.9	0.0
LnGrp Delay(d),s/veh	21.7	0.0	0.0				0.0	13.4	0.0	19.8	6.1	0.0
LnGrp LOS	C							B		B	A	
Approach Vol, veh/h		210						512			660	
Approach Delay, s/veh		21.7						13.4			7.8	
Approach LOS		C						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		14.4		27.6			9.9	17.7
Change Period (Y+Rc), s		7.0		6.0			5.5	6.0
Max Green Setting (Gmax), s		16.0		31.0			8.5	17.0
Max Q Clear Time (g_c+I1), s		6.9		6.2			4.0	7.5
Green Ext Time (p_c), s		1.1		6.8			0.1	4.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	365	144	117	367	288	0	0	235	1885
Future Volume (vph)	0	0	0	365	144	117	367	288	0	0	235	1885
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.99	1.00	1.00			1.00	0.99
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1593	1640	1479	1676	3353			3353	1481
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1593	1640	1479	1676	3353			3353	1481
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	372	147	119	374	294	0	0	240	1923
RTOR Reduction (vph)	0	0	0	0	0	55	0	0	0	0	0	43
Lane Group Flow (vph)	0	0	0	257	262	64	374	294	0	0	240	1880
Confl. Peds. (#/hr)							1		1	1		1
Confl. Bikes (#/hr)						1						
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				1	1		3	8			4	
Permitted Phases						1						4
Actuated Green, G (s)				18.0	18.0	18.0	19.5	119.0			94.0	94.0
Effective Green, g (s)				18.0	18.0	18.0	19.5	119.0			94.0	94.0
Actuated g/C Ratio				0.12	0.12	0.12	0.13	0.79			0.63	0.63
Clearance Time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Vehicle Extension (s)				4.5	4.5	4.5	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				191	196	177	217	2660			2101	928
v/s Ratio Prot				c0.16	0.16		c0.22	0.09			0.07	
v/s Ratio Perm						0.04						c1.27
v/c Ratio				1.35	1.34	0.36	1.72	0.11			0.11	2.03
Uniform Delay, d1				66.0	66.0	60.7	65.2	3.5			11.3	28.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				186.2	181.9	2.2	344.3	0.0			0.0	465.3
Delay (s)				252.2	247.9	62.9	409.5	3.5			11.3	493.3
Level of Service				F	F	E	F	A			B	F
Approach Delay (s)		0.0			215.1			230.8			439.8	
Approach LOS		A			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	358.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.89		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	174.9%	ICU Level of Service	H
Analysis Period (min)	15		

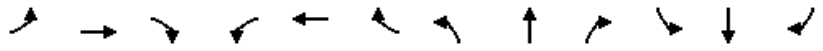
c Critical Lane Group

Intersection	
Intersection Delay, s/veh	67.4
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	271	21	44	0	2	44	41	0	200	108	0	0	12	74	362
Future Vol, veh/h	0	271	21	44	0	2	44	41	0	200	108	0	0	12	74	362
Peak Hour Factor	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65	0.92	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	417	32	68	0	3	68	63	0	308	166	0	0	18	114	557
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	161.6	17.2	35.8	28.3
HCM LOS	F	C	E	D

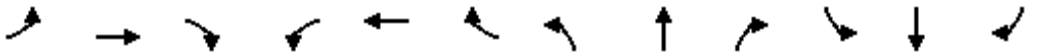
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	81%	2%	100%	0%	0%
Vol Thru, %	0%	100%	6%	51%	0%	33%	0%
Vol Right, %	0%	0%	13%	47%	0%	67%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	200	108	336	87	12	222	214
LT Vol	200	0	271	2	12	0	0
Through Vol	0	108	21	44	0	74	0
RT Vol	0	0	44	41	0	148	214
Lane Flow Rate	308	166	517	134	18	342	329
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.805	0.412	1.26	0.333	0.044	0.728	0.678
Departure Headway (Hd)	10.421	9.89	8.772	9.746	9.5	8.487	8.243
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	351	367	419	371	379	428	440
Service Time	8.121	7.59	6.472	7.446	7.2	6.187	5.943
HCM Lane V/C Ratio	0.877	0.452	1.234	0.361	0.047	0.799	0.748
HCM Control Delay	44.7	19.3	161.6	17.2	12.6	30.8	26.6
HCM Lane LOS	E	C	F	C	B	D	D
HCM 95th-tile Q	6.8	2	22.1	1.4	0.1	5.7	4.9



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	479	4	20	7	2	34	11	406	3	8	421	154
Future Volume (veh/h)	479	4	20	7	2	34	11	406	3	8	421	154
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	665	6	28	10	3	47	15	564	4	11	585	214
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	686	111	518	14	4	67	29	941	7	12	638	233
Arrive On Green	0.41	0.41	0.41	0.06	0.06	0.06	0.02	0.28	0.28	0.01	0.27	0.27
Sat Flow, veh/h	1681	272	1268	256	77	1201	1681	3412	24	1681	2405	878
Grp Volume(v), veh/h	665	0	34	60	0	0	15	277	291	11	408	391
Grp Sat Flow(s),veh/h/ln	1681	0	1540	1534	0	0	1681	1676	1760	1681	1676	1606
Q Serve(g_s), s	33.8	0.0	1.2	3.4	0.0	0.0	0.8	12.5	12.5	0.6	20.6	20.7
Cycle Q Clear(g_c), s	33.8	0.0	1.2	3.4	0.0	0.0	0.8	12.5	12.5	0.6	20.6	20.7
Prop In Lane	1.00		0.82	0.17		0.78	1.00		0.01	1.00		0.55
Lane Grp Cap(c), veh/h	686	0	629	85	0	0	29	463	485	12	445	426
V/C Ratio(X)	0.97	0.00	0.05	0.71	0.00	0.00	0.51	0.60	0.60	0.95	0.92	0.92
Avail Cap(c_a), veh/h	686	0	629	422	0	0	96	479	503	66	448	429
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	0.0	15.6	40.5	0.0	0.0	42.5	27.4	27.4	43.3	31.1	31.1
Incr Delay (d2), s/veh	26.6	0.0	0.0	3.9	0.0	0.0	5.0	2.0	1.9	62.3	23.4	24.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.6	0.0	0.5	1.5	0.0	0.0	0.4	6.0	6.3	0.5	12.4	12.1
LnGrp Delay(d),s/veh	51.9	0.0	15.6	44.4	0.0	0.0	47.5	29.3	29.3	105.6	54.5	55.8
LnGrp LOS	D		B	D			D	C	C	F	D	E
Approach Vol, veh/h		699			60			583			810	
Approach Delay, s/veh		50.1			44.4			29.8			55.8	
Approach LOS		D			D			C			E	

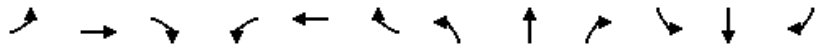
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.1	30.5		41.2	6.0	29.5		10.4
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	3.4	24.9		35.6	5.0	23.3		24.0
Max Q Clear Time (g_c+I1), s	2.6	14.5		35.8	2.8	22.7		5.4
Green Ext Time (p_c), s	0.0	5.6		0.0	0.0	0.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	46.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	317	186	212	282	805	821	125	740	201	269	310	461
Future Volume (vph)	317	186	212	282	805	821	125	740	201	269	310	461
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1000	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	6.0	6.0	5.5	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	3085		1676	3353	833	3252	3353	1480	3252	3025	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	3085		1676	3353	833	3252	3353	1480	3252	3025	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	369	216	247	328	936	955	145	860	234	313	360	536
RTOR Reduction (vph)	0	162	0	0	0	0	0	0	101	0	215	0
Lane Group Flow (vph)	369	301	0	328	936	955	145	860	133	313	681	0
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						Free			8			
Actuated Green, G (s)	25.8	32.7		27.5	34.4	125.0	7.7	29.0	29.0	11.8	33.1	
Effective Green, g (s)	25.8	32.7		27.5	34.4	125.0	7.7	29.0	29.0	11.8	33.1	
Actuated g/C Ratio	0.21	0.26		0.22	0.28	1.00	0.06	0.23	0.23	0.09	0.26	
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	6.0	6.0	5.5	6.0	
Vehicle Extension (s)	3.0	4.5		3.0	4.5		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	345	807		368	922	833	200	777	343	306	801	
v/s Ratio Prot	0.22	0.10		0.20	0.28		0.04	0.26		0.10	0.23	
v/s Ratio Perm						c1.15			0.09			
v/c Ratio	1.07	0.37		0.89	1.02	1.15	0.72	1.11	0.39	1.02	0.85	
Uniform Delay, d1	49.6	37.8		47.3	45.3	62.5	57.6	48.0	40.5	56.6	43.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	68.2	0.5		22.6	33.5	79.9	12.3	65.6	0.7	57.4	8.6	
Delay (s)	117.8	38.3		69.9	78.8	142.4	69.9	113.6	41.3	114.0	52.2	
Level of Service	F	D		E	E	F	E	F	D	F	D	
Approach Delay (s)		73.5			104.8			94.9			68.2	
Approach LOS		E			F			F			E	

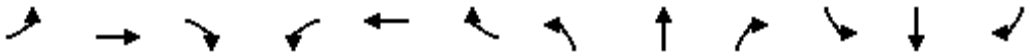
Intersection Summary			
HCM 2000 Control Delay	89.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	339	0	709	0	0	0	0	1499	379	0	330	285
Future Volume (veh/h)	339	0	709	0	0	0	0	1499	379	0	330	285
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	373	0	779				0	1647	416	0	363	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	1329	0	612				0	1657	413	0	1444	646
Arrive On Green	0.41	0.00	0.41				0.00	0.43	0.43	0.00	0.43	0.00
Sat Flow, veh/h	3261	0	1500				0	4006	958	0	3441	1500
Grp Volume(v), veh/h	373	0	779				0	1371	692	0	363	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1594	0	1676	1500
Q Serve(g_s), s	5.0	0.0	26.5				0.0	27.6	28.0	0.0	4.5	0.0
Cycle Q Clear(g_c), s	5.0	0.0	26.5				0.0	27.6	28.0	0.0	4.5	0.0
Prop In Lane	1.00		1.00				0.00		0.60	0.00		1.00
Lane Grp Cap(c), veh/h	1329	0	612				0	1384	687	0	1444	646
V/C Ratio(X)	0.28	0.00	1.27				0.00	0.99	1.01	0.00	0.25	0.00
Avail Cap(c_a), veh/h	1329	0	612				0	1384	687	0	1444	646
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	12.9	0.0	19.2				0.0	18.4	18.5	0.0	11.8	0.0
Incr Delay (d2), s/veh	0.1	0.0	135.7				0.0	22.0	36.2	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	33.9				0.0	16.2	19.1	0.0	2.1	0.0
LnGrp Delay(d),s/veh	13.0	0.0	154.9				0.0	40.3	54.7	0.0	11.9	0.0
LnGrp LOS	B		F					D	F		B	
Approach Vol, veh/h		1152						2063			363	
Approach Delay, s/veh		109.0						45.2			11.9	
Approach LOS		F						D			B	

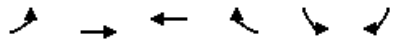
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		34.0		31.0		34.0		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		28.0		26.5		28.0		
Max Q Clear Time (g_c+I1), s		30.0		28.5		6.5		
Green Ext Time (p_c), s		0.0		0.0		16.7		

Intersection Summary	
HCM 2010 Ctrl Delay	62.3
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	456	98	307	101	549	373	0	0	1803	408
Future Volume (vph)	35	0	456	98	307	101	549	373	0	0	1803	408
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			*0.50	
Frpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.97	
Flt Protected	0.95		1.00		0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3252		1500		1744	1500	1676	4818			3418	
Flt Permitted	0.51		1.00		0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1745		1500		1744	1500	1676	4818			3418	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	38	0	490	105	330	109	590	401	0	0	1939	439
RTOR Reduction (vph)	0	0	454	0	0	65	0	0	0	0	13	0
Lane Group Flow (vph)	38	0	36	0	435	44	590	401	0	0	2365	0
Confl. Bikes (#/hr)												1
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	10.4		10.4		32.0	32.0	34.0	85.1			47.1	
Effective Green, g (s)	10.4		10.4		32.0	32.0	34.0	85.1			47.1	
Actuated g/C Ratio	0.07		0.07		0.23	0.23	0.24	0.61			0.34	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	129		111		397	341	405	2918			1145	
v/s Ratio Prot					c0.25		c0.35	0.08			c0.69	
v/s Ratio Perm	0.02		c0.02			0.03						
v/c Ratio	0.29		0.33		1.10	0.13	1.46	0.14			2.07	
Uniform Delay, d1	61.6		61.7		54.2	43.2	53.2	11.9			46.7	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.9		1.3		73.5	0.1	218.9	0.0			482.4	
Delay (s)	62.5		63.0		127.7	43.2	272.1	11.9			529.1	
Level of Service	E		E		F	D	F	B			F	
Approach Delay (s)		62.9			110.8			166.8			529.1	
Approach LOS		E			F			F			F	

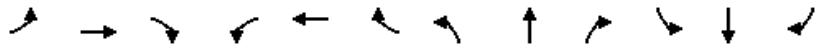
Intersection Summary			
HCM 2000 Control Delay	341.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	140.5	Sum of lost time (s)	17.0
Intersection Capacity Utilization	107.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	217	299	1425	428	256	606
Future Volume (veh/h)	217	299	1425	428	256	606
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	236	325	1549	465	278	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	335	2444	1897	1052	490	225
Arrive On Green	0.10	0.73	0.57	0.57	0.15	0.00
Sat Flow, veh/h	3261	3441	3441	1461	3261	1500
Grp Volume(v), veh/h	236	325	1549	465	278	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1461	1630	1500
Q Serve(g_s), s	4.6	1.9	24.7	8.8	5.2	0.0
Cycle Q Clear(g_c), s	4.6	1.9	24.7	8.8	5.2	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	335	2444	1897	1052	490	225
V/C Ratio(X)	0.71	0.13	0.82	0.44	0.57	0.00
Avail Cap(c_a), veh/h	493	2736	2026	1108	1379	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.7	2.7	11.6	3.9	26.1	0.0
Incr Delay (d2), s/veh	2.7	0.0	2.6	0.3	1.0	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	2.2	0.9	11.9	5.4	2.4	0.0
LnGrp Delay(d),s/veh	31.5	2.7	14.2	4.2	27.2	0.0
LnGrp LOS	C	A	B	A	C	
Approach Vol, veh/h		561	2014		278	
Approach Delay, s/veh		14.8	11.9		27.2	
Approach LOS		B	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				52.2		13.9	10.8	41.5
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				54.0		28.0	10.0	40.0
Max Q Clear Time (g_c+I1), s				3.9		7.2	6.6	26.7
Green Ext Time (p_c), s				27.5		0.9	0.2	10.8

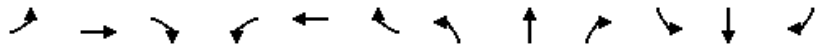
Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	334	166	327	1753	5	395	15	231	9	17	9
Future Volume (veh/h)	5	334	166	327	1753	5	395	15	231	9	17	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	5	355	177	348	1865	5	420	16	246	10	18	10
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	11	463	226	362	1449	4	296	700	591	20	247	137
Arrive On Green	0.01	0.21	0.21	0.22	0.42	0.42	0.18	0.40	0.40	0.01	0.23	0.23
Sat Flow, veh/h	1681	2167	1060	1681	3430	9	1681	1765	1492	1681	1063	591
Grp Volume(v), veh/h	5	273	259	348	911	959	420	16	246	10	0	28
Grp Sat Flow(s),veh/h/ln	1681	1676	1551	1681	1676	1763	1681	1765	1492	1681	0	1654
Q Serve(g_s), s	0.4	19.9	20.5	26.6	54.9	54.9	22.9	0.7	15.5	0.8	0.0	1.7
Cycle Q Clear(g_c), s	0.4	19.9	20.5	26.6	54.9	54.9	22.9	0.7	15.5	0.8	0.0	1.7
Prop In Lane	1.00		0.68	1.00		0.01	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	11	358	331	362	708	745	296	700	591	20	0	384
V/C Ratio(X)	0.47	0.76	0.78	0.96	1.29	1.29	1.42	0.02	0.42	0.51	0.00	0.07
Avail Cap(c_a), veh/h	65	406	376	362	708	745	296	700	591	65	0	384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	1.00	1.00	1.00	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	64.4	48.0	48.3	50.5	37.5	37.5	53.5	23.9	28.4	63.9	0.0	39.0
Incr Delay (d2), s/veh	28.3	6.3	8.0	37.1	139.4	139.4	206.8	0.1	2.1	19.0	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	9.9	9.5	16.1	52.8	55.5	27.6	0.4	6.7	0.5	0.0	0.8
LnGrp Delay(d),s/veh	92.6	54.4	56.3	87.6	176.9	176.9	260.4	24.0	30.5	82.9	0.0	39.4
LnGrp LOS	F	D	E	F	F	F	F	C	C	F		D
Approach Vol, veh/h		537			2218			682			38	
Approach Delay, s/veh		55.6			162.9			171.9			50.8	
Approach LOS		E			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	57.0	33.1	33.3	28.0	35.6	5.9	60.4
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	5.0	44.3	28.0	31.5	22.9	26.4	5.0	54.5
Max Q Clear Time (g_c+I1), s	2.4	17.5	28.6	22.5	24.9	3.7	2.4	56.9
Green Ext Time (p_c), s	0.0	0.7	0.0	5.3	0.0	0.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	146.9
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	427	46	18	1709	4	66	11	119	39	24	31
Future Volume (veh/h)	4	427	46	18	1709	4	66	11	119	39	24	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	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	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	436	47	18	1744	4	67	11	121	40	24	32
Adj No. of Lanes	1	1	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	894	96	20	1999	5	78	13	141	69	42	55
Arrive On Green	0.00	0.57	0.57	0.01	0.58	0.58	0.15	0.15	0.15	0.10	0.10	0.10
Sat Flow, veh/h	1681	1561	168	1681	3432	8	521	86	941	667	400	534
Grp Volume(v), veh/h	4	0	483	18	852	896	199	0	0	96	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1729	1681	1676	1763	1548	0	0	1602	0	0
Q Serve(g_s), s	0.2	0.0	16.4	1.1	42.6	42.7	12.4	0.0	0.0	5.6	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	16.4	1.1	42.6	42.7	12.4	0.0	0.0	5.6	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.00	0.34		0.61	0.42		0.33
Lane Grp Cap(c), veh/h	4	0	991	20	977	1027	231	0	0	166	0	0
V/C Ratio(X)	1.01	0.00	0.49	0.89	0.87	0.87	0.86	0.00	0.00	0.58	0.00	0.00
Avail Cap(c_a), veh/h	187	0	1068	187	1035	1088	251	0	0	259	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.3	0.0	12.5	48.7	17.5	17.5	41.0	0.0	0.0	42.2	0.0	0.0
Incr Delay (d2), s/veh	214.8	0.0	0.4	65.3	8.0	7.7	23.5	0.0	0.0	3.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.1	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	7.9	0.9	21.6	22.6	6.8	0.0	0.0	2.7	0.0	0.0
LnGrp Delay(d),s/veh	264.2	0.0	12.9	114.1	25.5	25.2	64.5	0.0	0.0	45.4	0.0	0.0
LnGrp LOS	F		B	F	C	C	E			D		
Approach Vol, veh/h		487			1766			199			96	
Approach Delay, s/veh		14.9			26.2			64.5			45.4	
Approach LOS		B			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		18.8	5.2	60.6		14.2	4.2	61.6
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	61.0		16.0	11.0	61.0
Max Q Clear Time (g_c+I1), s		14.4	3.1	18.4		7.6	2.2	44.7
Green Ext Time (p_c), s		0.2	0.0	25.8		0.3	0.0	12.9

Intersection Summary	
HCM 2010 Ctrl Delay	27.8
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	208	1	45	0	0	0	0	66	14	5	111	0
Future Vol, veh/h	208	1	45	0	0	0	0	66	14	5	111	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	257	1	56	0	0	0	0	81	17	6	137	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	230	230	137	-	0	0	81	0	0
Stage 1	149	149	-	-	-	-	-	-	-
Stage 2	81	81	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	758	670	911	0	-	-	1517	-	0
Stage 1	879	774	-	0	-	-	-	-	0
Stage 2	942	828	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	755	0	911	-	-	-	1517	-	-
Mov Cap-2 Maneuver	755	0	-	-	-	-	-	-	-
Stage 1	875	0	-	-	-	-	-	-	-
Stage 2	942	0	-	-	-	-	-	-	-

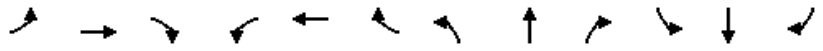
Approach	EB	NB	SB
HCM Control Delay, s	12.7	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	779	1517	-
HCM Lane V/C Ratio	-	-	0.403	0.004	-
HCM Control Delay (s)	-	-	12.7	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	2	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	22	252	116	647
Future Volume (Veh/h)	0	0	22	252	116	647
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	25	283	130	727
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	463	130	130			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	463	130	130			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	548	920	1455			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	25	283	130	727
Volume Left	25	0	0	0
Volume Right	0	0	0	727
cSH	1455	1700	1700	1700
Volume to Capacity	0.02	0.17	0.08	0.43
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.6		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		



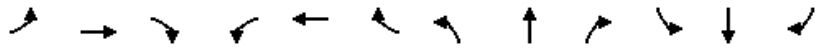
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	154	149	94	456	104	316	322	54	136	206	110
Future Volume (veh/h)	44	154	149	94	456	104	316	322	54	136	206	110
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		0.96	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	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	51	179	0	109	530	121	367	374	63	158	240	128
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	90	632	537	142	532	122	384	526	429	192	317	251
Arrive On Green	0.05	0.36	0.00	0.08	0.39	0.38	0.23	0.30	0.30	0.12	0.18	0.18
Sat Flow, veh/h	1681	1765	1500	1681	1380	315	1648	1731	1411	1648	1731	1371
Grp Volume(v), veh/h	51	179	0	109	0	651	367	374	63	158	240	128
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1695	1648	1731	1411	1648	1731	1371
Q Serve(g_s), s	3.5	8.5	0.0	7.4	0.0	44.7	25.6	22.4	3.8	10.9	15.3	9.8
Cycle Q Clear(g_c), s	3.5	8.5	0.0	7.4	0.0	44.7	25.6	22.4	3.8	10.9	15.3	9.8
Prop In Lane	1.00		1.00	1.00		0.19	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	632	537	142	0	654	384	526	429	192	317	251
V/C Ratio(X)	0.57	0.28	0.00	0.77	0.00	1.00	0.95	0.71	0.15	0.82	0.76	0.51
Avail Cap(c_a), veh/h	109	632	537	225	0	654	384	528	430	223	359	284
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.9	26.7	0.0	52.3	0.0	35.8	44.1	36.1	29.6	50.4	45.2	42.9
Incr Delay (d2), s/veh	5.5	0.2	0.0	8.4	0.0	34.0	34.3	4.4	0.2	19.2	7.9	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	4.2	0.0	3.8	0.0	27.0	15.3	11.3	1.5	6.0	8.0	3.8
LnGrp Delay(d),s/veh	59.3	27.0	0.0	60.6	0.0	69.8	78.4	40.5	29.8	69.6	53.0	44.5
LnGrp LOS	E	C		E		E	E	D	C	E	D	D
Approach Vol, veh/h		230			760			804			526	
Approach Delay, s/veh		34.1			68.5			57.0			55.9	
Approach LOS		C			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.2	25.8	10.3	49.4	17.6	39.4	13.9	45.8
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	26.6	* 24	7.0	* 44	15.2	34.6	15.0	36.0
Max Q Clear Time (g_c+I1), s	27.6	17.3	5.5	46.7	12.9	24.4	9.4	10.5
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.1	2.6	0.1	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	58.2
HCM 2010 LOS	E

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	691	54	65	1539	9	204	5	152	22	5	20
Future Volume (veh/h)	13	691	54	65	1539	9	204	5	152	22	5	20
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	15	803	63	76	1790	10	237	6	177	26	6	23
Adj No. of Lanes	1	2	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	1809	787	96	1960	11	267	327	278	58	20	75
Arrive On Green	0.02	0.54	0.54	0.06	0.57	0.57	0.16	0.19	0.19	0.03	0.06	0.06
Sat Flow, veh/h	1681	3353	1458	1681	3419	19	1681	1765	1500	1681	320	1228
Grp Volume(v), veh/h	15	803	63	76	877	923	237	6	177	26	0	29
Grp Sat Flow(s),veh/h/ln	1681	1676	1458	1681	1676	1761	1681	1765	1500	1681	0	1548
Q Serve(g_s), s	1.0	16.6	2.4	5.1	53.6	53.7	15.8	0.3	12.5	1.7	0.0	2.0
Cycle Q Clear(g_c), s	1.0	16.6	2.4	5.1	53.6	53.7	15.8	0.3	12.5	1.7	0.0	2.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	39	1809	787	96	961	1010	267	327	278	58	0	95
V/C Ratio(X)	0.38	0.44	0.08	0.79	0.91	0.91	0.89	0.02	0.64	0.45	0.00	0.31
Avail Cap(c_a), veh/h	103	1876	816	191	1026	1078	353	509	433	132	0	244
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	55.0	15.9	12.7	53.2	21.8	21.9	47.1	38.1	43.0	54.1	0.0	51.4
Incr Delay (d2), s/veh	6.1	0.1	0.0	13.5	11.2	10.9	19.0	0.0	2.4	5.4	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	0.5	7.6	1.0	2.7	27.6	28.9	8.7	0.2	5.4	0.9	0.0	0.9
LnGrp Delay(d),s/veh	61.1	16.0	12.7	66.8	33.0	32.7	66.1	38.1	45.4	59.5	0.0	53.2
LnGrp LOS	E	B	B	E	C	C	E	D	D	E		D
Approach Vol, veh/h		881			1876			420			55	
Approach Delay, s/veh		16.5			34.2			57.0			56.2	
Approach LOS		B			C			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	67.7	23.1	12.0	7.7	71.6	8.9	26.2
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	13.0	64.0	24.0	18.0	7.0	70.0	9.0	33.0
Max Q Clear Time (g_c+I1), s	17.1	18.6	17.8	4.0	3.0	55.7	3.7	14.5
Green Ext Time (p_c), s	0.1	18.5	0.4	0.6	0.0	9.8	0.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.7
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	807	58	29	1336	277	173
Future Volume (veh/h)	807	58	29	1336	277	173
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	868	62	31	1437	298	186
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1432	102	80	1973	365	326
Arrive On Green	0.45	0.45	0.05	0.59	0.22	0.22
Sat Flow, veh/h	3253	226	1681	3441	1681	1500
Grp Volume(v), veh/h	460	470	31	1437	298	186
Grp Sat Flow(s),veh/h/ln	1676	1715	1681	1676	1681	1500
Q Serve(g_s), s	11.7	11.7	1.0	17.5	9.5	6.3
Cycle Q Clear(g_c), s	11.7	11.7	1.0	17.5	9.5	6.3
Prop In Lane		0.13	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	758	776	80	1973	365	326
V/C Ratio(X)	0.61	0.61	0.39	0.73	0.82	0.57
Avail Cap(c_a), veh/h	758	776	267	2253	476	424
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.7	11.7	26.1	8.4	21.1	19.8
Incr Delay (d2), s/veh	1.4	1.4	3.0	1.0	8.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	5.8	0.5	8.3	5.2	2.7
LnGrp Delay(d),s/veh	13.1	13.0	29.1	9.4	29.4	21.4
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	930			1468	484	
Approach Delay, s/veh	13.1			9.8	26.3	
Approach LOS	B			A	C	

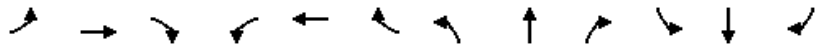
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.7	31.6				39.3		17.3
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	9.0	24.0				38.0		16.0
Max Q Clear Time (g_c+I1), s	3.0	13.7				19.5		11.5
Green Ext Time (p_c), s	0.0	8.9				13.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	926	54	125	1183	182	500
Future Volume (vph)	926	54	125	1183	182	500
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.90	
Flt Protected	1.00		0.95	1.00	0.99	
Satd. Flow (prot)	3310		1676	3353	1554	
Flt Permitted	1.00		0.95	1.00	0.99	
Satd. Flow (perm)	3310		1676	3353	1554	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1064	62	144	1360	209	575
RTOR Reduction (vph)	3	0	0	0	66	0
Lane Group Flow (vph)	1123	0	144	1360	718	0
Confl. Peds. (#/hr)		14	14		1	1
Confl. Bikes (#/hr)		2				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	44.0		10.0	85.0	55.0	
Effective Green, g (s)	45.0		10.6	85.6	55.6	
Actuated g/C Ratio	0.30		0.07	0.57	0.37	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	993		118	1913	576	
v/s Ratio Prot	c0.34		c0.09	c0.41	c0.46	
v/s Ratio Perm						
v/c Ratio	1.13		1.22	0.71	1.25	
Uniform Delay, d1	52.5		69.7	23.3	47.2	
Progression Factor	1.00		1.28	0.55	1.00	
Incremental Delay, d2	71.8		151.4	1.2	124.9	
Delay (s)	124.3		240.8	13.9	172.1	
Level of Service	F		F	B	F	
Approach Delay (s)	124.3			35.7	172.1	
Approach LOS	F			D	F	

Intersection Summary			
HCM 2000 Control Delay	96.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	90.1%	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)	409	435	670	316	1198	738	145	677	160	304	575	189
Future Volume (veh/h)	409	435	670	316	1198	738	145	677	160	304	575	189
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1731	1731	1800	1731	1731	1731
Adj Flow Rate, veh/h	454	483	744	351	1331	820	161	752	178	338	639	210
Adj No. of Lanes	2	2	1	1	2	1	1	2	0	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	426	852	352	388	1186	509	127	749	177	344	546	459
Arrive On Green	0.13	0.25	0.24	0.23	0.35	0.35	0.08	0.28	0.27	0.22	0.63	0.63
Sat Flow, veh/h	3261	3353	1454	1681	3353	1437	1648	2632	623	3198	1731	1454
Grp Volume(v), veh/h	454	483	744	351	1331	820	161	470	460	338	639	210
Grp Sat Flow(s),veh/h/ln	1630	1676	1454	1681	1676	1437	1648	1644	1611	1599	1731	1454
Q Serve(g_s), s	17.0	16.3	31.5	26.4	46.0	46.0	10.0	37.0	37.0	13.7	41.0	9.7
Cycle Q Clear(g_c), s	17.0	16.3	31.5	26.4	46.0	46.0	10.0	37.0	37.0	13.7	41.0	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	426	852	352	388	1186	509	127	468	459	344	546	459
V/C Ratio(X)	1.06	0.57	2.11	0.91	1.12	1.61	1.27	1.00	1.00	0.98	1.17	0.46
Avail Cap(c_a), veh/h	426	852	352	427	1186	509	127	468	459	344	546	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.99	0.99	0.99	0.09	0.09	0.09	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	56.5	42.3	49.2	48.6	42.0	42.0	60.0	46.5	46.8	50.9	24.0	18.2
Incr Delay (d2), s/veh	61.6	0.6	509.4	2.7	56.1	276.4	169.3	42.5	43.0	39.6	92.6	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	7.7	62.5	12.6	30.5	57.3	10.5	22.3	21.9	7.9	33.2	4.2
LnGrp Delay(d),s/veh	118.1	42.9	558.6	51.4	98.1	318.4	229.3	89.0	89.8	90.4	116.6	21.0
LnGrp LOS	F	D	F	D	F	F	F	F	F	F	F	C
Approach Vol, veh/h		1681			2502			1091			1187	
Approach Delay, s/veh		291.5			163.7			110.0			92.2	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	41.0	34.0	37.0	14.0	45.0	21.0	50.0
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	12.9	35.5	31.9	28.5	8.9	39.5	15.9	44.5
Max Q Clear Time (g_c+I1), s	15.7	39.0	28.4	33.5	12.0	43.0	19.0	48.0
Green Ext Time (p_c), s	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay	174.8	
HCM 2010 LOS	F	

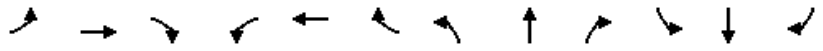
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	20	150	36	25	66	183	1626	15	16	883	258
Future Volume (vph)	154	20	150	36	25	66	183	1626	15	16	883	258
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.97	
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1613	1466	1676	1574		1644	3283		1644	4219	
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1613	1466	1676	1574		1644	3283		1644	4219	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	164	21	160	38	27	70	195	1730	16	17	939	274
RTOR Reduction (vph)	0	0	142	0	66	0	0	0	0	0	29	0
Lane Group Flow (vph)	84	101	18	38	31	0	195	1746	0	17	1184	0
Confl. Peds. (#/hr)			7	7			7		6	6		7
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	13.7	13.7	13.7	7.1	7.1		19.0	86.5		2.3	69.8	
Effective Green, g (s)	14.8	14.8	14.8	8.2	8.2		20.1	87.6		3.4	70.9	
Actuated g/C Ratio	0.11	0.11	0.11	0.06	0.06		0.15	0.67		0.03	0.55	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	181	183	166	105	99		254	2212		42	2300	
v/s Ratio Prot	0.05	c0.06		c0.02	0.02		c0.12	c0.53		0.01	0.28	
v/s Ratio Perm			0.01									
v/c Ratio	0.46	0.55	0.11	0.36	0.32		0.77	0.79		0.40	0.51	
Uniform Delay, d1	53.9	54.5	51.7	58.4	58.2		52.7	14.8		62.3	18.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.98		1.15	0.59	
Incremental Delay, d2	0.7	2.0	0.1	0.8	0.7		1.2	0.3		2.1	0.7	
Delay (s)	54.6	56.5	51.8	59.2	58.9		53.9	14.7		73.5	11.7	
Level of Service	D	E	D	E	E		D	B		E	B	
Approach Delay (s)		53.9			59.0			18.7			12.6	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.7%	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)	220	273	395	0	0	288	0	1455	391	230	799	293
Future Volume (vph)	220	273	395	0	0	288	0	1455	391	230	799	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			0.88		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.98			1.00		1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3462	1551			2787		3471	1523	3367	3471	1505
Flt Permitted		0.98	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3462	1551			2787		3471	1523	3367	3471	1505
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	224	279	403	0	0	294	0	1485	399	235	815	299
RTOR Reduction (vph)	0	0	67	0	0	233	0	0	70	0	0	0
Lane Group Flow (vph)	0	503	336	0	0	61	0	1485	329	235	815	299
Confl. Peds. (#/hr)			10	10			22		4	4		22
Confl. Bikes (#/hr)			4									
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		27.3	34.4			27.3		75.8	75.8	12.9	80.6	130.0
Effective Green, g (s)		26.9	33.6			26.8		75.3	75.3	11.9	80.1	130.0
Actuated g/C Ratio		0.21	0.26			0.21		0.58	0.58	0.09	0.62	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		716	465			574		2010	882	308	2138	1505
v/s Ratio Prot			c0.04					c0.43		c0.07	0.23	
v/s Ratio Perm		0.15	0.18			0.02			0.22			c0.20
v/c Ratio		0.70	0.72			0.11		0.74	0.37	0.76	0.38	0.20
Uniform Delay, d1		47.8	44.0			41.9		20.1	14.7	57.7	12.5	0.0
Progression Factor		1.00	1.00			1.00		0.60	0.29	0.95	1.38	1.00
Incremental Delay, d2		2.6	4.7			0.0		1.7	0.8	8.2	0.4	0.2
Delay (s)		50.4	48.6			41.9		13.8	5.1	63.1	17.7	0.2
Level of Service		D	D			D		B	A	E	B	A
Approach Delay (s)		49.6			41.9			11.9			21.8	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	82.7%	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)	0	0	0	341	277	152	895	855	340	127	597	165
Future Volume (veh/h)	0	0	0	341	277	152	895	855	340	127	597	165
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		0.97	1.00		0.96
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1765	1800	1731	1731	1800	1731	1731	1800
Adj Flow Rate, veh/h				363	295	162	952	910	362	135	635	176
Adj No. of Lanes				0	2	0	2	3	0	1	2	0
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	2	0	4	4	4	4	4	4
Cap, veh/h				391	342	192	935	1738	690	160	837	232
Arrive On Green				0.28	0.28	0.28	0.29	0.53	0.53	0.03	0.11	0.11
Sat Flow, veh/h				1412	1232	692	3198	3297	1308	1648	2521	698
Grp Volume(v), veh/h				436	0	384	952	869	403	135	414	397
Grp Sat Flow(s),veh/h/ln				1694	0	1642	1599	1575	1455	1648	1644	1574
Q Serve(g_s), s				32.5	0.0	28.7	38.0	23.4	23.6	10.6	31.8	31.9
Cycle Q Clear(g_c), s				32.5	0.0	28.7	38.0	23.4	23.6	10.6	31.8	31.9
Prop In Lane				0.83		0.42	1.00		0.90	1.00		0.44
Lane Grp Cap(c), veh/h				470	0	455	935	1661	767	160	546	523
V/C Ratio(X)				0.93	0.00	0.84	1.02	0.52	0.52	0.84	0.76	0.76
Avail Cap(c_a), veh/h				521	0	505	935	1661	767	241	546	523
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh				45.7	0.0	44.3	46.0	20.1	20.2	61.9	52.8	52.9
Incr Delay (d2), s/veh				21.5	0.0	11.1	34.2	1.2	2.6	10.1	9.5	10.0
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				18.0	0.0	14.4	21.2	10.4	10.0	5.3	15.9	15.4
LnGrp Delay(d),s/veh				67.2	0.0	55.5	80.2	21.2	22.7	72.1	62.3	62.8
LnGrp LOS				E		E	F	C	C	E	E	E
Approach Vol, veh/h					820			2224			946	
Approach Delay, s/veh					61.7			46.7			63.9	
Approach LOS					E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	16.6	73.3			42.0	48.0		40.0
Change Period (Y+Rc), s	4.0	5.0			4.0	5.0		4.0
Max Green Setting (Gmax), s	19.0	58.0			38.0	39.0		40.0
Max Q Clear Time (g_c+I1), s	12.6	25.6			40.0	33.9		34.5
Green Ext Time (p_c), s	0.1	19.7			0.0	4.4		1.5

Intersection Summary		
HCM 2010 Ctrl Delay		53.9
HCM 2010 LOS		D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	233	382	644	527	47
Future Volume (veh/h)	32	233	382	644	527	47
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	33	243	398	671	549	49
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	296	264	415	2517	1467	131
Arrive On Green	0.18	0.18	0.49	1.00	0.16	0.16
Sat Flow, veh/h	1681	1500	1681	3441	3190	276
Grp Volume(v), veh/h	33	243	398	671	296	302
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1702
Q Serve(g_s), s	2.1	20.7	29.6	0.0	20.6	20.7
Cycle Q Clear(g_c), s	2.1	20.7	29.6	0.0	20.6	20.7
Prop In Lane	1.00	1.00	1.00			0.16
Lane Grp Cap(c), veh/h	296	264	415	2517	793	805
V/C Ratio(X)	0.11	0.92	0.96	0.27	0.37	0.38
Avail Cap(c_a), veh/h	349	312	646	2517	793	805
HCM Platoon Ratio	1.00	1.00	2.00	2.00	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.31	0.31
Uniform Delay (d), s/veh	45.0	52.6	32.2	0.0	37.6	37.6
Incr Delay (d2), s/veh	0.1	26.7	15.8	0.3	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	17.9	15.3	0.1	9.7	9.9
LnGrp Delay(d),s/veh	45.1	79.3	48.0	0.3	38.0	38.1
LnGrp LOS	D	E	D	A	D	D
Approach Vol, veh/h	276			1069	598	
Approach Delay, s/veh	75.2			18.0	38.0	
Approach LOS	E			B	D	

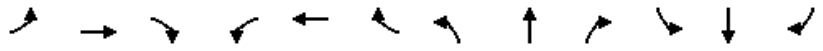
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		103.1		26.9	36.1	67.0		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		93.5		27.0	50.0	39.5		
Max Q Clear Time (g_c+I1), s		2.0		22.7	31.6	22.7		
Green Ext Time (p_c), s		18.4		0.2	0.6	9.8		

Intersection Summary	
HCM 2010 Ctrl Delay	32.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	835	3	4	2268	2	66	5	4	2	5	9
Future Volume (veh/h)	3	835	3	4	2268	2	66	5	4	2	5	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	1031	4	5	2800	2	81	6	5	2	6	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	1632	6	11	1643	1	173	10	179	47	64	91
Arrive On Green	0.01	0.48	0.47	0.01	0.96	0.93	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1681	3425	13	1681	3438	2	794	83	1489	21	528	754
Grp Volume(v), veh/h	4	505	530	5	1365	1437	87	0	5	19	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1762	1681	1676	1764	877	0	1489	1302	0	0
Q Serve(g_s), s	0.2	20.3	20.3	0.3	43.0	43.0	0.2	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	20.3	20.3	0.3	43.0	43.0	9.6	0.0	0.3	9.5	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.93		1.00	0.11		0.58
Lane Grp Cap(c), veh/h	9	799	840	11	801	843	183	0	179	201	0	0
V/C Ratio(X)	0.45	0.63	0.63	0.46	1.70	1.70	0.48	0.00	0.03	0.09	0.00	0.00
Avail Cap(c_a), veh/h	187	801	842	187	801	843	404	0	414	446	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.58	0.58	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.6	17.6	17.6	44.3	2.0	2.0	39.0	0.0	34.9	35.3	0.0	0.0
Incr Delay (d2), s/veh	7.4	0.8	0.8	1.0	317.4	317.6	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	9.6	10.1	0.1	80.9	85.1	2.2	0.0	0.1	0.4	0.0	0.0
LnGrp Delay(d),s/veh	52.1	18.5	18.4	45.2	319.4	319.6	39.7	0.0	35.0	35.3	0.0	0.0
LnGrp LOS	D	B	B	D	F	F	D		C	D		
Approach Vol, veh/h		1039			2807			92			19	
Approach Delay, s/veh		18.6			319.0			39.5			35.3	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.6	46.9		14.9	4.5	47.0		14.9
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	42.0		25.0	10.0	42.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	22.3		11.5	2.2	45.0		11.6
Green Ext Time (p_c), s	0.0	17.3		0.1	0.0	0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	232.3
HCM 2010 LOS	F



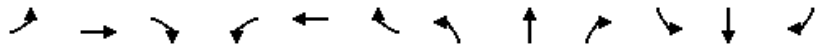
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	801	27	5	2094	12	83	1	45	24	5	16
Future Volume (veh/h)	3	801	27	5	2094	12	83	1	45	24	5	16
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	954	32	6	2493	14	99	1	54	29	6	19
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1534	51	18	1595	9	182	7	67	147	38	67
Arrive On Green	0.01	0.46	0.45	0.02	0.93	0.91	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1681	3311	111	1681	3418	19	907	58	521	671	298	526
Grp Volume(v), veh/h	4	483	503	6	1221	1286	154	0	0	54	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1745	1681	1676	1761	1486	0	0	1495	0	0
Q Serve(g_s), s	0.2	19.6	19.6	0.3	42.0	42.0	6.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	19.6	19.6	0.3	42.0	42.0	8.9	0.0	0.0	2.8	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.01	0.64		0.35	0.54		0.35
Lane Grp Cap(c), veh/h	12	777	808	18	782	822	256	0	0	253	0	0
V/C Ratio(X)	0.32	0.62	0.62	0.33	1.56	1.56	0.60	0.00	0.00	0.21	0.00	0.00
Avail Cap(c_a), veh/h	187	782	814	187	782	822	484	0	0	483	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.35	0.35	0.35	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	18.2	18.2	43.7	3.0	3.0	37.9	0.0	0.0	35.4	0.0	0.0
Incr Delay (d2), s/veh	13.1	1.4	1.3	3.6	254.7	256.2	2.3	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	9.3	9.7	0.2	68.4	72.6	3.9	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	57.6	19.6	19.6	47.3	257.7	259.2	40.2	0.0	0.0	35.8	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D			D		
Approach Vol, veh/h		990			2513			154			54	
Approach Delay, s/veh		19.8			258.0			40.2			35.8	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	45.7		15.5	4.7	46.0		15.5
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	41.0		26.0	10.0	41.0		26.0
Max Q Clear Time (g_c+I1), s	2.3	21.6		4.8	2.2	44.0		10.9
Green Ext Time (p_c), s	0.0	17.3		0.8	0.0	0.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	182.1
HCM 2010 LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	917	4	11	2050	25	29
Future Volume (vph)	917	4	11	2050	25	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3350		1676	3353	1588	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3350		1676	3353	1588	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	1105	5	13	2470	30	35
RTOR Reduction (vph)	0	0	0	0	31	0
Lane Group Flow (vph)	1110	0	13	2470	34	0
Confl. Peds. (#/hr)		2	2			1
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	63.5		1.5	70.0	9.0	
Effective Green, g (s)	65.5		2.5	72.0	10.0	
Actuated g/C Ratio	0.73		0.03	0.80	0.11	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2438		46	2682	176	
v/s Ratio Prot	0.33		0.01	c0.74	c0.02	
v/s Ratio Perm						
v/c Ratio	0.46		0.28	0.92	0.19	
Uniform Delay, d1	5.0		42.9	6.8	36.3	
Progression Factor	1.80		1.25	1.27	1.00	
Incremental Delay, d2	0.2		1.7	3.5	0.5	
Delay (s)	9.2		55.1	12.2	36.9	
Level of Service	A		E	B	D	
Approach Delay (s)	9.2			12.4	36.9	
Approach LOS	A			B	D	

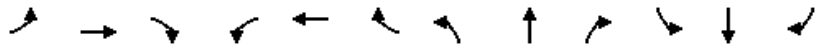
Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	810	12	10	1653	74	11	1	9	281	3	204
Future Volume (veh/h)	145	810	12	10	1653	74	11	1	9	281	3	204
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	156	871	13	11	1777	80	12	1	10	302	3	219
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	1833	27	22	1452	65	364	440	370	439	459	370
Arrive On Green	0.11	0.54	0.53	0.03	0.89	0.87	0.25	0.25	0.25	0.26	0.26	0.25
Sat Flow, veh/h	1681	3381	50	1681	3268	146	1145	1765	1484	1384	1765	1484
Grp Volume(v), veh/h	156	432	452	11	906	951	12	1	10	302	3	219
Grp Sat Flow(s),veh/h/ln	1681	1676	1755	1681	1676	1737	1145	1765	1484	1384	1765	1484
Q Serve(g_s), s	8.2	14.3	14.3	0.6	40.0	40.0	0.7	0.0	0.5	18.6	0.1	11.7
Cycle Q Clear(g_c), s	8.2	14.3	14.3	0.6	40.0	40.0	0.8	0.0	0.5	18.6	0.1	11.7
Prop In Lane	1.00		0.03	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	186	909	951	22	745	772	364	440	370	439	459	370
V/C Ratio(X)	0.84	0.48	0.48	0.49	1.22	1.23	0.03	0.00	0.03	0.69	0.01	0.59
Avail Cap(c_a), veh/h	187	909	951	187	745	772	435	549	462	525	569	462
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	0.62	0.62	0.62	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	12.7	12.7	43.5	5.0	5.1	25.7	25.4	25.5	31.5	24.7	29.8
Incr Delay (d2), s/veh	23.8	0.1	0.1	3.8	105.0	111.4	0.0	0.0	0.0	2.9	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	6.6	6.9	0.3	36.6	39.8	0.2	0.0	0.2	7.5	0.1	4.9
LnGrp Delay(d),s/veh	63.0	12.8	12.9	47.3	110.0	116.5	25.8	25.4	25.6	34.5	24.7	31.3
LnGrp LOS	E	B	B	D	F	F	C	C	C	C	C	C
Approach Vol, veh/h		1040			1868			23			524	
Approach Delay, s/veh		20.4			112.9			25.7			33.1	
Approach LOS		C			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	52.8		26.4	14.0	44.0		26.4
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	39.0		28.0	10.0	39.0		28.0
Max Q Clear Time (g_c+I1), s	2.6	16.3		20.6	10.2	42.0		2.8
Green Ext Time (p_c), s	0.0	8.5		1.5	0.0	0.0		2.4

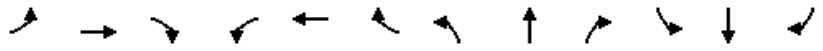
Intersection Summary	
HCM 2010 Ctrl Delay	72.4
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1041	40	2	1751	10	116	5	9	12	1	31
Future Volume (veh/h)	7	1041	40	2	1751	10	116	5	9	12	1	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	7	1052	40	2	1769	10	117	5	9	12	1	31
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	15	1374	52	5	1405	8	220	6	11	80	24	126
Arrive On Green	0.01	0.42	0.41	0.01	0.82	0.80	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1681	3292	125	1681	3418	19	1299	55	100	257	217	1130
Grp Volume(v), veh/h	7	536	556	2	867	912	131	0	0	44	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1740	1681	1676	1761	1454	0	0	1604	0	0
Q Serve(g_s), s	0.4	24.6	24.6	0.1	37.0	37.0	5.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	24.6	24.6	0.1	37.0	37.0	7.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.01	0.89		0.07	0.27		0.70
Lane Grp Cap(c), veh/h	15	700	726	5	689	724	238	0	0	230	0	0
V/C Ratio(X)	0.47	0.77	0.77	0.44	1.26	1.26	0.55	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	243	700	726	243	689	724	514	0	0	523	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.42	0.42	0.42	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	22.5	22.5	44.7	8.0	8.0	38.8	0.0	0.0	36.6	0.0	0.0
Incr Delay (d2), s/veh	6.9	4.1	4.0	10.1	121.2	121.8	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	12.1	12.5	0.1	38.5	40.6	3.2	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	51.2	26.6	26.5	54.8	129.2	129.8	39.6	0.0	0.0	36.7	0.0	0.0
LnGrp LOS	D	C	C	D	F	F	D			D		
Approach Vol, veh/h		1099			1781			131			44	
Approach Delay, s/veh		26.7			129.5			39.6			36.7	
Approach LOS		C			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	41.6		14.0	4.8	41.0		14.0
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	13.0	36.0		28.0	13.0	36.0		28.0
Max Q Clear Time (g_c+I1), s	2.1	26.6		4.3	2.4	39.0		9.8
Green Ext Time (p_c), s	0.0	6.9		0.3	0.0	0.0		0.2

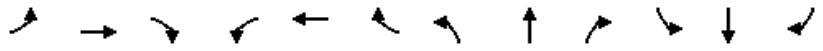
Intersection Summary	
HCM 2010 Ctrl Delay	87.3
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	997	56	1	1638	133	45	60	1	87	23	54
Future Volume (veh/h)	53	997	56	1	1638	133	45	60	1	87	23	54
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.97		0.96	0.97		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	55	1039	58	1	1706	139	47	62	1	91	24	56
Adj No. of Lanes	0	2	0	0	2	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	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	913	68	40	1469	118	161	188	3	194	57	92
Arrive On Green	0.48	0.48	0.46	0.96	0.96	0.91	0.19	0.19	0.18	0.19	0.19	0.18
Sat Flow, veh/h	0	1910	142	0	3076	247	544	988	14	697	297	484
Grp Volume(v), veh/h	508	0	644	969	0	877	110	0	0	171	0	0
Grp Sat Flow(s),veh/h/ln	473	0	1579	1764	0	1559	1546	0	0	1478	0	0
Q Serve(g_s), s	0.0	0.0	32.4	6.5	0.0	43.0	0.0	0.0	0.0	3.7	0.0	0.0
Cycle Q Clear(g_c), s	43.0	0.0	32.4	43.0	0.0	43.0	5.3	0.0	0.0	9.0	0.0	0.0
Prop In Lane	0.11		0.09	0.00		0.16	0.43		0.01	0.53		0.33
Lane Grp Cap(c), veh/h	271	0	754	883	0	745	351	0	0	343	0	0
V/C Ratio(X)	1.88	0.00	0.85	1.10	0.00	1.18	0.31	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	271	0	754	883	0	745	720	0	0	681	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.00	0.90	0.33	0.00	0.33	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.6	0.0	20.8	3.0	0.0	2.3	31.5	0.0	0.0	33.1	0.0	0.0
Incr Delay (d2), s/veh	407.5	0.0	8.1	50.6	0.0	84.8	0.5	0.0	0.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	36.2	0.0	15.7	34.0	0.0	28.4	2.4	0.0	0.0	4.0	0.0	0.0
LnGrp Delay(d),s/veh	438.1	0.0	28.9	53.6	0.0	87.1	32.0	0.0	0.0	34.2	0.0	0.0
LnGrp LOS	F		C	F		F	C			C		
Approach Vol, veh/h		1152			1846			110			171	
Approach Delay, s/veh		209.4			69.5			32.0			34.2	
Approach LOS		F			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		47.0		21.1		47.0		21.1
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		41.0		38.0		41.0		38.0
Max Q Clear Time (g_c+I1), s		45.0		11.0		45.0		7.3
Green Ext Time (p_c), s		0.0		1.2		0.0		1.2

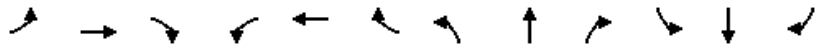
Intersection Summary		
HCM 2010 Ctrl Delay		115.5
HCM 2010 LOS		F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	937	91	38	1694	59	148	6	97	94	20	60
Future Volume (veh/h)	21	937	91	38	1694	59	148	6	97	94	20	60
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		0.99	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	22	986	96	40	1783	62	156	6	102	99	21	63
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	960	93	59	1066	37	187	216	173	124	33	98
Arrive On Green	0.02	0.31	0.30	0.04	0.32	0.31	0.11	0.12	0.12	0.07	0.09	0.08
Sat Flow, veh/h	1681	3085	300	1681	3303	114	1681	1765	1481	1681	384	1152
Grp Volume(v), veh/h	22	536	546	40	900	945	156	6	102	99	0	84
Grp Sat Flow(s),veh/h/ln	1681	1676	1709	1681	1676	1741	1681	1765	1481	1681	0	1535
Q Serve(g_s), s	1.2	28.0	28.0	2.1	29.0	29.0	8.2	0.3	5.9	5.2	0.0	4.8
Cycle Q Clear(g_c), s	1.2	28.0	28.0	2.1	29.0	29.0	8.2	0.3	5.9	5.2	0.0	4.8
Prop In Lane	1.00		0.18	1.00		0.07	1.00		1.00	1.00		0.75
Lane Grp Cap(c), veh/h	40	522	532	59	541	562	187	216	173	124	0	131
V/C Ratio(X)	0.56	1.03	1.03	0.68	1.66	1.68	0.84	0.03	0.59	0.80	0.00	0.64
Avail Cap(c_a), veh/h	205	522	532	205	541	562	205	471	387	205	0	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.62	0.62	0.62	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.5	31.0	31.1	42.9	30.5	30.5	39.2	34.8	37.7	41.0	0.0	40.0
Incr Delay (d2), s/veh	2.8	38.2	38.1	0.5	299.4	307.7	21.2	0.0	1.2	4.4	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	0.6	18.4	18.8	1.0	58.4	61.9	4.9	0.1	2.5	2.6	0.0	2.1
LnGrp Delay(d),s/veh	46.3	69.2	69.1	43.4	329.9	338.2	60.4	34.8	38.9	45.4	0.0	42.0
LnGrp LOS	D	F	F	D	F	F	E	C	D	D		D
Approach Vol, veh/h		1104			1885			264			183	
Approach Delay, s/veh		68.7			328.0			51.5			43.8	
Approach LOS		E			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	32.0	10.6	15.0	6.1	33.0	14.0	11.7
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	11.0	27.0	11.0	23.5	11.0	27.0	11.0	23.5
Max Q Clear Time (g_c+I1), s	4.1	30.0	7.2	7.9	3.2	31.0	10.2	6.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	208.3
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	463	647	67	20	808	126	169	445	55	162	275	789
Future Volume (veh/h)	463	647	67	20	808	126	169	445	55	162	275	789
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	509	711	74	22	888	138	186	489	60	178	302	867
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	261	1229	128	64	951	422	192	1059	462	206	1086	482
Arrive On Green	0.16	0.41	0.40	0.04	0.29	0.29	0.12	0.32	0.32	0.13	0.33	0.33
Sat Flow, veh/h	1648	3005	313	1648	3288	1460	1648	3288	1436	1648	3288	1459
Grp Volume(v), veh/h	509	389	396	22	888	138	186	489	60	178	302	867
Grp Sat Flow(s),veh/h/ln	1648	1644	1674	1648	1644	1460	1648	1644	1436	1648	1644	1459
Q Serve(g_s), s	19.0	22.0	22.0	1.6	31.6	8.9	13.5	14.2	3.5	12.7	8.1	39.6
Cycle Q Clear(g_c), s	19.0	22.0	22.0	1.6	31.6	8.9	13.5	14.2	3.5	12.7	8.1	39.6
Prop In Lane	1.00		0.19	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	672	684	64	951	422	192	1059	462	206	1086	482
V/C Ratio(X)	1.95	0.58	0.58	0.35	0.93	0.33	0.97	0.46	0.13	0.86	0.28	1.80
Avail Cap(c_a), veh/h	261	672	684	151	956	425	192	1059	462	206	1086	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.82	0.34	0.34	0.34	0.92	0.92	0.92	0.85	0.85	0.85
Uniform Delay (d), s/veh	50.5	27.5	27.5	56.2	41.5	33.5	52.8	32.4	28.8	51.5	29.6	40.2
Incr Delay (d2), s/veh	438.9	1.0	1.0	1.1	6.5	0.1	52.7	0.3	0.1	25.9	0.5	366.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	40.4	10.1	10.3	0.7	15.2	3.6	9.0	6.5	1.4	7.3	3.8	65.0
LnGrp Delay(d),s/veh	489.4	28.5	28.5	57.3	48.0	33.6	105.5	32.7	28.9	77.4	30.2	406.8
LnGrp LOS	F	C	C	E	D	C	F	C	C	E	C	F
Approach Vol, veh/h		1294			1048			735			1347	
Approach Delay, s/veh		209.8			46.3			50.8			278.8	
Approach LOS		F			D			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	43.7	8.6	53.5	19.0	42.7	23.0	39.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	35.0	10.0	41.6	14.0	34.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	15.5	41.6	3.6	24.0	14.7	16.2	21.0	33.6
Green Ext Time (p_c), s	0.0	0.0	0.0	8.3	0.0	9.0	0.0	0.2

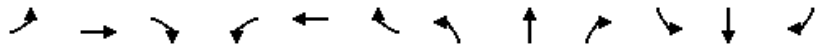
Intersection Summary	
HCM 2010 Ctrl Delay	165.7
HCM 2010 LOS	F

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	520	1	422	0	0	0	0	872	324	283	933	0
Future Volume (vph)	520	1	422	0	0	0	0	872	324	283	933	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.98					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.94	0.85					0.96		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1539	1482					4753		1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1539	1482					4753		1736	3471	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	578	1	469	0	0	0	0	969	360	314	1037	0
RTOR Reduction (vph)	0	21	94	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	364	335	234	0	0	0	0	1276	0	314	1037	0
Confl. Peds. (#/hr)			3	3			9		1	1		9
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	28.7	28.7	28.7					50.8		23.5	78.3	
Effective Green, g (s)	28.8	28.8	28.8					50.9		22.5	78.4	
Actuated g/C Ratio	0.25	0.25	0.25					0.44		0.19	0.68	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	417	382	367					2085		336	2345	
v/s Ratio Prot	0.22	c0.22						c0.27		c0.18	0.30	
v/s Ratio Perm			0.16									
v/c Ratio	0.87	0.88	0.64					0.61		0.93	0.44	
Uniform Delay, d1	41.8	41.9	38.9					25.0		46.0	8.7	
Progression Factor	1.00	1.00	1.00					0.50		0.91	0.82	
Incremental Delay, d2	17.4	19.1	2.7					1.0		26.4	0.5	
Delay (s)	59.3	61.0	41.6					13.4		68.4	7.6	
Level of Service	E	E	D					B		E	A	
Approach Delay (s)		54.3			0.0			13.4			21.7	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



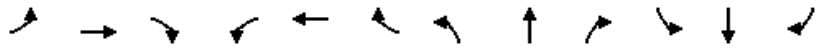
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	127	439	199	1055	138	98	916	163
Future Volume (veh/h)	0	0	0	300	127	439	199	1055	138	98	916	163
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.99	1.00		0.93	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1827	1900	1827	1827	1900	1827	1827	1827
Adj Flow Rate, veh/h				319	135	467	212	1122	147	104	974	0
Adj No. of Lanes				0	2	0	2	2	0	1	2	1
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	4	0	4	4	4	4	4	4
Cap, veh/h				375	159	467	997	1597	209	112	1012	452
Arrive On Green				0.51	0.51	0.50	0.20	0.35	0.35	0.13	0.58	0.00
Sat Flow, veh/h				1240	525	1542	3375	3058	399	1740	3471	1553
Grp Volume(v), veh/h				454	0	467	212	635	634	104	974	0
Grp Sat Flow(s),veh/h/ln				1765	0	1542	1688	1736	1721	1740	1736	1553
Q Serve(g_s), s				25.9	0.0	35.1	6.1	36.6	36.8	6.9	30.9	0.0
Cycle Q Clear(g_c), s				25.9	0.0	35.1	6.1	36.6	36.8	6.9	30.9	0.0
Prop In Lane				0.70		1.00	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h				534	0	467	997	907	899	112	1012	452
V/C Ratio(X)				0.85	0.00	1.00	0.21	0.70	0.70	0.92	0.96	0.00
Avail Cap(c_a), veh/h				534	0	467	997	907	899	112	1035	462
HCM Platoon Ratio				1.67	1.67	1.67	0.67	0.67	0.67	2.00	2.00	2.00
Upstream Filter(I)				0.67	0.00	0.67	0.68	0.68	0.68	0.81	0.81	0.00
Uniform Delay (d), s/veh				26.4	0.0	28.8	35.2	29.9	30.0	50.2	23.6	0.0
Incr Delay (d2), s/veh				8.5	0.0	34.4	0.0	3.1	3.2	53.4	17.9	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				13.8	0.0	19.1	2.8	18.3	18.3	5.0	16.9	0.0
LnGrp Delay(d),s/veh				35.0	0.0	63.2	35.3	33.0	33.2	103.6	41.5	0.0
LnGrp LOS				C		F	D	C	C	F	D	
Approach Vol, veh/h					921			1481			1078	
Approach Delay, s/veh					49.3			33.4			47.5	
Approach LOS					D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	12.0	65.0			38.8	38.2		39.0
Change Period (Y+Rc), s	4.0	4.5			4.5	* 4.5		4.0
Max Green Setting (Gmax), s	8.0	60.5			34.0	* 35		35.0
Max Q Clear Time (g_c+I1), s	8.9	38.8			8.1	32.9		37.1
Green Ext Time (p_c), s	0.0	6.9			7.3	0.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Notes

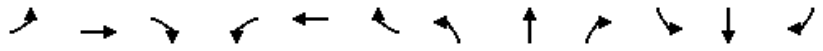
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	347	19	74	1139	282	129	610	131	360	291	123
Future Volume (veh/h)	32	347	19	74	1139	282	129	610	131	360	291	123
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	34	369	20	79	1212	300	137	649	139	383	310	0
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	1078	58	99	1196	532	165	679	303	389	1125	503
Arrive On Green	0.04	0.33	0.33	0.06	0.36	0.36	0.10	0.20	0.20	0.23	0.34	0.00
Sat Flow, veh/h	1681	3232	175	1681	3353	1492	1681	3353	1498	1681	3353	1500
Grp Volume(v), veh/h	34	191	198	79	1212	300	137	649	139	383	310	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1730	1681	1676	1492	1681	1676	1498	1681	1676	1500
Q Serve(g_s), s	2.1	8.9	8.9	4.8	37.0	16.8	8.3	19.9	8.5	23.5	7.0	0.0
Cycle Q Clear(g_c), s	2.1	8.9	8.9	4.8	37.0	16.8	8.3	19.9	8.5	23.5	7.0	0.0
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	61	559	577	99	1196	532	165	679	303	389	1125	503
V/C Ratio(X)	0.56	0.34	0.34	0.80	1.01	0.56	0.83	0.96	0.46	0.99	0.28	0.00
Avail Cap(c_a), veh/h	162	598	617	162	1196	532	259	679	303	389	1125	503
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.2	26.0	26.0	48.2	33.4	26.9	45.9	40.9	36.4	39.7	25.2	0.0
Incr Delay (d2), s/veh	3.0	0.4	0.4	5.3	29.4	1.4	6.5	24.0	0.4	41.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.1	4.4	2.4	21.8	7.1	4.1	11.5	3.5	15.3	3.2	0.0
LnGrp Delay(d),s/veh	52.2	26.4	26.4	53.5	62.8	28.2	52.5	64.9	36.8	81.1	25.3	0.0
LnGrp LOS	D	C	C	D	F	C	D	E	D	F	C	
Approach Vol, veh/h		423			1591			925			693	
Approach Delay, s/veh		28.4			55.8			58.9			56.2	
Approach LOS		C			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	39.6	14.2	39.8	7.7	42.0	28.0	26.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	37.0	16.0	29.0	10.0	37.0	24.0	21.0
Max Q Clear Time (g_c+I1), s	6.8	10.9	10.3	9.0	4.1	39.0	25.5	21.9
Green Ext Time (p_c), s	0.0	14.3	0.1	4.5	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	53.5
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	393	45	29	1026	221	216	732	77	218	232	108
Future Volume (veh/h)	23	393	45	29	1026	221	216	732	77	218	232	108
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	24	418	48	31	1091	235	230	779	82	232	247	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	51	1294	148	60	1187	254	187	820	362	301	757	339
Arrive On Green	0.03	0.43	0.43	0.04	0.43	0.43	0.11	0.24	0.24	0.09	0.23	0.00
Sat Flow, veh/h	1681	3029	346	1681	2741	587	1681	3353	1481	3261	3353	1500
Grp Volume(v), veh/h	24	230	236	31	665	661	230	779	82	232	247	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1698	1681	1676	1651	1681	1676	1481	1630	1676	1500
Q Serve(g_s), s	1.3	8.2	8.3	1.6	33.6	34.0	10.0	20.6	4.0	6.3	5.5	0.0
Cycle Q Clear(g_c), s	1.3	8.2	8.3	1.6	33.6	34.0	10.0	20.6	4.0	6.3	5.5	0.0
Prop In Lane	1.00		0.20	1.00		0.36	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	51	716	725	60	726	715	187	820	362	301	757	339
V/C Ratio(X)	0.47	0.32	0.32	0.51	0.92	0.92	1.23	0.95	0.23	0.77	0.33	0.00
Avail Cap(c_a), veh/h	149	716	725	149	726	715	187	820	362	362	820	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.9	17.1	17.1	42.6	24.0	24.1	40.0	33.5	27.2	39.9	29.1	0.0
Incr Delay (d2), s/veh	2.6	1.2	1.2	2.5	16.6	17.9	141.9	20.1	0.1	6.4	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.0	4.1	0.8	18.9	19.0	12.0	11.8	1.6	3.1	2.6	0.0
LnGrp Delay(d),s/veh	45.5	18.3	18.3	45.1	40.6	42.1	181.9	53.6	27.3	46.3	29.2	0.0
LnGrp LOS	D	B	B	D	D	D	F	D	C	D	C	
Approach Vol, veh/h		490			1357			1091			479	
Approach Delay, s/veh		19.6			41.4			78.7			37.5	
Approach LOS		B			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	43.4	14.0	25.3	6.7	44.0	12.3	27.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	3.6	10.3	12.0	7.5	3.3	36.0	8.3	22.6
Green Ext Time (p_c), s	0.0	15.9	0.0	4.5	0.0	0.0	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	238	89	168	1275	44	59	138	12	110	651	985
Future Volume (vph)	165	238	89	168	1275	44	59	138	12	110	651	985
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.96		1.00	1.00			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1676	3196		1676	3333			1727			1752	1477
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (perm)	1676	3196		1676	3333			1727			1752	1477
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	262	98	185	1401	48	65	152	13	121	715	1082
RTOR Reduction (vph)	0	25	0	0	1	0	0	2	0	0	0	243
Lane Group Flow (vph)	181	335	0	185	1448	0	0	228	0	0	836	839
Confl. Peds. (#/hr)	1					1	2					2
Confl. Bikes (#/hr)			2			2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	11.0	37.9		20.2	47.1			21.9			48.0	48.0
Effective Green, g (s)	11.0	37.9		20.2	47.1			21.9			48.0	48.0
Actuated g/C Ratio	0.07	0.26		0.14	0.32			0.15			0.32	0.32
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	124	818		228	1060			255			568	479
v/s Ratio Prot	c0.11	0.10		0.11	c0.43			c0.13			0.48	
v/s Ratio Perm												c0.57
v/c Ratio	1.46	0.41		0.81	1.37			0.90			1.47	1.75
Uniform Delay, d1	68.5	45.8		62.1	50.5			61.9			50.0	50.0
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	245.7	0.5		18.4	170.7			29.7			221.8	347.1
Delay (s)	314.2	46.2		80.4	221.1			91.6			271.8	397.1
Level of Service	F	D		F	F			F			F	F
Approach Delay (s)		135.9			205.2			91.6			342.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	251.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.44		
Actuated Cycle Length (s)	148.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	127.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	231.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	46	258	65	766	1675
Future Vol, veh/h	52	46	258	65	766	1675
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	52	290	73	861	1882

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3929	326	0	0	363	0
Stage 1	326	-	-	-	-	-
Stage 2	3603	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 4	715	-	-	1196	-
Stage 1	731	-	-	-	-	-
Stage 2	~ 16	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 4	715	-	-	1196	-
Mov Cap-2 Maneuver	~ 4	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	~ 16	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 6648.8	0	4.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	8	1196	-
HCM Lane V/C Ratio	-	-	13.764	0.72	-
HCM Control Delay (s)	-	-	$ 6648.8	15.3	0
HCM Lane LOS	-	-	F	C	A
HCM 95th %tile Q(veh)	-	-	15.4	6.6	-

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	685	140	200	1908	157	233
Future Volume (veh/h)	685	140	200	1908	157	233
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	737	151	215	2052	169	251
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	958	412	699	2484	303	271
Arrive On Green	0.29	0.29	0.42	0.74	0.18	0.18
Sat Flow, veh/h	3441	1441	1681	3441	1681	1500
Grp Volume(v), veh/h	737	151	215	2052	169	251
Grp Sat Flow(s),veh/h/ln	1676	1441	1681	1676	1681	1500
Q Serve(g_s), s	28.2	11.7	12.0	57.2	12.8	23.1
Cycle Q Clear(g_c), s	28.2	11.7	12.0	57.2	12.8	23.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	958	412	699	2484	303	271
V/C Ratio(X)	0.77	0.37	0.31	0.83	0.56	0.93
Avail Cap(c_a), veh/h	1832	787	699	2484	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	39.9	27.4	12.1	52.3	56.5
Incr Delay (d2), s/veh	5.9	2.5	0.1	2.5	0.8	31.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.9	4.9	5.6	26.8	6.0	11.9
LnGrp Delay(d),s/veh	51.7	42.4	27.5	14.6	53.0	87.8
LnGrp LOS	D	D	C	B	D	F
Approach Vol, veh/h	888			2267	420	
Approach Delay, s/veh	50.1			15.9	73.8	
Approach LOS	D			B	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	63.7	45.5		30.8		109.2		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	21.0	* 77		27.5		101.5		
Max Q Clear Time (g_c+I1), s	14.0	30.2		25.1		59.2		
Green Ext Time (p_c), s	6.6	9.8		0.2		31.0		

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	780	23	11	1916	736	13	10	8	178	5	142
Future Volume (vph)	150	780	23	11	1916	736	13	10	8	178	5	142
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.96			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (prot)	1676	4791		1676	4588			1668			1683	1474
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (perm)	1676	4791		1676	4588			1668			1683	1474
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	170	886	26	12	2177	836	15	11	9	202	6	161
RTOR Reduction (vph)	0	1	0	0	35	0	0	8	0	0	0	152
Lane Group Flow (vph)	170	911	0	13	2978	0	0	27	0	0	208	9
Confl. Peds. (#/hr)	5		6	6		5	1					1
Confl. Bikes (#/hr)			2			4						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	custom
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												3
Actuated Green, G (s)	15.6	88.3		2.4	75.1			7.9			21.4	7.9
Effective Green, g (s)	15.6	88.3		2.4	75.1			7.9			21.4	7.9
Actuated g/C Ratio	0.11	0.63		0.02	0.54			0.06			0.15	0.06
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	186	3021		28	2461			94			257	83
v/s Ratio Prot	c0.10	0.19		0.01	c0.65			c0.02			c0.12	
v/s Ratio Perm												0.01
v/c Ratio	0.91	0.30		0.46	1.21			0.28			0.81	0.11
Uniform Delay, d1	61.5	11.8		68.2	32.5			63.3			57.3	62.7
Progression Factor	1.31	0.29		1.36	0.73			1.00			1.00	1.00
Incremental Delay, d2	39.9	0.2		2.1	96.6			0.6			16.0	0.2
Delay (s)	120.5	3.7		94.7	120.4			63.9			73.4	62.9
Level of Service	F	A		F	F			E			E	E
Approach Delay (s)		22.1			120.3			63.9			68.8	
Approach LOS		C			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	92.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	95.4%	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)	110	665	232	633	1825	37	291	190	216	90	607	90
Future Volume (vph)	110	665	232	633	1825	37	291	190	216	90	607	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4598		3252	4802		1526	3147	1491	1676	3282	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4598		3252	4802		1526	3147	1491	1676	3282	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	731	255	696	2005	41	320	209	237	99	667	99
RTOR Reduction (vph)	0	44	0	0	1	0	0	0	146	0	8	0
Lane Group Flow (vph)	121	942	0	696	2045	0	173	356	91	99	758	0
Confl. Peds. (#/hr)	2		7	7		2	1		2	2		1
Confl. Bikes (#/hr)			2									
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	9.0	27.2		32.8	51.0		21.1	21.1	53.9	38.9	38.9	
Effective Green, g (s)	9.0	27.2		32.8	51.0		21.1	21.1	53.9	38.9	38.9	
Actuated g/C Ratio	0.06	0.19		0.23	0.36		0.15	0.15	0.38	0.28	0.28	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	107	893		761	1749		229	474	574	465	911	
v/s Ratio Prot	0.07	0.20		c0.21	c0.43		c0.11	0.11	0.04	0.06	c0.23	
v/s Ratio Perm									0.02			
v/c Ratio	1.13	1.05		0.91	1.17		0.76	0.75	0.16	0.21	0.83	
Uniform Delay, d1	65.5	56.4		52.2	44.5		57.0	56.9	28.2	38.8	47.5	
Progression Factor	1.11	0.77		1.34	0.92		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	124.5	44.9		1.8	76.7		11.8	5.9	0.0	0.1	6.3	
Delay (s)	196.9	88.5		71.7	117.7		68.8	62.8	28.2	38.9	53.8	
Level of Service	F	F		E	F		E	E	C	D	D	
Approach Delay (s)		100.4			106.0			53.5			52.1	
Approach LOS		F			F			D			D	

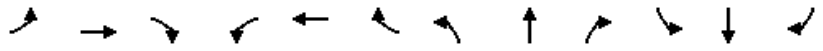
Intersection Summary			
HCM 2000 Control Delay	89.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	671	0	13	1858	47	3	0	0	125	1	938
Future Volume (vph)	150	671	0	13	1858	47	3	0	0	125	1	938
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00			0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (prot)	1676	4818		1676	4796		1676			1593	1598	1445
Flt Permitted	0.95	1.00		0.95	1.00		0.95			0.95	0.95	1.00
Satd. Flow (perm)	1676	4818		1676	4796		1676			1593	1598	1445
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	176	789	0	15	2186	55	4	0	0	147	1	1104
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	243
Lane Group Flow (vph)	176	789	0	15	2239	0	4	0	0	73	75	861
Confl. Peds. (#/hr)	3		9	9		3	17					17
Confl. Bikes (#/hr)						4						
Turn Type	Prot	NA		Prot	NA		Split			Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	15.8	79.6		2.9	67.2		6.0			31.5	31.5	31.5
Effective Green, g (s)	15.8	79.6		2.9	67.2		6.0			31.5	31.5	31.5
Actuated g/C Ratio	0.11	0.57		0.02	0.48		0.04			0.22	0.22	0.22
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	189	2739		34	2302		71			358	359	325
v/s Ratio Prot	c0.10	0.16		0.01	c0.47		c0.00			0.05	0.05	
v/s Ratio Perm												c0.60
v/c Ratio	0.93	0.29		0.44	0.97		0.06			0.20	0.21	2.65
Uniform Delay, d1	61.6	15.6		67.7	35.5		64.3			44.1	44.1	54.2
Progression Factor	0.81	0.53		1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	31.2	0.1		3.3	13.0		0.1			0.1	0.1	751.5
Delay (s)	81.0	8.5		71.0	48.5		64.4			44.2	44.2	805.8
Level of Service	F	A		E	D		E			D	D	F
Approach Delay (s)		21.7			48.7			64.4			715.8	
Approach LOS		C			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	229.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	119.9%	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)	110	245	336	663	618	77	80	379	163	59	1548	149
Future Volume (veh/h)	110	245	336	663	618	77	80	379	163	59	1548	149
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	116	258	354	698	651	81	84	399	172	62	1629	157
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	715	319	630	1074	134	102	1421	635	78	1371	605
Arrive On Green	0.05	0.21	0.21	0.19	0.36	0.36	0.06	0.42	0.42	0.05	0.41	0.41
Sat Flow, veh/h	3261	3353	1496	3261	3002	373	1681	3353	1498	1681	3353	1479
Grp Volume(v), veh/h	116	258	354	698	363	369	84	399	172	62	1629	157
Grp Sat Flow(s),veh/h/ln	1630	1676	1496	1630	1676	1698	1681	1676	1498	1681	1676	1479
Q Serve(g_s), s	5.3	9.8	32.0	29.0	26.6	26.7	7.4	11.7	11.2	5.5	61.4	10.5
Cycle Q Clear(g_c), s	5.3	9.8	32.0	29.0	26.6	26.7	7.4	11.7	11.2	5.5	61.4	10.5
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	159	715	319	630	600	608	102	1421	635	78	1371	605
V/C Ratio(X)	0.73	0.36	1.11	1.11	0.61	0.61	0.82	0.28	0.27	0.80	1.19	0.26
Avail Cap(c_a), veh/h	348	715	319	630	600	608	134	1421	635	134	1371	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	50.3	59.0	60.5	39.5	39.5	69.6	28.3	28.1	70.8	44.3	29.3
Incr Delay (d2), s/veh	2.4	0.1	83.1	68.9	1.3	1.3	19.9	0.5	1.1	6.8	92.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	4.6	20.6	19.1	12.5	12.7	4.0	5.5	4.8	2.7	45.9	4.4
LnGrp Delay(d),s/veh	72.8	50.4	142.1	129.4	40.7	40.8	89.5	28.8	29.2	77.7	136.4	29.6
LnGrp LOS	E	D	F	F	D	D	F	C	C	E	F	C
Approach Vol, veh/h		728			1430			655			1848	
Approach Delay, s/veh		98.6			84.0			36.7			125.4	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	69.1	11.3	58.7	13.1	66.9	33.0	37.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	12.0	58.5	16.0	45.0	12.0	58.5	29.0	32.0
Max Q Clear Time (g_c+I1), s	7.3	13.7	7.3	28.7	9.4	63.4	31.0	34.0
Green Ext Time (p_c), s	0.0	34.2	0.1	4.4	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	96.0
HCM 2010 LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	652	53	56	1335	264	63
Future Volume (veh/h)	652	53	56	1335	264	63
Number	2	12	1	6	3	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	709	58	61	1451	287	68
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1837	822	432	1837	352	314
Arrive On Green	0.55	0.55	0.55	0.55	0.21	0.21
Sat Flow, veh/h	3441	1500	698	3441	1681	1500
Grp Volume(v), veh/h	709	58	61	1451	287	68
Grp Sat Flow(s),veh/h/ln	1676	1500	698	1676	1681	1500
Q Serve(g_s), s	6.5	1.0	2.9	18.5	8.7	2.0
Cycle Q Clear(g_c), s	6.5	1.0	9.4	18.5	8.7	2.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1837	822	432	1837	352	314
V/C Ratio(X)	0.39	0.07	0.14	0.79	0.82	0.22
Avail Cap(c_a), veh/h	1942	869	454	1942	503	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.9	5.7	9.6	9.6	20.2	17.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	2.2	6.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.4	0.6	9.0	4.7	0.9
LnGrp Delay(d),s/veh	7.1	5.7	9.8	11.8	27.0	17.9
LnGrp LOS	A	A	A	B	C	B
Approach Vol, veh/h	767			1512	355	
Approach Delay, s/veh	7.0			11.7	25.3	
Approach LOS	A			B	C	

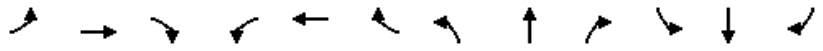
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		36.3				36.3		17.2
Change Period (Y+Rc), s		7.0				7.0		6.0
Max Green Setting (Gmax), s		31.0				31.0		16.0
Max Q Clear Time (g_c+I1), s		8.5				20.5		10.7
Green Ext Time (p_c), s		16.6				8.8		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	336	204	88	657	1453	169
Future Volume (veh/h)	336	204	88	657	1453	169
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	365	222	96	714	1579	184
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	179	160	48	1482	1482	1260
Arrive On Green	0.11	0.11	0.84	0.84	0.84	0.84
Sat Flow, veh/h	1681	1500	270	1765	1765	1500
Grp Volume(v), veh/h	365	222	96	714	1579	184
Grp Sat Flow(s),veh/h/ln	1681	1500	270	1765	1765	1500
Q Serve(g_s), s	16.0	16.0	0.0	16.3	126.0	3.4
Cycle Q Clear(g_c), s	16.0	16.0	126.0	16.3	126.0	3.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	179	160	48	1482	1482	1260
V/C Ratio(X)	2.04	1.39	2.00	0.48	1.07	0.15
Avail Cap(c_a), veh/h	179	160	48	1482	1482	1260
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.0	67.0	75.0	3.2	12.0	2.2
Incr Delay (d2), s/veh	485.2	208.1	515.5	0.2	42.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	31.6	15.9	8.9	7.8	77.0	1.4
LnGrp Delay(d),s/veh	552.2	275.1	590.5	3.5	54.9	2.2
LnGrp LOS	F	F	F	A	F	A
Approach Vol, veh/h	587			810	1763	
Approach Delay, s/veh	447.4			73.0	49.4	
Approach LOS	F			E	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		130.0		20.0		130.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		126.0		16.0		126.0		
Max Q Clear Time (g_c+I1), s		128.0		18.0		128.0		
Green Ext Time (p_c), s		0.0		0.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	129.4
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	688	1584	209	308	611	202	119	427	322	465	1842	264
Future Volume (veh/h)	688	1584	209	308	611	202	119	427	322	465	1842	264
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		0.88	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	732	1685	222	328	650	215	127	454	343	495	1960	281
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	391	742	291	369	719	283	148	759	344	514	1933	273
Arrive On Green	0.12	0.22	0.22	0.11	0.21	0.21	0.09	0.24	0.24	0.31	0.45	0.45
Sat Flow, veh/h	3261	3353	1314	3261	3353	1321	1681	3212	1456	1681	4258	602
Grp Volume(v), veh/h	732	1685	222	328	650	215	127	454	343	495	1471	770
Grp Sat Flow(s),veh/h/ln	1630	1676	1314	1630	1676	1321	1681	1606	1456	1681	1606	1648
Q Serve(g_s), s	18.0	33.2	23.7	14.9	28.3	22.9	11.2	18.9	35.3	43.5	68.1	68.1
Cycle Q Clear(g_c), s	18.0	33.2	23.7	14.9	28.3	22.9	11.2	18.9	35.3	43.5	68.1	68.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.37
Lane Grp Cap(c), veh/h	391	742	291	369	719	283	148	759	344	514	1458	748
V/C Ratio(X)	1.87	2.27	0.76	0.89	0.90	0.76	0.86	0.60	1.00	0.96	1.01	1.03
Avail Cap(c_a), veh/h	391	742	291	391	738	291	269	759	344	560	1458	748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.0	58.4	54.7	65.6	57.4	55.3	67.5	50.9	57.2	51.2	41.0	41.0
Incr Delay (d2), s/veh	401.5	575.6	10.3	19.7	13.9	9.6	5.4	1.6	47.6	27.2	25.8	40.5
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	29.9	74.7	9.4	7.7	14.6	9.1	5.4	8.6	18.7	24.1	35.4	39.4
LnGrp Delay(d),s/veh	467.5	634.0	65.0	85.3	71.3	64.8	72.9	52.5	104.8	78.5	66.8	81.4
LnGrp LOS	F	F	E	F	E	E	E	D	F	E	F	F
Approach Vol, veh/h		2639			1193			924			2736	
Approach Delay, s/veh		540.0			74.0			74.7			73.0	
Approach LOS		F			E			E			E	

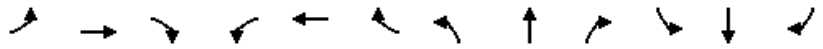
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.2	73.6	21.0	38.2	49.9	41.0	22.0	37.2
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	24.0	56.5	18.0	33.0	50.0	30.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	13.2	70.1	16.9	35.2	45.5	37.3	20.0	30.3
Green Ext Time (p_c), s	0.1	0.0	0.1	0.0	0.4	0.0	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	237.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	1358	175	78	1160	261	76	14	22	155	26	266
Future Volume (vph)	299	1358	175	78	1160	261	76	14	22	155	26	266
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1481	3252	4818	1474	3252	3353	1470	3252	1765	2640
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	318	1445	186	83	1234	278	81	15	23	165	28	283
RTOR Reduction (vph)	0	0	73	0	0	87	0	0	21	0	0	217
Lane Group Flow (vph)	318	1445	113	83	1234	191	81	15	2	165	28	66
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1			8			1			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	15.1	67.0	67.0	8.0	59.9	59.9	6.6	7.5	7.5	10.0	10.4	25.5
Effective Green, g (s)	15.1	67.0	67.0	8.0	59.9	59.9	6.6	7.5	7.5	10.0	10.4	25.5
Actuated g/C Ratio	0.14	0.61	0.61	0.07	0.54	0.54	0.06	0.07	0.07	0.09	0.09	0.23
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.5	4.5	4.0	5.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	446	2934	902	236	2623	802	195	228	100	295	166	612
v/s Ratio Prot	c0.10	c0.30		0.03	0.26		0.02	0.00		c0.05	c0.02	0.01
v/s Ratio Perm			0.08			0.13			0.00			0.01
v/c Ratio	0.71	0.49	0.13	0.35	0.47	0.24	0.42	0.07	0.02	0.56	0.17	0.11
Uniform Delay, d1	45.4	12.0	9.1	48.5	15.3	13.1	49.8	48.0	47.8	47.9	45.8	33.3
Progression Factor	1.00	1.00	1.00	1.30	0.39	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.6	0.3	0.1	0.0	0.0	0.5	0.0	0.0	1.3	0.2	0.0
Delay (s)	49.8	12.6	9.4	63.4	6.0	3.1	50.4	48.0	47.8	49.2	46.0	33.3
Level of Service	D	B	A	E	A	A	D	D	D	D	D	C
Approach Delay (s)		18.4			8.5			49.6			39.6	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

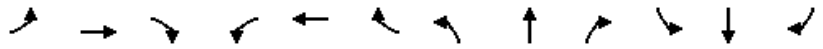
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	973	172	0	1109	120	524	492	239	120	328	244
Future Volume (veh/h)	86	973	172	0	1109	120	524	492	239	120	328	244
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	0	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	99	1118	0	0	1275	0	602	566	275	138	377	280
Adj No. of Lanes	2	3	1	0	3	0	2	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	169	2097	653	0	1650	0	608	727	353	166	826	368
Arrive On Green	0.05	0.44	0.00	0.00	0.34	0.00	0.19	0.33	0.33	0.10	0.25	0.25
Sat Flow, veh/h	3261	4818	1500	0	5135	0	3261	2179	1057	1681	3353	1495
Grp Volume(v), veh/h	99	1118	0	0	1275	0	602	435	406	138	377	280
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	0	1606	0	1630	1676	1559	1681	1676	1495
Q Serve(g_s), s	3.3	18.8	0.0	0.0	26.0	0.0	20.3	25.7	25.8	8.9	10.5	19.1
Cycle Q Clear(g_c), s	3.3	18.8	0.0	0.0	26.0	0.0	20.3	25.7	25.8	8.9	10.5	19.1
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.68	1.00		1.00
Lane Grp Cap(c), veh/h	169	2097	653	0	1650	0	608	560	520	166	826	368
V/C Ratio(X)	0.59	0.53	0.00	0.00	0.77	0.00	0.99	0.78	0.78	0.83	0.46	0.76
Avail Cap(c_a), veh/h	282	2097	653	0	1650	0	608	560	520	283	1006	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	22.8	0.0	0.0	32.3	0.0	44.7	33.0	33.0	48.6	35.2	38.4
Incr Delay (d2), s/veh	2.8	0.3	0.0	0.0	3.6	0.0	34.0	7.3	7.9	10.0	0.6	7.0
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	1.5	8.3	0.0	0.0	12.1	0.0	12.0	13.0	12.2	4.6	4.9	8.6
LnGrp Delay(d),s/veh	53.8	23.1	0.0	0.0	35.9	0.0	78.7	40.2	40.9	58.7	35.7	45.4
LnGrp LOS	D	C			D		E	D	D	E	D	D
Approach Vol, veh/h		1217			1275			1443			795	
Approach Delay, s/veh		25.6			35.9			56.5			43.1	
Approach LOS		C			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	10.2	42.7	25.0	32.1		52.9	15.4	41.7
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0		5.0	4.5	5.0
Max Green Setting (Gmax), s	9.5	28.0	20.5	33.0		42.0	18.5	35.0
Max Q Clear Time (g_c+I1), s	5.3	28.0	22.3	21.1		20.8	10.9	27.8
Green Ext Time (p_c), s	0.1	0.0	0.0	5.9		18.0	0.2	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	40.7
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	403	89	131	799	383	99	1390	96	63	793	36
Future Volume (veh/h)	144	403	89	131	799	383	99	1390	96	63	793	36
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	150	420	93	136	832	399	103	1448	100	66	826	38
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	1064	234	163	1280	560	127	1379	95	84	918	403
Arrive On Green	0.10	0.39	0.39	0.10	0.38	0.38	0.08	0.30	0.30	0.05	0.27	0.27
Sat Flow, veh/h	1681	2730	599	1681	3353	1467	1681	4596	317	1681	3353	1473
Grp Volume(v), veh/h	150	256	257	136	832	399	103	1012	536	66	826	38
Grp Sat Flow(s),veh/h/ln	1681	1676	1653	1681	1676	1467	1681	1606	1702	1681	1676	1473
Q Serve(g_s), s	9.6	12.1	12.3	8.7	22.4	25.4	6.6	33.0	33.0	4.3	26.1	2.1
Cycle Q Clear(g_c), s	9.6	12.1	12.3	8.7	22.4	25.4	6.6	33.0	33.0	4.3	26.1	2.1
Prop In Lane	1.00		0.36	1.00		1.00	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	176	654	644	163	1280	560	127	964	511	84	918	403
V/C Ratio(X)	0.85	0.39	0.40	0.84	0.65	0.71	0.81	1.05	1.05	0.79	0.90	0.09
Avail Cap(c_a), veh/h	183	654	644	244	1280	560	290	964	511	214	918	403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.30	0.30	0.30	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	24.2	24.2	48.8	28.0	28.9	50.0	38.5	38.5	51.7	38.5	29.8
Incr Delay (d2), s/veh	27.5	1.8	1.8	3.0	0.4	1.3	4.5	43.0	53.6	6.1	11.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	5.9	6.0	4.2	10.5	10.5	3.3	20.3	23.1	2.1	13.5	0.9
LnGrp Delay(d),s/veh	75.9	25.9	26.1	51.8	28.3	30.2	54.6	81.5	92.1	57.8	49.9	29.8
LnGrp LOS	E	C	C	D	C	C	D	F	F	E	D	C
Approach Vol, veh/h		663			1367			1651			930	
Approach Delay, s/veh		37.3			31.2			83.3			49.6	
Approach LOS		D			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.7	47.9	12.3	35.1	15.5	47.0	9.5	38.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	29.0	19.0	28.0	12.0	33.0	14.0	33.0
Max Q Clear Time (g_c+I1), s	10.7	14.3	8.6	28.1	11.6	27.4	6.3	35.0
Green Ext Time (p_c), s	0.1	8.7	0.1	0.0	0.0	3.1	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	164	0	0	1310	295	679	383	378	0	0	0
Future Volume (vph)	3	164	0	0	1310	295	679	383	378	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.99				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.97		1.00	0.95				
Flt Protected	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (prot)	1676	1765			3249		1442	4199				
Flt Permitted	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (perm)	1676	1765			3249		1442	4199				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	169	0	0	1351	304	700	395	390	0	0	0
RTOR Reduction (vph)	0	0	0	0	22	0	0	91	0	0	0	0
Lane Group Flow (vph)	3	169	0	0	1633	0	378	1016	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			16	16		
Confl. Bikes (#/hr)						1						1
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.2	34.7			29.5		44.8	44.8				
Effective Green, g (s)	1.2	34.7			29.5		44.8	44.8				
Actuated g/C Ratio	0.01	0.39			0.33		0.50	0.50				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	22	680			1064		717	2090				
v/s Ratio Prot	0.00	c0.10			c0.50		c0.26	0.24				
v/s Ratio Perm												
v/c Ratio	0.14	0.25			1.54		0.53	0.49				
Uniform Delay, d1	43.9	18.8			30.2		15.4	15.0				
Progression Factor	1.00	1.00			1.17		1.00	1.00				
Incremental Delay, d2	1.0	0.1			243.7		2.8	0.8				
Delay (s)	44.9	18.9			279.0		18.2	15.8				
Level of Service	D	B			F		B	B				
Approach Delay (s)		19.3			279.0			16.4			0.0	
Approach LOS		B			F			B			A	

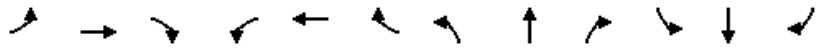
Intersection Summary			
HCM 2000 Control Delay	147.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	151	225	233	428	156	119	621	109	97	1895	776
Future Volume (vph)	160	151	225	233	428	156	119	621	109	97	1895	776
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	3024		1676	3353	1481	1676	4700		1676	4608	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	3024		1676	3353	1481	1676	4700		1676	4608	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	186	176	262	271	498	181	138	722	127	113	2203	902
RTOR Reduction (vph)	0	132	0	0	0	74	0	21	0	0	48	0
Lane Group Flow (vph)	186	306	0	271	498	107	138	828	0	113	3057	0
Confl. Peds. (#/hr)			2	2					1	1		
Confl. Bikes (#/hr)			1			1						
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	17.0	74.3		11.0	68.3	68.3	16.9	32.5		12.7	28.3	
Effective Green, g (s)	17.0	74.3		11.0	68.3	68.3	16.9	32.5		12.7	28.3	
Actuated g/C Ratio	0.11	0.50		0.07	0.46	0.46	0.11	0.22		0.08	0.19	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.5		4.0	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	189	1497		122	1526	674	188	1018		141	869	
v/s Ratio Prot	c0.11	0.10		c0.16	c0.15		c0.08	0.18		0.07	c0.66	
v/s Ratio Perm						0.07						
v/c Ratio	0.98	0.20		2.22	0.33	0.16	0.73	0.81		0.80	3.52	
Uniform Delay, d1	66.4	21.3		69.5	26.1	24.0	64.4	55.9		67.4	60.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.28	0.87		1.00	1.00	
Incremental Delay, d2	60.3	0.3		575.2	0.2	0.2	11.8	4.7		25.6	1136.0	
Delay (s)	126.7	21.6		644.7	26.3	24.1	94.0	53.5		93.0	1196.8	
Level of Service	F	C		F	C	C	F	D		F	F	
Approach Delay (s)		52.9			202.3			59.1			1158.1	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	693.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	120.5%	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)	155	454	38	1357	647	162	75	381	291	204	1567	543
Future Volume (veh/h)	155	454	38	1357	647	162	75	381	291	204	1567	543
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	168	493	0	1475	703	0	82	414	316	222	1703	590
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	935	291	456	1292	0	126	2058	631	268	2267	704
Arrive On Green	0.07	0.19	0.00	0.14	0.27	0.00	0.04	0.43	0.43	0.08	0.47	0.47
Sat Flow, veh/h	3261	4818	1500	3261	4976	0	3261	4818	1476	3261	4818	1495
Grp Volume(v), veh/h	168	493	0	1475	703	0	82	414	316	222	1703	590
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	0	1630	1606	1476	1630	1606	1495
Q Serve(g_s), s	7.6	13.8	0.0	21.0	18.8	0.0	3.7	8.1	23.4	10.1	43.4	51.8
Cycle Q Clear(g_c), s	7.6	13.8	0.0	21.0	18.8	0.0	3.7	8.1	23.4	10.1	43.4	51.8
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	935	291	456	1292	0	126	2058	631	268	2267	704
V/C Ratio(X)	0.78	0.53	0.00	3.23	0.54	0.00	0.65	0.20	0.50	0.83	0.75	0.84
Avail Cap(c_a), veh/h	761	1718	535	456	1292	0	304	2058	631	456	2267	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	69.0	54.3	0.0	64.5	47.0	0.0	71.1	26.9	31.3	67.8	32.5	34.7
Incr Delay (d2), s/veh	2.4	0.7	0.0	1009.8	0.6	0.0	2.1	0.1	0.9	0.2	0.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	6.2	0.0	73.5	8.4	0.0	1.7	3.6	9.7	4.5	19.3	21.6
LnGrp Delay(d),s/veh	71.4	54.9	0.0	1074.3	47.6	0.0	73.2	27.0	32.2	68.0	32.7	35.9
LnGrp LOS	E	D		F	D		E	C	C	E	C	D
Approach Vol, veh/h		661			2178			812			2515	
Approach Delay, s/veh		59.1			742.9			33.7			36.6	
Approach LOS		E			F			C			D	

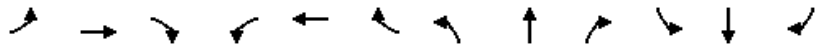
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	77.6	14.9	46.7	17.3	71.1	26.0	35.6
Change Period (Y+Rc), s	5.0	7.0	5.0	6.5	5.0	7.0	5.0	6.5
Max Green Setting (Gmax), s	14.0	38.0	35.0	39.5	21.0	31.0	21.0	53.5
Max Q Clear Time (g_c+I1), s	5.7	53.8	9.6	20.8	12.1	25.4	23.0	15.8
Green Ext Time (p_c), s	0.1	0.0	0.3	9.9	0.3	5.4	0.0	12.9

Intersection Summary		
HCM 2010 Ctrl Delay	288.1	
HCM 2010 LOS	F	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	364	173	1065	1017	382	531
Future Volume (veh/h)	364	173	1065	1017	382	531
Number	1	16	8	18	7	4
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	1765	1765	1765	1800	1765	1765
Adj Flow Rate, veh/h	379	180	1109	1059	398	553
Adj No. of Lanes	2	1	2	0	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	352	162	991	815	339	2700
Arrive On Green	0.11	0.11	0.57	0.57	0.20	0.81
Sat Flow, veh/h	3261	1500	1836	1439	1681	3441
Grp Volume(v), veh/h	379	180	1056	1112	398	553
Grp Sat Flow(s),veh/h/ln	1630	1500	1676	1511	1681	1676
Q Serve(g_s), s	16.2	16.2	85.0	85.0	30.3	5.8
Cycle Q Clear(g_c), s	16.2	16.2	85.0	85.0	30.3	5.8
Prop In Lane	1.00	1.00		0.95	1.00	
Lane Grp Cap(c), veh/h	352	162	950	856	339	2700
V/C Ratio(X)	1.08	1.11	1.11	1.30	1.17	0.20
Avail Cap(c_a), veh/h	352	162	950	856	339	2700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.9	66.9	32.5	32.5	59.8	3.4
Incr Delay (d2), s/veh	69.8	103.6	64.9	143.0	104.4	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	10.7	17.4	56.2	69.2	23.9	2.6
LnGrp Delay(d),s/veh	136.7	170.5	97.4	175.5	164.2	3.4
LnGrp LOS	F	F	F	F	F	A
Approach Vol, veh/h	559		2168			951
Approach Delay, s/veh	147.6		137.5			70.7
Approach LOS	F		F			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				126.8		23.2	35.8	91.0
Change Period (Y+Rc), s				6.0		7.0	5.5	6.0
Max Green Setting (Gmax), s				120.8		16.2	30.3	85.0
Max Q Clear Time (g_c+I1), s				7.8		18.2	32.3	87.0
Green Ext Time (p_c), s				59.0		0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	121.7
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	711	3	305	0	0	0	0	624	614	11	608	0
Future Volume (veh/h)	711	3	305	0	0	0	0	624	614	11	608	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		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1765				0	1765	1765	1765	1765	0
Adj Flow Rate, veh/h	718	3	0				0	630	0	11	614	0
Adj No. of Lanes	0	1	1				0	2	1	1	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	810	3	726				0	757	339	32	1092	0
Arrive On Green	0.48	0.48	0.00				0.00	0.23	0.00	0.02	0.33	0.00
Sat Flow, veh/h	1674	7	1500				0	3441	1500	1681	3441	0
Grp Volume(v), veh/h	721	0	0				0	630	0	11	614	0
Grp Sat Flow(s),veh/h/ln	1681	0	1500				0	1676	1500	1681	1676	0
Q Serve(g_s), s	26.5	0.0	0.0				0.0	12.2	0.0	0.4	10.3	0.0
Cycle Q Clear(g_c), s	26.5	0.0	0.0				0.0	12.2	0.0	0.4	10.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	814	0	726				0	757	339	32	1092	0
V/C Ratio(X)	0.89	0.00	0.00				0.00	0.83	0.00	0.34	0.56	0.00
Avail Cap(c_a), veh/h	911	0	813				0	785	351	209	1473	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.9	0.0	0.0				0.0	25.2	0.0	33.1	19.0	0.0
Incr Delay (d2), s/veh	10.5	0.0	0.0				0.0	7.4	0.0	6.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.6	0.0	0.0				0.0	6.4	0.0	0.3	4.8	0.0
LnGrp Delay(d),s/veh	26.4	0.0	0.0				0.0	32.6	0.0	39.1	19.5	0.0
LnGrp LOS	C							C		D	B	
Approach Vol, veh/h		721						630			625	
Approach Delay, s/veh		26.4						32.6			19.8	
Approach LOS		C						C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		40.1		28.2			6.8	21.4
Change Period (Y+Rc), s		7.0		6.0			5.5	6.0
Max Green Setting (Gmax), s		37.0		30.0			8.5	16.0
Max Q Clear Time (g_c+I1), s		28.5		12.3			2.4	14.2
Green Ext Time (p_c), s		4.6		6.9			0.0	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	26.3
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	447	2	109	219	1116	0	0	172	292
Future Volume (vph)	0	0	0	447	2	109	219	1116	0	0	172	292
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1593	1597	1500	1676	3353			3353	1500
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1593	1597	1500	1676	3353			3353	1500
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	476	2	116	233	1187	0	0	183	311
RTOR Reduction (vph)	0	0	0	0	0	86	0	0	0	0	0	244
Lane Group Flow (vph)	0	0	0	238	240	30	233	1187	0	0	183	67
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				1	1		3	8			4	
Permitted Phases						1						4
Actuated Green, G (s)				13.8	13.8	13.8	9.6	26.5			11.4	11.4
Effective Green, g (s)				13.8	13.8	13.8	9.6	26.5			11.4	11.4
Actuated g/C Ratio				0.26	0.26	0.26	0.18	0.50			0.21	0.21
Clearance Time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Vehicle Extension (s)				4.5	4.5	4.5	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				412	413	388	301	1667			717	320
v/s Ratio Prot				0.15	c0.15		0.14	c0.35			0.05	
v/s Ratio Perm						0.02						0.04
v/c Ratio				0.58	0.58	0.08	0.77	0.71			0.26	0.21
Uniform Delay, d1				17.2	17.2	14.9	20.8	10.4			17.4	17.2
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				2.7	2.8	0.1	11.7	1.5			0.2	0.3
Delay (s)				19.9	20.1	15.1	32.5	11.9			17.6	17.6
Level of Service				B	C	B	C	B			B	B
Approach Delay (s)		0.0			19.0			15.3			17.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	18.5
Intersection Capacity Utilization	103.1%	ICU Level of Service	G
Analysis Period (min)	15		

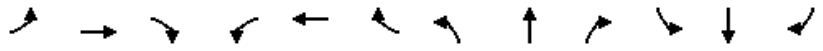
c Critical Lane Group

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	78	3	32	0	0	6	23	0	4	213	2	0	44	267	116
Future Vol, veh/h	0	78	3	32	0	0	6	23	0	4	213	2	0	44	267	116
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75	0.92	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	104	4	43	0	0	8	31	0	5	284	3	0	59	356	155
Number of Lanes	0	0	1	0	0	0	1	0	0	1	1	0	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay	12.4	9.7	15.8	13.4
HCM LOS	B	A	C	B

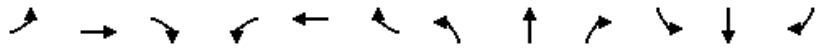
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	69%	0%	100%	0%	0%
Vol Thru, %	0%	99%	3%	21%	0%	96%	0%
Vol Right, %	0%	1%	28%	79%	0%	4%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	215	113	29	44	279	104
LT Vol	4	0	78	0	44	0	0
Through Vol	0	213	3	6	0	267	0
RT Vol	0	2	32	23	0	12	104
Lane Flow Rate	5	287	151	39	59	371	139
Geometry Grp	8	8	7	7	7	7	7
Degree of Util (X)	0.01	0.514	0.288	0.07	0.1	0.576	0.19
Departure Headway (Hd)	6.964	6.451	6.886	6.488	6.121	5.586	4.907
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	514	559	521	551	585	646	731
Service Time	4.711	4.198	4.635	4.246	3.855	3.32	2.641
HCM Lane V/C Ratio	0.01	0.513	0.29	0.071	0.101	0.574	0.19
HCM Control Delay	9.8	15.9	12.4	9.7	9.5	15.7	8.8
HCM Lane LOS	A	C	B	A	A	C	A
HCM 95th-tile Q	0	2.9	1.2	0.2	0.3	3.7	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	193	4	81	1	2	25	55	258	1	20	345	270
Future Volume (veh/h)	193	4	81	1	2	25	55	258	1	20	345	270
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1800	1765	1800	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	208	4	87	1	2	27	59	277	1	22	371	290
Adj No. of Lanes	1	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	11	230	2	4	60	93	1205	4	24	559	431
Arrive On Green	0.16	0.16	0.16	0.04	0.04	0.04	0.06	0.35	0.35	0.01	0.31	0.31
Sat Flow, veh/h	1681	66	1441	51	101	1365	1681	3427	12	1681	1802	1389
Grp Volume(v), veh/h	208	0	91	30	0	0	59	135	143	22	345	316
Grp Sat Flow(s),veh/h/ln	1681	0	1507	1517	0	0	1681	1676	1762	1681	1676	1514
Q Serve(g_s), s	6.1	0.0	2.8	1.0	0.0	0.0	1.8	2.9	2.9	0.7	9.2	9.3
Cycle Q Clear(g_c), s	6.1	0.0	2.8	1.0	0.0	0.0	1.8	2.9	2.9	0.7	9.2	9.3
Prop In Lane	1.00		0.96	0.03		0.90	1.00		0.01	1.00		0.92
Lane Grp Cap(c), veh/h	268	0	240	66	0	0	93	589	620	24	520	470
V/C Ratio(X)	0.78	0.00	0.38	0.45	0.00	0.00	0.63	0.23	0.23	0.93	0.66	0.67
Avail Cap(c_a), veh/h	787	0	706	710	0	0	213	788	829	190	765	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.7	0.0	19.3	23.9	0.0	0.0	23.7	11.7	11.7	25.2	15.4	15.4
Incr Delay (d2), s/veh	1.8	0.0	0.4	1.8	0.0	0.0	2.6	0.2	0.2	38.0	1.5	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	3.0	0.0	1.2	0.4	0.0	0.0	0.9	1.4	1.5	0.6	4.4	4.1
LnGrp Delay(d),s/veh	22.5	0.0	19.6	25.7	0.0	0.0	26.3	11.9	11.9	63.2	16.8	17.1
LnGrp LOS	C		B	C			C	B	B	E	B	B
Approach Vol, veh/h		299			30			337			683	
Approach Delay, s/veh		21.6			25.7			14.4			18.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	24.4		13.8	7.3	22.3		7.8
Change Period (Y+Rc), s	4.5	6.4		5.6	4.5	6.4		5.6
Max Green Setting (Gmax), s	5.8	24.1		24.0	6.5	23.4		24.0
Max Q Clear Time (g_c+I1), s	2.7	4.9		8.1	3.8	11.3		3.0
Green Ext Time (p_c), s	0.0	5.4		0.1	0.0	4.4		0.0

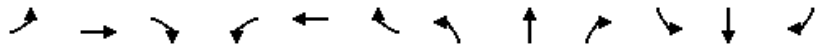
Intersection Summary	
HCM 2010 Ctrl Delay	18.3
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	764	793	132	149	419	196	116	253	152	605	474	521
Future Volume (veh/h)	764	793	132	149	419	196	116	253	152	605	474	521
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	813	844	140	159	446	0	123	269	162	644	504	554
Adj No. of Lanes	1	2	0	1	2	1	2	2	1	2	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	548	1145	190	180	600	269	166	615	273	468	463	407
Arrive On Green	0.33	0.40	0.40	0.11	0.18	0.00	0.05	0.18	0.18	0.14	0.28	0.28
Sat Flow, veh/h	1681	2879	477	1681	3353	1500	3261	3353	1490	3261	1676	1474
Grp Volume(v), veh/h	813	492	492	159	446	0	123	269	162	644	504	554
Grp Sat Flow(s),veh/h/ln	1681	1676	1680	1681	1676	1500	1630	1676	1490	1630	1676	1474
Q Serve(g_s), s	46.5	35.7	35.7	13.3	18.0	0.0	5.3	10.2	14.2	20.5	39.4	39.4
Cycle Q Clear(g_c), s	46.5	35.7	35.7	13.3	18.0	0.0	5.3	10.2	14.2	20.5	39.4	39.4
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	548	667	668	180	600	269	166	615	273	468	463	407
V/C Ratio(X)	1.48	0.74	0.74	0.88	0.74	0.00	0.74	0.44	0.59	1.38	1.09	1.36
Avail Cap(c_a), veh/h	548	679	680	185	634	284	185	634	282	468	463	407
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.1	36.6	36.6	62.8	55.5	0.0	66.8	51.7	53.4	61.1	51.7	51.7
Incr Delay (d2), s/veh	227.8	4.8	4.7	35.2	5.2	0.0	13.1	0.5	3.1	181.9	68.1	177.8
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	56.1	17.4	17.4	7.9	8.8	0.0	2.7	4.7	6.1	21.0	26.9	36.0
LnGrp Delay(d),s/veh	276.0	41.4	41.4	98.0	60.7	0.0	79.9	52.2	56.5	243.1	119.8	229.5
LnGrp LOS	F	D	D	F	E		E	D	E	F	F	F
Approach Vol, veh/h		1797			605			554			1702	
Approach Delay, s/veh		147.5			70.5			59.6			202.1	
Approach LOS		F			E			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.8	63.8	12.8	45.4	52.0	32.6	26.0	32.2
Change Period (Y+Rc), s	5.5	7.0	5.5	6.0	5.5	7.0	5.5	6.0
Max Green Setting (Gmax), s	15.3	57.8	8.1	39.4	46.5	27.0	20.5	27.0
Max Q Clear Time (g_c+I1), s	15.3	37.7	7.3	41.4	48.5	20.0	22.5	16.2
Green Ext Time (p_c), s	0.0	13.0	0.0	0.0	0.0	5.5	0.0	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	147.0
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	928	0	1140	0	0	0	0	1067	146	0	460	222
Future Volume (veh/h)	928	0	1140	0	0	0	0	1067	146	0	460	222
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	0	1765				0	1765	1800	0	1765	1765
Adj Flow Rate, veh/h	987	0	1213				0	1135	155	0	489	0
Adj No. of Lanes	2	0	1				0	3	0	0	2	1
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	0	2				0	2	2	0	2	2
Cap, veh/h	2103	0	968				0	1071	146	0	838	375
Arrive On Green	0.64	0.00	0.64				0.00	0.25	0.25	0.00	0.25	0.00
Sat Flow, veh/h	3261	0	1500				0	4444	585	0	3441	1500
Grp Volume(v), veh/h	987	0	1213				0	850	440	0	489	0
Grp Sat Flow(s),veh/h/ln	1630	0	1500				0	1606	1659	0	1676	1500
Q Serve(g_s), s	15.4	0.0	64.5				0.0	25.0	25.0	0.0	12.8	0.0
Cycle Q Clear(g_c), s	15.4	0.0	64.5				0.0	25.0	25.0	0.0	12.8	0.0
Prop In Lane	1.00		1.00				0.00		0.35	0.00		1.00
Lane Grp Cap(c), veh/h	2103	0	968				0	803	415	0	838	375
V/C Ratio(X)	0.47	0.00	1.25				0.00	1.06	1.06	0.00	0.58	0.00
Avail Cap(c_a), veh/h	2103	0	968				0	803	415	0	838	375
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	9.0	0.0	17.8				0.0	37.5	37.5	0.0	32.9	0.0
Incr Delay (d2), s/veh	0.2	0.0	122.7				0.0	48.6	61.0	0.0	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	6.9	0.0	59.3				0.0	16.5	18.4	0.0	6.0	0.0
LnGrp Delay(d),s/veh	9.2	0.0	140.5				0.0	86.1	98.5	0.0	34.0	0.0
LnGrp LOS	A		F					F	F		C	
Approach Vol, veh/h		2200						1290			489	
Approach Delay, s/veh		81.6						90.3			34.0	
Approach LOS		F						F			C	

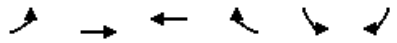
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		31.0		69.0		31.0		
Change Period (Y+Rc), s		6.0		4.5		6.0		
Max Green Setting (Gmax), s		25.0		64.5		25.0		
Max Q Clear Time (g_c+I1), s		27.0		66.5		14.8		
Green Ext Time (p_c), s		0.0		0.0		7.2		

Intersection Summary	
HCM 2010 Ctrl Delay	78.6
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	502	0	275	120	83	240	146	910	0	0	821	66
Future Volume (vph)	502	0	275	120	83	240	146	910	0	0	821	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Lane Util. Factor	0.97		1.00		1.00	1.00	1.00	0.91			0.86	
Frpb, ped/bikes	1.00		1.00		1.00	0.99	1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Frt	1.00		0.85		1.00	0.85	1.00	1.00			0.99	
Flt Protected	0.95		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	3250		1500		1714	1481	1676	4818			5993	
Flt Permitted	0.63		1.00		0.97	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	2141		1500		1714	1481	1676	4818			5993	
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)	523	0	286	125	86	250	152	948	0	0	855	69
RTOR Reduction (vph)	0	0	210	0	0	84	0	0	0	0	12	0
Lane Group Flow (vph)	523	0	76	0	211	166	152	948	0	0	912	0
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm	Split	NA	Perm	Prot	NA			NA	
Protected Phases				3	3		5	2			6	
Permitted Phases	4		4			3						
Actuated Green, G (s)	22.4		22.4		16.0	16.0	9.2	33.2			20.0	
Effective Green, g (s)	22.4		22.4		16.0	16.0	9.2	33.2			20.0	
Actuated g/C Ratio	0.26		0.26		0.19	0.19	0.11	0.39			0.24	
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	5.0			5.0	
Vehicle Extension (s)	2.5		2.5		2.0	2.0	2.0	3.0			3.0	
Lane Grp Cap (vph)	566		397		324	280	182	1890			1416	
v/s Ratio Prot					c0.12		c0.09	0.20			c0.15	
v/s Ratio Perm	c0.24		0.05			0.11						
v/c Ratio	0.92		0.19		0.65	0.59	0.84	0.50			0.64	
Uniform Delay, d1	30.3		24.1		31.7	31.3	37.0	19.4			29.1	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	20.9		0.2		3.6	2.2	25.8	0.2			1.0	
Delay (s)	51.2		24.3		35.3	33.5	62.8	19.7			30.1	
Level of Service	D		C		D	C	E	B			C	
Approach Delay (s)		41.7			34.3			25.6			30.1	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	17.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

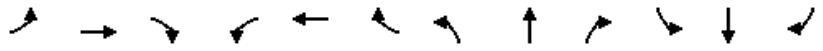
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	583	1063	488	253	259	391
Future Volume (veh/h)	583	1063	488	253	259	391
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	607	1107	508	264	270	0
Adj No. of Lanes	2	2	2	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	789	2097	1002	744	670	308
Arrive On Green	0.24	0.63	0.30	0.30	0.21	0.00
Sat Flow, veh/h	3261	3441	3441	1458	3261	1500
Grp Volume(v), veh/h	607	1107	508	264	270	0
Grp Sat Flow(s),veh/h/ln	1630	1676	1676	1458	1630	1500
Q Serve(g_s), s	8.2	8.7	5.9	5.2	3.4	0.0
Cycle Q Clear(g_c), s	8.2	8.7	5.9	5.2	3.4	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	789	2097	1002	744	670	308
V/C Ratio(X)	0.77	0.53	0.51	0.36	0.40	0.00
Avail Cap(c_a), veh/h	1103	2553	1135	801	1103	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.7	5.0	13.7	7.1	16.3	0.0
Incr Delay (d2), s/veh	2.2	0.2	0.4	0.3	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	3.9	4.1	2.7	3.0	1.5	0.0
LnGrp Delay(d),s/veh	18.9	5.2	14.1	7.4	16.7	0.0
LnGrp LOS	B	A	B	A	B	
Approach Vol, veh/h		1714	772		270	
Approach Delay, s/veh		10.0	11.8		16.7	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				33.6		13.7	15.4	18.1
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				36.0		16.0	16.0	16.0
Max Q Clear Time (g_c+I1), s				10.7		5.4	10.2	7.9
Green Ext Time (p_c), s				14.2		0.7	1.2	6.2

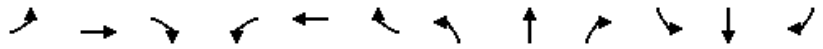
Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	885	296	220	373	19	348	31	557	30	18	29
Future Volume (veh/h)	27	885	296	220	373	19	348	31	557	30	18	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	28	912	305	227	385	20	359	32	574	31	19	30
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	783	261	206	1350	70	309	652	545	44	128	202
Arrive On Green	0.02	0.32	0.32	0.12	0.42	0.42	0.18	0.37	0.37	0.03	0.21	0.21
Sat Flow, veh/h	1681	2454	817	1681	3237	168	1681	1765	1474	1681	605	956
Grp Volume(v), veh/h	28	622	595	227	199	206	359	32	574	31	0	49
Grp Sat Flow(s),veh/h/ln	1681	1676	1595	1681	1676	1728	1681	1765	1474	1681	0	1561
Q Serve(g_s), s	2.1	41.5	41.5	15.9	10.2	10.3	23.9	1.5	48.0	2.4	0.0	3.3
Cycle Q Clear(g_c), s	2.1	41.5	41.5	15.9	10.2	10.3	23.9	1.5	48.0	2.4	0.0	3.3
Prop In Lane	1.00		0.51	1.00		0.10	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	41	535	509	206	699	721	309	652	545	44	0	330
V/C Ratio(X)	0.68	1.16	1.17	1.10	0.28	0.29	1.16	0.05	1.05	0.71	0.00	0.15
Avail Cap(c_a), veh/h	85	535	509	206	699	721	309	652	545	66	0	330
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	1.00	1.00	1.00	0.94	0.94	0.94	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.9	44.3	44.3	57.0	25.1	25.1	53.0	26.3	41.0	62.8	0.0	41.7
Incr Delay (d2), s/veh	15.5	89.6	93.1	93.5	0.1	0.1	101.2	0.1	52.4	19.2	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	32.5	31.4	12.7	4.7	4.9	19.8	0.8	27.4	1.3	0.0	1.5
LnGrp Delay(d),s/veh	78.4	133.9	137.3	150.5	25.2	25.2	154.3	26.5	93.4	82.1	0.0	42.7
LnGrp LOS	E	F	F	F	C	C	F	C	F	F		D
Approach Vol, veh/h		1245			632			965			80	
Approach Delay, s/veh		134.3			70.2			113.8			57.9	
Approach LOS		F			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	53.5	21.0	47.0	29.0	33.0	8.3	59.7
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	5.1	46.3	15.9	41.5	23.9	27.5	6.6	50.8
Max Q Clear Time (g_c+I1), s	4.4	50.0	17.9	43.5	25.9	5.3	4.1	12.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.7	0.0	9.8

Intersection Summary	
HCM 2010 Ctrl Delay	111.6
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1018	40	11	457	9	35	12	52	8	6	6
Future Volume (veh/h)	11	1018	40	11	457	9	35	12	52	8	6	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	11	1049	41	11	471	9	36	12	54	8	6	6
Adj No. of Lanes	1	1	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1166	46	12	2327	44	56	19	83	30	22	22
Arrive On Green	0.01	0.69	0.69	0.01	0.69	0.69	0.10	0.10	0.10	0.05	0.05	0.05
Sat Flow, veh/h	1681	1687	66	1681	3365	64	559	186	838	656	492	492
Grp Volume(v), veh/h	11	0	1090	11	234	246	102	0	0	20	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1753	1681	1676	1753	1583	0	0	1639	0	0
Q Serve(g_s), s	0.7	0.0	51.9	0.7	5.1	5.1	6.3	0.0	0.0	1.2	0.0	0.0
Cycle Q Clear(g_c), s	0.7	0.0	51.9	0.7	5.1	5.1	6.3	0.0	0.0	1.2	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.04	0.35		0.53	0.40		0.30
Lane Grp Cap(c), veh/h	12	0	1212	12	1159	1212	157	0	0	75	0	0
V/C Ratio(X)	0.93	0.00	0.90	0.93	0.20	0.20	0.65	0.00	0.00	0.27	0.00	0.00
Avail Cap(c_a), veh/h	181	0	1560	181	1492	1561	248	0	0	257	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	50.7	0.0	12.9	50.7	5.7	5.7	44.3	0.0	0.0	47.1	0.0	0.0
Incr Delay (d2), s/veh	103.7	0.0	6.2	103.7	0.1	0.1	4.4	0.0	0.0	1.9	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	0.6	0.0	26.6	0.6	2.4	2.5	3.0	0.0	0.0	0.6	0.0	0.0
LnGrp Delay(d),s/veh	154.4	0.0	19.0	154.4	5.7	5.7	48.7	0.0	0.0	49.0	0.0	0.0
LnGrp LOS	F		B	F	A	A	D			D		
Approach Vol, veh/h		1101			491			102			20	
Approach Delay, s/veh		20.4			9.1			48.7			49.0	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		14.2	4.7	74.7		8.7	4.7	74.7
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	91.0		16.0	11.0	91.0
Max Q Clear Time (g_c+I1), s		8.3	2.7	53.9		3.2	2.7	7.1
Green Ext Time (p_c), s		0.3	0.0	16.8		0.0	0.0	20.9

Intersection Summary		
HCM 2010 Ctrl Delay		19.2
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	319	0	45	0	0	0	0	120	14	5	63	0
Future Vol, veh/h	319	0	45	0	0	0	0	120	14	5	63	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	358	0	51	0	0	0	0	135	16	6	71	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	217	217	71	-	0	0	135	0	0
Stage 1	82	82	-	-	-	-	-	-	-
Stage 2	135	135	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	771	681	991	0	-	-	1449	-	0
Stage 1	941	827	-	0	-	-	-	-	0
Stage 2	891	785	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	768	0	991	-	-	-	1449	-	-
Mov Cap-2 Maneuver	768	0	-	-	-	-	-	-	-
Stage 1	937	0	-	-	-	-	-	-	-
Stage 2	891	0	-	-	-	-	-	-	-

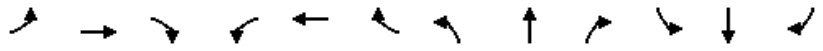
Approach	EB	NB	SB
HCM Control Delay, s	14.3	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	790	1449	-
HCM Lane V/C Ratio	-	-	0.518	0.004	-
HCM Control Delay (s)	-	-	14.3	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	3	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	39	400	68	201
Future Volume (Veh/h)	0	0	39	400	68	201
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	42	430	73	216
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	587	73	73			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	587	73	73			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	459	989	1527			

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	42	430	73	216
Volume Left	42	0	0	0
Volume Right	0	0	0	216
cSH	1527	1700	1700	1700
Volume to Capacity	0.03	0.25	0.04	0.13
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	7.4	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.7		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	167	288	102	240	49	229	338	91	49	403	26
Future Volume (veh/h)	42	167	288	102	240	49	229	338	91	49	403	26
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	46	184	0	112	264	54	252	371	100	54	443	29
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	109	380	323	152	333	68	300	721	606	116	518	434
Arrive On Green	0.06	0.22	0.00	0.09	0.24	0.23	0.18	0.42	0.42	0.07	0.30	0.30
Sat Flow, veh/h	1681	1765	1500	1681	1413	289	1648	1731	1455	1648	1731	1449
Grp Volume(v), veh/h	46	184	0	112	0	318	252	371	100	54	443	29
Grp Sat Flow(s),veh/h/ln	1681	1765	1500	1681	0	1703	1648	1731	1455	1648	1731	1449
Q Serve(g_s), s	2.0	7.0	0.0	5.0	0.0	13.5	11.4	12.3	3.3	2.4	18.5	1.1
Cycle Q Clear(g_c), s	2.0	7.0	0.0	5.0	0.0	13.5	11.4	12.3	3.3	2.4	18.5	1.1
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	109	380	323	152	0	401	300	721	606	116	518	434
V/C Ratio(X)	0.42	0.48	0.00	0.74	0.00	0.79	0.84	0.51	0.17	0.47	0.86	0.07
Avail Cap(c_a), veh/h	166	573	487	175	0	562	321	751	632	163	585	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.6	26.5	0.0	34.1	0.0	27.7	30.4	16.7	14.1	34.4	25.4	19.3
Incr Delay (d2), s/veh	2.6	1.0	0.0	13.0	0.0	5.2	16.9	0.6	0.1	2.9	10.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	3.5	0.0	2.9	0.0	6.9	6.6	6.0	1.4	1.2	10.4	0.5
LnGrp Delay(d),s/veh	37.2	27.4	0.0	47.1	0.0	32.9	47.3	17.3	14.2	37.3	36.3	19.3
LnGrp LOS	D	C		D		C	D	B	B	D	D	B
Approach Vol, veh/h		230			430			723			526	
Approach Delay, s/veh		29.4			36.6			27.3			35.5	
Approach LOS		C			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	27.4	9.0	22.5	9.4	36.0	11.0	20.5
Change Period (Y+Rc), s	4.6	* 5	4.6	* 5	4.6	5.0	4.6	5.0
Max Green Setting (Gmax), s	14.4	* 25	7.0	* 25	7.0	32.4	7.4	24.0
Max Q Clear Time (g_c+I1), s	13.4	20.5	4.0	15.5	4.4	14.3	7.0	9.0
Green Ext Time (p_c), s	0.1	1.9	0.0	1.4	0.0	3.8	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	1271	164	150	664	4	82	5	90	8	8	6
Future Volume (veh/h)	16	1271	164	150	664	4	82	5	90	8	8	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	16	1310	169	155	685	4	85	5	93	8	8	6
Adj No. of Lanes	1	2	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	1510	666	188	1832	11	129	260	221	24	79	60
Arrive On Green	0.03	0.45	0.45	0.11	0.54	0.54	0.08	0.15	0.15	0.01	0.08	0.08
Sat Flow, veh/h	1681	3353	1478	1681	3417	20	1681	1765	1500	1681	938	703
Grp Volume(v), veh/h	16	1310	169	155	336	353	85	5	93	8	0	14
Grp Sat Flow(s),veh/h/ln	1681	1676	1478	1681	1676	1760	1681	1765	1500	1681	0	1641
Q Serve(g_s), s	0.7	26.8	5.4	6.9	8.8	8.9	3.7	0.2	4.3	0.4	0.0	0.6
Cycle Q Clear(g_c), s	0.7	26.8	5.4	6.9	8.8	8.9	3.7	0.2	4.3	0.4	0.0	0.6
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	44	1510	666	188	899	944	129	260	221	24	0	139
V/C Ratio(X)	0.36	0.87	0.25	0.82	0.37	0.37	0.66	0.02	0.42	0.33	0.00	0.10
Avail Cap(c_a), veh/h	155	1675	738	199	899	944	265	765	651	199	0	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.4	18.9	13.0	33.0	10.2	10.2	34.2	27.7	29.5	37.1	0.0	32.1
Incr Delay (d2), s/veh	4.9	4.4	0.1	22.6	0.1	0.1	5.6	0.0	1.3	7.9	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	13.3	2.2	4.4	4.0	4.2	1.9	0.1	1.9	0.2	0.0	0.3
LnGrp Delay(d),s/veh	41.3	23.2	13.0	55.6	10.3	10.3	39.8	27.8	30.8	45.0	0.0	32.5
LnGrp LOS	D	C	B	E	B	B	D	C	C	D		C
Approach Vol, veh/h		1495			844			183			22	
Approach Delay, s/veh		22.3			18.6			34.9			37.0	
Approach LOS		C			B			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	40.3	10.8	11.4	7.0	46.8	6.1	16.2
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0
Max Green Setting (Gmax), s	9.0	38.0	12.0	30.0	7.0	40.0	9.0	33.0
Max Q Clear Time (g_c+I1), s	8.9	28.8	5.7	2.6	2.7	10.9	2.4	6.3
Green Ext Time (p_c), s	0.0	5.5	0.1	0.4	0.0	10.9	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

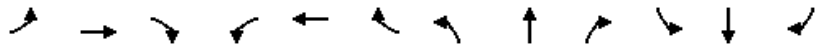
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1226	143	82	753	65	71
Future Volume (veh/h)	1226	143	82	753	65	71
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1800	1765	1765	1765	1765
Adj Flow Rate, veh/h	1251	146	84	768	66	72
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1613	188	149	2372	179	159
Arrive On Green	0.53	0.53	0.09	0.71	0.11	0.11
Sat Flow, veh/h	3110	351	1681	3441	1681	1500
Grp Volume(v), veh/h	692	705	84	768	66	72
Grp Sat Flow(s),veh/h/ln	1676	1696	1681	1676	1681	1500
Q Serve(g_s), s	19.3	19.6	2.8	5.1	2.2	2.7
Cycle Q Clear(g_c), s	19.3	19.6	2.8	5.1	2.2	2.7
Prop In Lane		0.21	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	895	906	149	2372	179	159
V/C Ratio(X)	0.77	0.78	0.56	0.32	0.37	0.45
Avail Cap(c_a), veh/h	966	977	256	2727	456	407
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	11.0	25.8	3.3	24.5	24.8
Incr Delay (d2), s/veh	3.7	3.8	3.3	0.1	1.3	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	10.0	1.4	2.4	1.1	1.2
LnGrp Delay(d),s/veh	14.6	14.8	29.1	3.4	25.8	26.8
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	1397			852	138	
Approach Delay, s/veh	14.7			5.9	26.3	
Approach LOS	B			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.2	37.5				47.7		11.3
Change Period (Y+Rc), s	5.0	6.0				6.0		5.0
Max Green Setting (Gmax), s	9.0	34.0				48.0		16.0
Max Q Clear Time (g_c+I1), s	4.8	21.6				7.1		4.7
Green Ext Time (p_c), s	0.1	9.9				23.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1127	170	169	745	90	153
Future Volume (vph)	1127	170	169	745	90	153
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3260		1676	3353	1585	
Flt Permitted	1.00		0.95	1.00	0.98	
Satd. Flow (perm)	3260		1676	3353	1585	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1150	173	172	760	92	156
RTOR Reduction (vph)	12	0	0	0	61	0
Lane Group Flow (vph)	1311	0	172	760	187	0
Confl. Peds. (#/hr)		15	15			
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	3 6	4	
Permitted Phases						
Actuated Green, G (s)	38.0		10.0	77.0	11.0	
Effective Green, g (s)	39.0		10.6	77.6	11.6	
Actuated g/C Ratio	0.40		0.11	0.79	0.12	
Clearance Time (s)	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		3.0		3.0	
Lane Grp Cap (vph)	1297		181	2655	187	
v/s Ratio Prot	c0.40		c0.10	c0.23	c0.12	
v/s Ratio Perm						
v/c Ratio	1.01		0.95	0.29	1.00	
Uniform Delay, d1	29.5		43.4	2.7	43.2	
Progression Factor	1.00		0.96	0.42	1.00	
Incremental Delay, d2	27.7		52.2	0.1	66.0	
Delay (s)	57.2		94.1	1.2	109.2	
Level of Service	E		F	A	F	
Approach Delay (s)	57.2			18.3	109.2	
Approach LOS	E			B	F	

Intersection Summary			
HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	74.5%	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)	377	798	194	111	328	262	328	598	268	737	633	453
Future Volume (veh/h)	377	798	194	111	328	262	328	598	268	737	633	453
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1731	1731	1800	1731	1731	1731
Adj Flow Rate, veh/h	401	849	206	118	349	279	349	636	285	784	673	482
Adj No. of Lanes	2	2	1	1	2	1	1	2	0	2	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	451	1027	437	83	727	317	382	559	251	857	502	425
Arrive On Green	0.14	0.31	0.29	0.05	0.22	0.22	0.23	0.25	0.24	0.09	0.10	0.10
Sat Flow, veh/h	3261	3353	1482	1681	3353	1462	1648	2206	988	3198	1731	1465
Grp Volume(v), veh/h	401	849	206	118	349	279	349	474	447	784	673	482
Grp Sat Flow(s),veh/h/ln	1630	1676	1482	1681	1676	1462	1648	1644	1551	1599	1731	1465
Q Serve(g_s), s	15.7	30.6	14.8	6.4	11.8	24.0	26.8	33.0	33.0	31.6	37.7	37.7
Cycle Q Clear(g_c), s	15.7	30.6	14.8	6.4	11.8	24.0	26.8	33.0	33.0	31.6	37.7	37.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.64	1.00		1.00
Lane Grp Cap(c), veh/h	451	1027	437	83	727	317	382	417	393	857	502	425
V/C Ratio(X)	0.89	0.83	0.47	1.43	0.48	0.88	0.91	1.14	1.14	0.91	1.34	1.13
Avail Cap(c_a), veh/h	451	1034	440	83	735	320	393	417	393	861	502	425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	0.97	0.97	0.97	0.98	0.98	0.98	1.00	1.00	1.00	0.45	0.45	0.45
Uniform Delay (d), s/veh	55.0	41.9	37.6	61.8	44.5	49.3	48.7	48.5	49.0	57.8	58.8	58.8
Incr Delay (d2), s/veh	18.6	5.2	0.4	247.0	0.3	22.2	25.1	87.1	88.4	7.3	159.6	73.8
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	8.2	14.9	6.1	8.6	5.5	11.6	14.9	25.0	23.7	14.9	40.3	24.0
LnGrp Delay(d),s/veh	73.6	47.1	38.0	308.8	44.7	71.5	73.8	135.6	137.4	65.1	218.4	132.6
LnGrp LOS	E	D	D	F	D	E	E	F	F	E	F	F
Approach Vol, veh/h		1456			746			1270			1939	
Approach Delay, s/veh		53.1			96.5			119.3			135.1	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	38.8	37.0	10.4	43.8	34.1	41.7	22.0	32.2
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	33.7	31.0	5.3	38.6	29.9	35.0	16.9	27.0
Max Q Clear Time (g_c+I1), s	33.6	35.0	8.4	32.6	28.8	39.7	17.7	26.0
Green Ext Time (p_c), s	0.1	0.0	0.0	3.0	0.2	0.0	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	104.0
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	493	19	279	17	9	82	60	1166	10	149	1527	400
Future Volume (vph)	493	19	279	17	9	82	60	1166	10	149	1527	400
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.95		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	0.97	
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	1602	1468	1676	1527		1644	3282		1644	4221	
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1593	1602	1468	1676	1527		1644	3282		1644	4221	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	524	20	297	18	10	87	64	1240	11	159	1624	426
RTOR Reduction (vph)	0	0	116	0	82	0	0	1	0	0	28	0
Lane Group Flow (vph)	267	277	181	18	15	0	64	1250	0	159	2022	0
Confl. Peds. (#/hr)			6	6			11		11	11		11
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	25.7	25.7	25.7	6.2	6.2		6.5	62.4		15.3	71.2	
Effective Green, g (s)	26.8	26.8	26.8	7.3	7.3		7.6	63.5		16.4	72.3	
Actuated g/C Ratio	0.21	0.21	0.21	0.06	0.06		0.06	0.49		0.13	0.56	
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1		5.1	5.1		5.1	5.1	
Vehicle Extension (s)	1.7	1.7	1.7	1.7	1.7		1.7	2.2		1.7	2.2	
Lane Grp Cap (vph)	328	330	302	94	85		96	1603		207	2347	
v/s Ratio Prot	0.17	c0.17		c0.01	0.01		0.04	0.38		c0.10	c0.48	
v/s Ratio Perm			0.12									
v/c Ratio	0.81	0.84	0.60	0.19	0.18		0.67	0.78		0.77	0.86	
Uniform Delay, d1	49.2	49.5	46.7	58.5	58.5		60.0	27.5		55.0	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.44	0.42		1.10	0.58	
Incremental Delay, d2	13.6	16.2	2.1	0.4	0.4		5.9	1.7		1.4	0.4	
Delay (s)	62.8	65.7	48.9	58.9	58.8		92.3	13.1		61.8	14.8	
Level of Service	E	E	D	E	E		F	B		E	B	
Approach Delay (s)		58.8			58.8			17.0			18.2	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.6%	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 (vph)	99	438	1063	0	0	652	0	1189	552	275	1063	459
Future Volume (vph)	99	438	1063	0	0	652	0	1189	552	275	1063	459
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4	5.4			5.5		5.5	5.5	5.0	5.5	4.5
Lane Util. Factor		0.95	1.00			0.88		0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes		1.00	0.98			0.99		1.00	0.98	1.00	1.00	0.95
Flpb, ped/bikes		1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85			0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3507	1548			2751		3471	1523	3367	3471	1470
Flt Permitted		0.99	1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3507	1548			2751		3471	1523	3367	3471	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	461	1119	0	0	686	0	1252	581	289	1119	483
RTOR Reduction (vph)	0	0	8	0	0	387	0	0	36	0	0	0
Lane Group Flow (vph)	0	565	1111	0	0	299	0	1252	545	289	1119	483
Confl. Peds. (#/hr)			38	38			68		4	4		68
Confl. Bikes (#/hr)			3			1						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	custom			Perm		NA	Perm	Prot	NA	Free
Protected Phases		4	5					2		1	6	
Permitted Phases	4		4			8			2			Free
Actuated Green, G (s)		30.7	71.7			30.7		70.2	70.2	15.1	43.3	130.0
Effective Green, g (s)		30.3	70.9			30.2		69.7	69.7	14.1	42.8	130.0
Actuated g/C Ratio		0.23	0.55			0.23		0.54	0.54	0.11	0.33	1.00
Clearance Time (s)		5.0	5.0			5.0		5.0	5.0	4.0	5.0	
Vehicle Extension (s)		2.0	2.0			2.0		3.0	3.0	2.0	4.0	
Lane Grp Cap (vph)		817	908			639		1860	816	365	1142	1470
v/s Ratio Prot			c0.38					0.36		0.09	c0.32	
v/s Ratio Perm		0.16	0.34			0.11			0.36			0.33
v/c Ratio		0.69	1.22			0.47		0.67	0.67	0.79	0.98	0.33
Uniform Delay, d1		45.6	29.5			43.0		21.9	21.8	56.5	43.2	0.0
Progression Factor		1.00	1.00			1.00		0.77	0.76	0.96	0.94	1.00
Incremental Delay, d2		2.1	110.6			0.2		1.3	2.8	10.4	22.1	0.6
Delay (s)		47.6	140.2			43.2		18.1	19.3	64.4	62.7	0.6
Level of Service		D	F			D		B	B	E	E	A
Approach Delay (s)		109.1			43.2			18.5			47.1	
Approach LOS		F			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.3
Intersection Capacity Utilization	107.5%	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)	0	0	0	209	151	65	444	1171	685	88	709	133
Future Volume (veh/h)	0	0	0	209	151	65	444	1171	685	88	709	133
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		0.95	1.00		0.98
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1765	1800	1731	1731	1800	1731	1731	1800
Adj Flow Rate, veh/h				213	154	66	453	1195	699	90	723	136
Adj No. of Lanes				0	2	0	2	3	0	1	2	0
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	2	0	4	4	4	4	4	4
Cap, veh/h				246	194	84	504	2139	946	109	1618	304
Arrive On Green				0.16	0.16	0.16	0.16	0.68	0.68	0.13	1.00	1.00
Sat Flow, veh/h				1579	1240	536	3198	3150	1393	1648	2753	518
Grp Volume(v), veh/h				227	0	206	453	1195	699	90	432	427
Grp Sat Flow(s),veh/h/ln				1686	0	1669	1599	1575	1393	1648	1644	1627
Q Serve(g_s), s				17.1	0.0	15.4	18.1	25.5	42.1	6.9	0.0	0.0
Cycle Q Clear(g_c), s				17.1	0.0	15.4	18.1	25.5	42.1	6.9	0.0	0.0
Prop In Lane				0.94		0.32	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h				263	0	261	504	2139	946	109	966	956
V/C Ratio(X)				0.86	0.00	0.79	0.90	0.56	0.74	0.82	0.45	0.45
Avail Cap(c_a), veh/h				441	0	436	566	2139	946	178	966	956
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh				53.5	0.0	52.8	53.7	10.8	13.5	55.6	0.0	0.0
Incr Delay (d2), s/veh				7.3	0.0	4.0	15.0	1.1	5.2	6.6	1.5	1.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.5	0.0	7.4	9.0	11.3	17.5	3.3	0.4	0.4
LnGrp Delay(d),s/veh				60.8	0.0	56.8	68.8	11.8	18.7	62.2	1.5	1.5
LnGrp LOS				E		E	E	B	B	E	A	A
Approach Vol, veh/h					433			2347			949	
Approach Delay, s/veh					58.9			24.9			7.3	
Approach LOS					E			C			A	

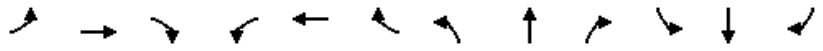
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	12.6	93.1			24.5	81.2		24.3
Change Period (Y+Rc), s	4.0	5.0			4.0	5.0		4.0
Max Green Setting (Gmax), s	14.0	69.0			23.0	60.0		34.0
Max Q Clear Time (g_c+I1), s	8.9	44.1			20.1	2.0		19.1
Green Ext Time (p_c), s	0.1	21.1			0.4	41.0		1.2

Intersection Summary		
HCM 2010 Ctrl Delay		24.3
HCM 2010 LOS		C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	181	280	991	601	28
Future Volume (veh/h)	28	181	280	991	601	28
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	29	187	289	1022	620	29
Adj No. of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	235	210	309	2639	1863	87
Arrive On Green	0.14	0.14	0.37	1.00	1.00	1.00
Sat Flow, veh/h	1681	1500	1681	3441	3343	152
Grp Volume(v), veh/h	29	187	289	1022	319	330
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1731
Q Serve(g_s), s	2.0	15.9	21.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.0	15.9	21.5	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00			0.09
Lane Grp Cap(c), veh/h	235	210	309	2639	960	991
V/C Ratio(X)	0.12	0.89	0.93	0.39	0.33	0.33
Avail Cap(c_a), veh/h	375	335	543	2639	960	991
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.23	0.23
Uniform Delay (d), s/veh	48.9	54.9	40.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	10.9	8.9	0.4	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	13.1	10.7	0.2	0.1	0.1
LnGrp Delay(d),s/veh	49.0	65.8	49.3	0.4	0.2	0.2
LnGrp LOS	D	E	D	A	A	A
Approach Vol, veh/h	216			1311	649	
Approach Delay, s/veh	63.5			11.2	0.2	
Approach LOS	E			B	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		107.8		22.2	27.9	79.9		
Change Period (Y+Rc), s		5.5		4.0	4.0	5.5		
Max Green Setting (Gmax), s		91.5		29.0	42.0	45.5		
Max Q Clear Time (g_c+I1), s		2.0		17.9	23.5	2.0		
Green Ext Time (p_c), s		31.1		0.3	0.4	23.5		

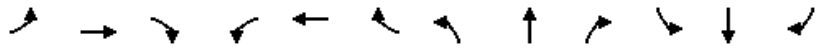
Intersection Summary	
HCM 2010 Ctrl Delay	13.1
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1739	23	1	661	2	18	5	3	5	5	7
Future Volume (veh/h)	7	1739	23	1	661	2	18	5	3	5	5	7
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	8	1890	25	1	718	2	20	5	3	5	5	8
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	1909	25	2	1904	5	97	9	43	48	10	13
Arrive On Green	0.01	0.56	0.55	0.00	1.00	1.00	0.03	0.03	0.03	0.03	0.03	0.03
Sat Flow, veh/h	1681	3387	45	1681	3430	10	1303	326	1490	211	341	442
Grp Volume(v), veh/h	8	933	982	1	351	369	25	0	3	18	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1756	1681	1676	1763	1628	0	1490	995	0	0
Q Serve(g_s), s	0.5	60.3	60.9	0.1	0.0	0.0	0.0	0.0	0.2	0.8	0.0	0.0
Cycle Q Clear(g_c), s	0.5	60.3	60.9	0.1	0.0	0.0	1.6	0.0	0.2	2.4	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.01	0.80		1.00	0.28		0.44
Lane Grp Cap(c), veh/h	17	945	990	2	931	979	106	0	43	71	0	0
V/C Ratio(X)	0.48	0.99	0.99	0.43	0.38	0.38	0.24	0.00	0.07	0.25	0.00	0.00
Avail Cap(c_a), veh/h	168	945	990	168	945	994	393	0	339	373	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.31	0.31	0.31	0.98	0.98	0.98	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	54.2	23.6	23.8	54.8	0.0	0.0	52.6	0.0	51.9	53.1	0.0	0.0
Incr Delay (d2), s/veh	2.5	13.4	14.0	40.8	1.1	1.1	0.4	0.0	0.2	0.7	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	0.3	31.0	33.0	0.1	0.3	0.3	0.8	0.0	0.1	0.6	0.0	0.0
LnGrp Delay(d),s/veh	56.6	37.0	37.8	95.6	1.1	1.1	53.0	0.0	52.2	53.8	0.0	0.0
LnGrp LOS	E	D	D	F	A	A	D		D	D		
Approach Vol, veh/h		1923			721			28			18	
Approach Delay, s/veh		37.5			1.2			52.9			53.8	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	66.0		7.2	5.1	65.1		7.2
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I2), s	2.1	62.9		4.4	2.5	2.0		3.6
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	15.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.1
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1532	129	31	564	8	60	5	39	11	5	14
Future Volume (veh/h)	17	1532	129	31	564	8	60	5	39	11	5	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	18	1613	136	33	594	8	63	5	41	12	5	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	1758	147	68	1947	26	124	13	51	83	40	69
Arrive On Green	0.03	0.56	0.55	0.05	0.76	0.75	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	1681	3133	262	1681	3387	46	790	139	560	418	434	752
Grp Volume(v), veh/h	18	856	893	33	294	308	109	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1718	1681	1676	1757	1488	0	0	1604	0	0
Q Serve(g_s), s	1.2	50.4	52.2	2.1	5.9	5.9	5.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.2	50.4	52.2	2.1	5.9	5.9	7.8	0.0	0.0	2.0	0.0	0.0
Prop In Lane	1.00		0.15	1.00		0.03	0.58		0.38	0.37		0.47
Lane Grp Cap(c), veh/h	45	941	964	68	964	1010	187	0	0	191	0	0
V/C Ratio(X)	0.40	0.91	0.93	0.49	0.30	0.31	0.58	0.00	0.00	0.17	0.00	0.00
Avail Cap(c_a), veh/h	168	975	1000	168	975	1022	357	0	0	365	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70	0.99	0.99	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	52.6	21.6	22.1	50.9	6.2	6.2	48.9	0.0	0.0	46.3	0.0	0.0
Incr Delay (d2), s/veh	3.9	9.0	10.4	5.2	0.8	0.8	2.8	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	25.4	27.3	1.1	2.9	3.0	3.4	0.0	0.0	0.9	0.0	0.0
LnGrp Delay(d),s/veh	56.6	30.6	32.5	56.1	7.0	7.0	51.7	0.0	0.0	46.7	0.0	0.0
LnGrp LOS	E	C	C	E	A	A	D			D		
Approach Vol, veh/h		1767			635			109			32	
Approach Delay, s/veh		31.8			9.5			51.7			46.7	
Approach LOS		C			A			D			D	

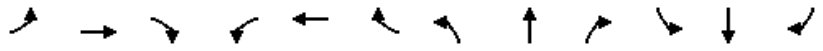
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.4	65.7		14.0	7.0	67.2		14.0
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	4.0	63.0		23.0	11.0	63.0		23.0
Max Q Clear Time (g_c+I1), s	4.1	54.2		4.0	3.2	7.9		9.8
Green Ext Time (p_c), s	0.0	6.5		0.5	0.0	18.3		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	27.3
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1537	29	18	605	16	14
Future Volume (vph)	1537	29	18	605	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.94	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3342		1676	3353	1598	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3342		1676	3353	1598	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1635	31	19	644	17	15
RTOR Reduction (vph)	1	0	0	0	14	0
Lane Group Flow (vph)	1665	0	19	644	18	0
Confl. Peds. (#/hr)		4	4			3
Confl. Bikes (#/hr)		1				
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Actuated Green, G (s)	83.4		3.2	91.6	7.4	
Effective Green, g (s)	85.4		4.2	93.6	8.4	
Actuated g/C Ratio	0.78		0.04	0.85	0.08	
Clearance Time (s)	6.0		5.0	6.0	5.0	
Vehicle Extension (s)	4.3		3.0	4.3	3.0	
Lane Grp Cap (vph)	2594		63	2853	122	
v/s Ratio Prot	c0.50		0.01	c0.19	c0.01	
v/s Ratio Perm						
v/c Ratio	0.64		0.30	0.23	0.15	
Uniform Delay, d1	5.5		51.5	1.5	47.5	
Progression Factor	0.88		0.63	1.68	1.00	
Incremental Delay, d2	0.5		2.6	0.2	0.6	
Delay (s)	5.3		34.8	2.7	48.0	
Level of Service	A		C	A	D	
Approach Delay (s)	5.3			3.6	48.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

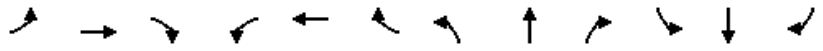
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	1391	11	6	564	106	13	4	12	70	3	70
Future Volume (veh/h)	144	1391	11	6	564	106	13	4	12	70	3	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	0.98		0.97	0.98		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	155	1496	12	6	606	114	14	4	13	75	3	75
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	1634	13	13	1090	205	186	168	139	205	184	139
Arrive On Green	0.10	0.48	0.47	0.02	0.77	0.76	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1681	3408	27	1681	2817	529	1286	1765	1462	1359	1765	1462
Grp Volume(v), veh/h	155	736	772	6	360	360	14	4	13	75	3	75
Grp Sat Flow(s),veh/h/ln	1681	1676	1759	1681	1676	1670	1286	1765	1462	1359	1765	1462
Q Serve(g_s), s	10.1	44.8	44.8	0.4	9.4	9.6	1.1	0.2	0.9	5.8	0.2	5.4
Cycle Q Clear(g_c), s	10.1	44.8	44.8	0.4	9.4	9.6	1.3	0.2	0.9	6.0	0.2	5.4
Prop In Lane	1.00		0.02	1.00		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	804	843	13	649	646	186	168	139	205	184	139
V/C Ratio(X)	0.92	0.92	0.92	0.47	0.56	0.56	0.08	0.02	0.09	0.37	0.02	0.54
Avail Cap(c_a), veh/h	168	914	959	168	914	911	379	433	359	409	449	359
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.77	0.77	0.77	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.1	26.6	26.6	53.9	8.7	8.9	45.7	45.1	45.4	46.9	44.2	47.4
Incr Delay (d2), s/veh	39.5	9.6	9.3	9.4	3.3	3.4	0.2	0.1	0.3	1.1	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	6.5	22.8	23.8	0.2	4.8	4.8	0.4	0.1	0.4	2.2	0.1	2.3
LnGrp Delay(d),s/veh	88.6	36.1	35.9	63.3	12.0	12.3	45.8	45.2	45.7	48.0	44.2	50.6
LnGrp LOS	F	D	D	E	B	B	D	D	D	D	D	D
Approach Vol, veh/h		1663			726			31			153	
Approach Delay, s/veh		40.9			12.6			45.7			49.2	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	56.7		14.5	15.0	46.6		14.5
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	59.0		27.0	11.0	59.0		27.0
Max Q Clear Time (g_c+I1), s	12.4	46.8		8.0	12.1	11.6		3.3
Green Ext Time (p_c), s	0.0	4.9		0.6	0.0	6.4		0.7

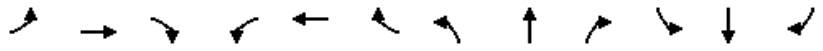
Intersection Summary	
HCM 2010 Ctrl Delay	33.5
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1368	75	7	623	10	41	1	3	11	5	14
Future Volume (veh/h)	10	1368	75	7	623	10	41	1	3	11	5	14
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	11	1455	80	7	663	11	44	1	3	12	5	15
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	1620	89	15	1677	28	123	1	4	66	17	33
Arrive On Green	0.01	0.50	0.49	0.02	0.99	0.98	0.04	0.04	0.04	0.04	0.04	0.04
Sat Flow, veh/h	1681	3233	177	1681	3374	56	1382	31	94	481	385	764
Grp Volume(v), veh/h	11	752	783	7	329	345	48	0	0	32	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1733	1681	1676	1753	1507	0	0	1630	0	0
Q Serve(g_s), s	0.7	44.7	45.2	0.5	0.2	0.2	1.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.7	44.7	45.2	0.5	0.2	0.2	3.3	0.0	0.0	2.1	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.03	0.92		0.06	0.37		0.47
Lane Grp Cap(c), veh/h	22	840	869	15	833	871	128	0	0	116	0	0
V/C Ratio(X)	0.50	0.90	0.90	0.48	0.40	0.40	0.37	0.00	0.00	0.28	0.00	0.00
Avail Cap(c_a), veh/h	168	945	977	168	945	988	383	0	0	388	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.82	0.98	0.98	0.98	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	53.9	24.8	25.0	53.8	0.2	0.2	51.8	0.0	0.0	51.3	0.0	0.0
Incr Delay (d2), s/veh	5.4	8.4	8.6	8.4	1.4	1.3	0.7	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	22.4	23.6	0.2	0.4	0.4	1.5	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	59.3	33.2	33.6	62.2	1.5	1.5	52.5	0.0	0.0	51.8	0.0	0.0
LnGrp LOS	E	C	C	E	A	A	D			D		
Approach Vol, veh/h		1546			681			48			32	
Approach Delay, s/veh		33.6			2.1			52.5			51.8	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	59.1		8.8	5.4	58.7		8.8
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	11.0	61.0		25.0	11.0	61.0		25.0
Max Q Clear Time (g_c+I1), s	2.5	47.2		4.1	2.7	2.2		5.3
Green Ext Time (p_c), s	0.0	7.0		0.1	0.0	10.4		0.1

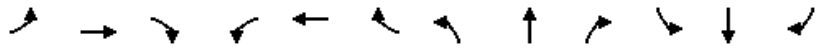
Intersection Summary	
HCM 2010 Ctrl Delay	25.0
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	1321	40	2	654	23	12	5	12	22	2	27
Future Volume (veh/h)	55	1321	40	2	654	23	12	5	12	22	2	27
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1800	1800	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	56	1334	40	2	661	23	12	5	12	22	2	27
Adj No. of Lanes	0	2	0	0	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	79	1409	42	33	1423	52	78	33	46	83	13	56
Arrive On Green	0.46	0.46	0.45	0.93	0.93	0.89	0.07	0.07	0.06	0.07	0.07	0.06
Sat Flow, veh/h	95	3039	91	1	3069	112	442	468	642	507	189	783
Grp Volume(v), veh/h	732	0	698	359	0	327	29	0	0	51	0	0
Grp Sat Flow(s),veh/h/ln	1637	0	1587	1596	0	1586	1552	0	0	1479	0	0
Q Serve(g_s), s	36.2	0.0	46.3	3.4	0.0	2.9	0.0	0.0	0.0	1.7	0.0	0.0
Cycle Q Clear(g_c), s	47.6	0.0	46.3	49.7	0.0	2.9	1.9	0.0	0.0	3.5	0.0	0.0
Prop In Lane	0.08		0.06	0.01		0.07	0.41		0.41	0.43		0.53
Lane Grp Cap(c), veh/h	794	0	736	773	0	735	157	0	0	152	0	0
V/C Ratio(X)	0.92	0.00	0.95	0.46	0.00	0.44	0.19	0.00	0.00	0.34	0.00	0.00
Avail Cap(c_a), veh/h	794	0	736	773	0	735	731	0	0	715	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.00	0.82	0.95	0.00	0.95	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.2	0.0	28.3	2.6	0.0	2.3	48.5	0.0	0.0	49.3	0.0	0.0
Incr Delay (d2), s/veh	13.5	0.0	18.5	1.9	0.0	1.8	0.6	0.0	0.0	1.3	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	24.3	0.0	23.9	1.8	0.0	1.5	0.9	0.0	0.0	1.5	0.0	0.0
LnGrp Delay(d),s/veh	41.6	0.0	46.8	4.5	0.0	4.2	49.1	0.0	0.0	50.6	0.0	0.0
LnGrp LOS	D		D	A		A	D			D		
Approach Vol, veh/h		1430			686			29			51	
Approach Delay, s/veh		44.1			4.3			49.1			50.6	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		55.0		11.8		55.0		11.8
Change Period (Y+Rc), s		6.0		5.0		6.0		5.0
Max Green Setting (Gmax), s		49.0		50.0		49.0		50.0
Max Q Clear Time (g_c+I1), s		49.6		5.5		51.7		3.9
Green Ext Time (p_c), s		0.0		0.3		0.0		0.3

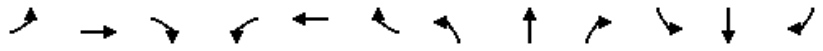
Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1236	144	104	629	78	92	19	77	66	14	19
Future Volume (veh/h)	20	1236	144	104	629	78	92	19	77	66	14	19
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		0.99	1.00		1.00	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	21	1274	148	107	648	80	95	20	79	68	14	20
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	1183	137	131	1344	166	118	143	113	86	40	57
Arrive On Green	0.02	0.39	0.38	0.08	0.45	0.44	0.07	0.08	0.08	0.05	0.06	0.06
Sat Flow, veh/h	1681	3027	350	1681	3004	370	1681	1765	1476	1681	642	917
Grp Volume(v), veh/h	21	703	719	107	361	367	95	20	79	68	0	34
Grp Sat Flow(s),veh/h/ln	1681	1676	1701	1681	1676	1697	1681	1765	1476	1681	0	1558
Q Serve(g_s), s	1.4	43.0	43.0	6.9	16.7	16.8	6.1	1.2	5.7	4.4	0.0	2.3
Cycle Q Clear(g_c), s	1.4	43.0	43.0	6.9	16.7	16.8	6.1	1.2	5.7	4.4	0.0	2.3
Prop In Lane	1.00		0.21	1.00		0.22	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	36	655	665	131	750	760	118	143	113	86	0	97
V/C Ratio(X)	0.58	1.07	1.08	0.81	0.48	0.48	0.81	0.14	0.70	0.79	0.00	0.35
Avail Cap(c_a), veh/h	199	655	665	199	750	760	199	401	329	199	0	354
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.77	0.77	0.77	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.3	33.5	33.6	49.9	21.4	21.5	50.4	47.0	49.6	51.6	0.0	49.6
Incr Delay (d2), s/veh	4.3	52.8	55.5	6.5	1.7	1.7	4.8	0.2	2.9	6.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	29.5	30.4	3.4	8.1	8.2	3.0	0.6	2.4	2.2	0.0	1.0
LnGrp Delay(d),s/veh	57.6	86.3	89.1	56.4	23.1	23.2	55.2	47.1	52.5	57.6	0.0	50.4
LnGrp LOS	E	F	F	E	C	C	E	D	D	E		D
Approach Vol, veh/h		1443			835			194			102	
Approach Delay, s/veh		87.3			27.4			53.2			55.2	
Approach LOS		F			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	47.0	9.6	12.9	6.4	53.2	11.7	10.8
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	13.0	42.0	13.0	24.5	13.0	42.0	13.0	24.5
Max Q Clear Time (g_c+I1), s	8.9	45.0	6.4	7.7	3.4	18.8	8.1	4.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	16.1	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	64.0
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	607	634	176	24	238	108	69	302	21	189	612	586
Future Volume (veh/h)	607	634	176	24	238	108	69	302	21	189	612	586
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1731	1731	1800	1731	1731	1731	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	632	660	183	25	248	112	72	315	22	197	638	610
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	241	751	208	65	623	274	102	1340	587	216	1566	686
Arrive On Green	0.15	0.30	0.29	0.04	0.19	0.19	0.06	0.41	0.41	0.13	0.48	0.48
Sat Flow, veh/h	1648	2539	703	1648	3288	1448	1648	3288	1441	1648	3288	1441
Grp Volume(v), veh/h	632	427	416	25	248	112	72	315	22	197	638	610
Grp Sat Flow(s),veh/h/ln	1648	1644	1598	1648	1644	1448	1648	1644	1441	1648	1644	1441
Q Serve(g_s), s	19.0	32.1	32.2	1.9	8.6	8.8	5.6	8.2	1.2	15.3	16.4	50.0
Cycle Q Clear(g_c), s	19.0	32.1	32.2	1.9	8.6	8.8	5.6	8.2	1.2	15.3	16.4	50.0
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	241	487	473	65	623	274	102	1340	587	216	1566	686
V/C Ratio(X)	2.62	0.88	0.88	0.38	0.40	0.41	0.70	0.24	0.04	0.91	0.41	0.89
Avail Cap(c_a), veh/h	241	539	524	139	883	389	178	1340	587	216	1566	686
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	0.34	0.34	0.34	0.92	0.92	0.92	0.66	0.66	0.66
Uniform Delay (d), s/veh	55.5	43.5	43.8	60.9	46.2	46.3	59.8	25.2	23.2	55.8	22.1	30.9
Incr Delay (d2), s/veh	738.5	10.1	10.5	1.2	0.1	0.3	7.8	0.1	0.0	28.9	0.5	11.3
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	58.1	16.0	15.6	0.9	3.9	3.6	2.8	3.7	0.5	8.7	7.6	22.0
LnGrp Delay(d),s/veh	794.0	53.6	54.2	62.1	46.3	46.6	67.6	25.3	23.2	84.6	22.7	42.2
LnGrp LOS	F	D	D	E	D	D	E	C	C	F	C	D
Approach Vol, veh/h		1475			385			409			1445	
Approach Delay, s/veh		371.0			47.4			32.7			39.4	
Approach LOS		F			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	65.9	9.2	42.9	21.0	57.0	23.0	29.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.4	5.0	5.0	5.0	* 5.4
Max Green Setting (Gmax), s	13.0	45.0	10.0	41.6	16.0	42.0	18.0	* 34
Max Q Clear Time (g_c+I1), s	17.6	52.0	3.9	34.2	17.3	10.2	21.0	10.8
Green Ext Time (p_c), s	0.1	0.0	0.0	3.3	0.0	9.6	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	171.2
HCM 2010 LOS	F

Notes

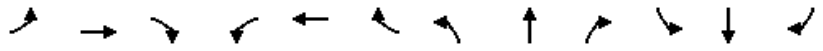
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	465	1	499	0	0	0	0	707	389	379	968	0
Future Volume (vph)	465	1	499	0	0	0	0	707	389	379	968	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.4	4.4					4.4		5.0	4.4	
Lane Util. Factor	0.95	0.91	0.95					0.91		1.00	0.95	
Frpb, ped/bikes	1.00	0.99	0.99					0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00		1.00	1.00	
Frt	1.00	0.93	0.85					0.95		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1681	1530	1485					4678		1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1681	1530	1485					4678		1736	3471	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	489	1	525	0	0	0	0	744	409	399	1019	0
RTOR Reduction (vph)	0	32	36	0	0	0	0	61	0	0	0	0
Lane Group Flow (vph)	308	297	342	0	0	0	0	1092	0	399	1019	0
Confl. Peds. (#/hr)			1	1			30		1	1		30
Confl. Bikes (#/hr)									4			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	34.4	34.4	34.4					59.6		13.0	76.6	
Effective Green, g (s)	34.5	34.5	34.5					59.7		12.0	76.7	
Actuated g/C Ratio	0.29	0.29	0.29					0.50		0.10	0.64	
Clearance Time (s)	4.5	4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0					4.0		2.0	4.0	
Lane Grp Cap (vph)	483	439	426					2327		173	2218	
v/s Ratio Prot	0.18	0.19						0.23		c0.23	c0.29	
v/s Ratio Perm			c0.23									
v/c Ratio	0.64	0.68	0.80					0.47		2.31	0.46	
Uniform Delay, d1	37.3	37.8	39.6					19.8		54.0	11.1	
Progression Factor	1.00	1.00	1.00					1.00		1.38	0.18	
Incremental Delay, d2	2.0	3.2	10.0					0.7		600.4	0.5	
Delay (s)	39.3	41.0	49.6					20.4		674.7	2.4	
Level of Service	D	D	D					C		F	A	
Approach Delay (s)		43.7			0.0			20.4			191.6	
Approach LOS		D			A			C			F	

Intersection Summary			
HCM 2000 Control Delay	94.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	73.3%	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	0	0	233	227	384	294	774	104	115	1114	445
Future Volume (vph)	0	0	0	233	227	384	294	774	104	115	1114	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.9		4.0	4.4		4.5	4.4	4.0
Lane Util. Factor					0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00		1.00	1.00	1.00
Frt					0.93		1.00	0.98		1.00	1.00	0.85
Flt Protected					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)					3190		3367	3400		1736	3471	1527
Flt Permitted					0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)					3190		3367	3400		1736	3471	1527
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	248	241	409	313	823	111	122	1185	473
RTOR Reduction (vph)	0	0	0	0	127	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	771	0	313	926	0	122	1185	473
Confl. Peds. (#/hr)							13		1	1		13
Confl. Bikes (#/hr)									2			3
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA		Prot	NA		Prot	NA	Free
Protected Phases				8	8		5	2		1	6	
Permitted Phases												Free
Actuated Green, G (s)					29.0		15.1	65.7		12.8	63.4	120.0
Effective Green, g (s)					29.1		15.1	65.8		12.3	63.5	120.0
Actuated g/C Ratio					0.24		0.13	0.55		0.10	0.53	1.00
Clearance Time (s)					4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)					2.5		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)					773		423	1864		177	1836	1527
v/s Ratio Prot					c0.24		c0.09	0.27		0.07	c0.34	
v/s Ratio Perm												0.31
v/c Ratio					1.00		0.74	0.50		0.69	0.65	0.31
Uniform Delay, d1					45.4		50.6	16.8		52.0	20.2	0.0
Progression Factor					1.00		1.04	1.10		1.00	1.00	1.00
Incremental Delay, d2					31.6		5.3	0.9		8.6	1.8	0.5
Delay (s)					77.1		57.8	19.4		60.6	22.0	0.5
Level of Service					E		E	B		E	C	A
Approach Delay (s)		0.0			77.1			29.0			18.9	
Approach LOS		A			E			C			B	

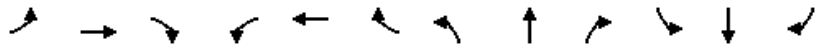
Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	1426	96	150	536	498	60	310	143	400	658	45
Future Volume (veh/h)	68	1426	96	150	536	498	60	310	143	400	658	45
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	70	1470	99	155	553	513	62	320	147	412	678	0
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	1423	95	146	1615	710	78	358	158	403	1007	451
Arrive On Green	0.05	0.45	0.45	0.09	0.48	0.48	0.05	0.11	0.11	0.24	0.30	0.00
Sat Flow, veh/h	1681	3186	214	1681	3353	1475	1681	3353	1483	1681	3353	1500
Grp Volume(v), veh/h	70	770	799	155	553	513	62	320	147	412	678	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1723	1681	1676	1475	1681	1676	1483	1681	1676	1500
Q Serve(g_s), s	6.2	67.0	67.0	13.0	15.4	41.5	5.5	14.1	14.7	36.0	26.6	0.0
Cycle Q Clear(g_c), s	6.2	67.0	67.0	13.0	15.4	41.5	5.5	14.1	14.7	36.0	26.6	0.0
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	87	749	770	146	1615	710	78	358	158	403	1007	451
V/C Ratio(X)	0.80	1.03	1.04	1.06	0.34	0.72	0.80	0.89	0.93	1.02	0.67	0.00
Avail Cap(c_a), veh/h	146	749	770	146	1615	710	134	358	158	403	1007	451
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	70.4	41.5	41.5	68.5	24.1	30.9	70.8	66.2	66.4	57.0	46.0	0.0
Incr Delay (d2), s/veh	6.4	40.4	42.7	92.7	0.1	3.6	6.8	23.2	50.3	50.4	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	39.4	41.0	9.8	7.1	17.5	2.7	7.7	8.3	22.3	12.5	0.0
LnGrp Delay(d),s/veh	76.8	81.9	84.2	161.2	24.3	34.5	77.7	89.3	116.8	107.4	47.5	0.0
LnGrp LOS	E	F	F	F	C	C	E	F	F	F	D	
Approach Vol, veh/h		1639			1221			529			1090	
Approach Delay, s/veh		82.8			46.0			95.6			70.1	
Approach LOS		F			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	72.0	10.9	50.1	11.8	77.2	40.0	21.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	67.0	12.0	40.0	13.0	67.0	36.0	16.0
Max Q Clear Time (g_c+I1), s	15.0	69.0	7.5	28.6	8.2	43.5	38.0	16.7
Green Ext Time (p_c), s	0.0	0.0	0.0	3.9	0.0	18.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	71.2
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	1019	135	88	501	159	33	180	69	284	569	40
Future Volume (veh/h)	114	1019	135	88	501	159	33	180	69	284	569	40
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	131	1171	155	101	576	183	38	207	79	326	654	0
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	149	1365	180	126	1116	354	69	519	232	362	755	338
Arrive On Green	0.09	0.46	0.46	0.07	0.45	0.45	0.04	0.15	0.15	0.11	0.23	0.00
Sat Flow, veh/h	1681	2973	392	1681	2506	794	1681	3353	1500	3261	3353	1500
Grp Volume(v), veh/h	131	659	667	101	385	374	38	207	79	326	654	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1689	1681	1676	1624	1681	1676	1500	1630	1676	1500
Q Serve(g_s), s	6.9	31.5	31.8	5.3	14.9	15.0	2.0	5.0	4.2	8.9	16.9	0.0
Cycle Q Clear(g_c), s	6.9	31.5	31.8	5.3	14.9	15.0	2.0	5.0	4.2	8.9	16.9	0.0
Prop In Lane	1.00		0.23	1.00		0.49	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	149	770	775	126	746	723	69	519	232	362	755	338
V/C Ratio(X)	0.88	0.86	0.86	0.80	0.52	0.52	0.55	0.40	0.34	0.90	0.87	0.00
Avail Cap(c_a), veh/h	149	770	775	149	746	723	187	820	367	362	820	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.5	21.7	21.8	41.0	18.0	18.0	42.4	34.3	33.9	39.5	33.6	0.0
Incr Delay (d2), s/veh	39.0	11.7	12.0	19.2	0.8	0.9	2.6	0.2	0.3	23.8	8.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	17.0	17.2	3.1	7.0	6.8	1.0	2.3	1.8	5.2	8.7	0.0
LnGrp Delay(d),s/veh	79.5	33.4	33.8	60.2	18.8	18.9	44.9	34.4	34.2	63.3	42.1	0.0
LnGrp LOS	E	C	C	E	B	B	D	C	C	E	D	
Approach Vol, veh/h		1457			860			324			980	
Approach Delay, s/veh		37.7			23.7			35.6			49.2	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	46.3	7.7	25.3	12.0	45.1	14.0	18.9
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	32.0	10.0	22.0	8.0	32.0	10.0	22.0
Max Q Clear Time (g_c+I1), s	7.3	33.8	4.0	18.9	8.9	17.0	10.9	7.0
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.0	12.8	0.0	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	37.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	792	867	71	27	405	111	79	414	42	91	227	403
Future Volume (vph)	792	867	71	27	405	111	79	414	42	91	227	403
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (prot)	1676	3309		1676	3245			1733			1740	1474
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.99	1.00
Satd. Flow (perm)	1676	3309		1676	3245			1733			1740	1474
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	834	913	75	28	426	117	83	436	44	96	239	424
RTOR Reduction (vph)	0	4	0	0	17	0	0	2	0	0	0	357
Lane Group Flow (vph)	834	984	0	28	526	0	0	561	0	0	335	67
Confl. Peds. (#/hr)			1	1			3					3
Confl. Bikes (#/hr)			1									
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases												3
Actuated Green, G (s)	50.0	70.2		4.8	25.0			33.0			24.0	24.0
Effective Green, g (s)	50.0	70.2		4.8	25.0			33.0			24.0	24.0
Actuated g/C Ratio	0.33	0.46		0.03	0.16			0.22			0.16	0.16
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0			2.0			2.0	2.0
Lane Grp Cap (vph)	551	1528		52	533			376			274	232
v/s Ratio Prot	c0.50	0.30		0.02	c0.16			c0.32			c0.19	
v/s Ratio Perm												0.05
v/c Ratio	1.51	0.64		0.54	0.99			1.49			1.22	0.29
Uniform Delay, d1	51.0	31.3		72.5	63.3			59.5			64.0	56.5
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	240.4	1.1		5.3	35.5			234.7			128.3	0.3
Delay (s)	291.4	32.4		77.8	98.8			294.2			192.3	56.7
Level of Service	F	C		E	F			F			F	E
Approach Delay (s)		150.9			97.8			294.2			116.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	157.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	152.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	127.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	379.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	557	1250	74	31	638
Future Vol, veh/h	48	557	1250	74	31	638
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	599	1344	80	33	686

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2137	1384	0	0	1424	0
Stage 1	1384	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	54	~ 176	-	-	478	-
Stage 1	232	-	-	-	-	-
Stage 2	465	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 48	~ 176	-	-	478	-
Mov Cap-2 Maneuver	~ 48	-	-	-	-	-
Stage 1	232	-	-	-	-	-
Stage 2	413	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 1630.1	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	145	478	-
HCM Lane V/C Ratio	-	-	4.486	0.07	-
HCM Control Delay (s)	-	-	$ 1630.1	13.1	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	66.8	0.2	-

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1751	205	123	964	224	153
Future Volume (veh/h)	1751	205	123	964	224	153
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.99	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	1843	216	129	1015	236	161
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1956	868	242	2570	261	233
Arrive On Green	0.58	0.58	0.14	0.77	0.16	0.16
Sat Flow, veh/h	3441	1487	1681	3441	1681	1500
Grp Volume(v), veh/h	1843	216	129	1015	236	161
Grp Sat Flow(s),veh/h/ln	1676	1487	1681	1676	1681	1500
Q Serve(g_s), s	71.2	9.9	10.0	14.2	19.3	14.2
Cycle Q Clear(g_c), s	71.2	9.9	10.0	14.2	19.3	14.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1956	868	242	2570	261	233
V/C Ratio(X)	0.94	0.25	0.53	0.39	0.91	0.69
Avail Cap(c_a), veh/h	1976	876	242	2570	330	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	14.2	55.6	5.5	58.1	56.0
Incr Delay (d2), s/veh	10.6	0.7	1.2	0.1	21.1	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.7	4.2	4.7	6.5	10.5	6.1
LnGrp Delay(d),s/veh	37.6	14.9	56.8	5.6	79.2	58.8
LnGrp LOS	D	B	E	A	E	E
Approach Vol, veh/h	2059			1144	397	
Approach Delay, s/veh	35.2			11.4	70.9	
Approach LOS	D			B	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	25.6	87.2		27.2		112.8		
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5		
Max Green Setting (Gmax), s	15.0	* 83		27.5		101.5		
Max Q Clear Time (g_c+I1), s	12.0	73.2		21.3		16.2		
Green Ext Time (p_c), s	2.1	8.5		0.4		13.7		

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	1775	6	9	973	164	13	3	8	617	1	92
Future Volume (vph)	128	1775	6	9	973	164	13	3	8	617	1	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	1676	4815		1676	4701			1641			1681	1473
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (perm)	1676	4815		1676	4701			1641			1681	1473
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	1811	6	9	993	167	13	3	8	630	1	94
RTOR Reduction (vph)	0	0	0	0	12	0	0	8	0	0	0	75
Lane Group Flow (vph)	131	1817	0	9	1148	0	0	16	0	0	631	19
Confl. Peds. (#/hr)	3					3	4					4
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	15.3	85.8		1.4	71.9			4.3			28.5	28.5
Effective Green, g (s)	15.3	85.8		1.4	71.9			4.3			28.5	28.5
Actuated g/C Ratio	0.11	0.61		0.01	0.51			0.03			0.20	0.20
Clearance Time (s)	4.0	5.5		4.0	5.5			5.0			5.5	5.5
Vehicle Extension (s)	2.0	3.0		2.0	3.0			2.0			2.0	2.0
Lane Grp Cap (vph)	183	2950		16	2414			50			342	299
v/s Ratio Prot	c0.08	c0.38		0.01	0.24			c0.01			c0.38	
v/s Ratio Perm												0.01
v/c Ratio	0.72	0.62		0.56	0.48			0.32			1.85	0.06
Uniform Delay, d1	60.2	16.9		69.0	21.9			66.4			55.8	45.0
Progression Factor	1.40	0.38		1.01	0.87			1.00			1.00	1.00
Incremental Delay, d2	5.7	0.5		16.8	0.1			1.4			391.4	0.0
Delay (s)	90.2	6.9		86.7	19.2			67.8			447.2	45.0
Level of Service	F	A		F	B			E			F	D
Approach Delay (s)		12.5			19.8			67.8			395.0	
Approach LOS		B			B			E			F	

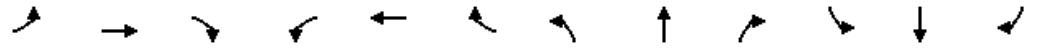
Intersection Summary			
HCM 2000 Control Delay	86.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	1680	224	375	862	83	353	559	561	177	364	97
Future Volume (vph)	171	1680	224	375	862	83	353	559	561	177	364	97
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4719		3252	4741		1526	3197	1489	1676	3232	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4719		3252	4741		1526	3197	1489	1676	3232	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	1787	238	399	917	88	376	595	597	188	387	103
RTOR Reduction (vph)	0	12	0	0	8	0	0	0	91	0	18	0
Lane Group Flow (vph)	182	2013	0	399	997	0	316	655	506	188	472	0
Confl. Peds. (#/hr)	9		7	7		9	7		1	1		7
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	18.2	42.1		22.9	46.8		30.0	30.0	52.9	25.0	25.0	
Effective Green, g (s)	18.2	42.1		22.9	46.8		30.0	30.0	52.9	25.0	25.0	
Actuated g/C Ratio	0.13	0.30		0.16	0.33		0.21	0.21	0.38	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	217	1419		531	1584		327	685	562	299	577	
v/s Ratio Prot	0.11	c0.43		0.12	c0.21		c0.21	0.20	c0.15	0.11	c0.15	
v/s Ratio Perm									0.19			
v/c Ratio	0.84	1.42		0.75	0.63		0.97	0.96	0.90	0.63	0.82	
Uniform Delay, d1	59.5	49.0		55.8	39.3		54.5	54.4	41.1	53.2	55.3	
Progression Factor	1.04	1.01		1.28	1.32		1.03	1.03	1.41	1.00	1.00	
Incremental Delay, d2	10.7	190.1		3.9	0.7		8.5	3.9	2.0	3.0	8.4	
Delay (s)	72.7	239.8		75.4	52.4		64.6	60.1	60.0	56.2	63.7	
Level of Service	E	F		E	D		E	E	E	E	E	
Approach Delay (s)		226.0			58.9			61.0			61.6	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	122.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	104.9%	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)	421	2072	4	67	1092	121	35	17	24	223	7	212
Future Volume (vph)	421	2072	4	67	1092	121	35	17	24	223	7	212
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	1676	4816		1676	4718		1676	1596		1593	1601	1436
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	1676	4816		1676	4718		1676	1596		1593	1601	1436
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)	439	2158	4	70	1138	126	36	18	25	232	7	221
RTOR Reduction (vph)	0	0	0	0	8	0	0	24	0	0	0	188
Lane Group Flow (vph)	439	2162	0	70	1256	0	36	19	0	118	121	33
Confl. Peds. (#/hr)	17		11	11		17	21					21
Confl. Bikes (#/hr)			3			1			1			
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	40.3	82.7		8.5	51.4		7.8	7.8		21.0	21.0	21.0
Effective Green, g (s)	40.3	82.7		8.5	51.4		7.8	7.8		21.0	21.0	21.0
Actuated g/C Ratio	0.29	0.59		0.06	0.37		0.06	0.06		0.15	0.15	0.15
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0	5.0		5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	482	2844		101	1732		93	88		238	240	215
v/s Ratio Prot	c0.26	c0.45		0.04	0.27		c0.02	0.01		0.07	c0.08	
v/s Ratio Perm												0.02
v/c Ratio	0.91	0.76		0.69	0.73		0.39	0.22		0.50	0.50	0.15
Uniform Delay, d1	48.1	21.3		64.5	38.2		63.8	63.2		54.6	54.7	51.8
Progression Factor	0.68	1.15		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	0.2		15.3	1.6		1.0	0.5		0.6	0.6	0.1
Delay (s)	35.3	24.7		79.8	39.9		64.8	63.7		55.2	55.3	51.9
Level of Service	D	C		E	D		E	E		E	E	D
Approach Delay (s)		26.5			41.9			64.2			53.7	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.6%	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)	333	693	145	246	295	99	269	1627	820	104	658	170
Future Volume (veh/h)	333	693	145	246	295	99	269	1627	820	104	658	170
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	370	770	161	273	328	110	299	1808	911	116	731	189
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	811	356	316	590	194	168	1497	656	138	1438	639
Arrive On Green	0.10	0.24	0.24	0.10	0.24	0.24	0.10	0.45	0.45	0.08	0.43	0.43
Sat Flow, veh/h	3261	3353	1472	3261	2468	812	1681	3353	1469	1681	3353	1491
Grp Volume(v), veh/h	370	770	161	273	221	217	299	1808	911	116	731	189
Grp Sat Flow(s),veh/h/ln	1630	1676	1472	1630	1676	1604	1681	1676	1469	1681	1676	1491
Q Serve(g_s), s	14.0	31.6	13.0	11.6	16.2	16.7	14.0	62.5	62.5	9.5	22.3	11.6
Cycle Q Clear(g_c), s	14.0	31.6	13.0	11.6	16.2	16.7	14.0	62.5	62.5	9.5	22.3	11.6
Prop In Lane	1.00		1.00	1.00		0.51	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	811	356	316	401	383	168	1497	656	138	1438	639
V/C Ratio(X)	1.13	0.95	0.45	0.86	0.55	0.57	1.78	1.21	1.39	0.84	0.51	0.30
Avail Cap(c_a), veh/h	326	814	357	326	407	390	168	1497	656	408	1438	639
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	52.2	45.2	62.3	46.7	46.9	63.0	38.7	38.7	63.3	29.2	26.1
Incr Delay (d2), s/veh	91.5	19.9	0.3	19.2	0.9	1.1	373.5	99.9	184.4	5.1	0.4	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	10.4	16.9	5.3	6.0	7.6	7.5	23.9	49.7	58.8	4.6	10.4	4.8
LnGrp Delay(d),s/veh	154.5	72.1	45.5	81.5	47.6	48.0	436.5	138.7	223.1	68.4	29.6	26.5
LnGrp LOS	F	E	D	F	D	D	F	F	F	E	C	C
Approach Vol, veh/h		1301			711			3018			1036	
Approach Delay, s/veh		92.3			60.7			193.7			33.4	
Approach LOS		F			E			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.5	68.0	18.0	38.5	18.0	65.5	17.6	38.9
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	34.0	39.5	14.0	34.0	14.0	59.5	14.0	34.0
Max Q Clear Time (g_c+I1), s	11.5	64.5	16.0	18.7	16.0	24.3	13.6	33.6
Green Ext Time (p_c), s	0.1	0.0	0.0	5.1	0.0	17.5	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	129.0
HCM 2010 LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1606	232	94	962	108	83
Future Volume (veh/h)	1606	232	94	962	108	83
Number	2	12	1	6	3	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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	1746	252	102	1046	117	90
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2499	1118	189	2499	161	144
Arrive On Green	0.75	0.75	0.75	0.75	0.10	0.10
Sat Flow, veh/h	3441	1500	215	3441	1681	1500
Grp Volume(v), veh/h	1746	252	102	1046	117	90
Grp Sat Flow(s),veh/h/ln	1676	1500	215	1676	1681	1500
Q Serve(g_s), s	22.6	4.2	38.4	9.4	5.5	4.7
Cycle Q Clear(g_c), s	22.6	4.2	61.0	9.4	5.5	4.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2499	1118	189	2499	161	144
V/C Ratio(X)	0.70	0.23	0.54	0.42	0.73	0.63
Avail Cap(c_a), veh/h	2499	1118	189	2499	329	293
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.5	3.2	22.0	3.9	36.0	35.6
Incr Delay (d2), s/veh	0.9	0.1	3.1	0.1	6.1	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	1.7	2.4	4.3	2.8	2.1
LnGrp Delay(d),s/veh	6.4	3.3	25.1	4.0	42.1	40.0
LnGrp LOS	A	A	C	A	D	D
Approach Vol, veh/h	1998			1148	207	
Approach Delay, s/veh	6.0			5.8	41.2	
Approach LOS	A			A	D	

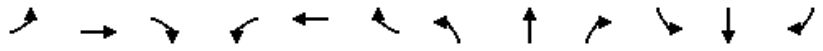
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		68.0				68.0		13.8
Change Period (Y+Rc), s		7.0				7.0		6.0
Max Green Setting (Gmax), s		61.0				61.0		16.0
Max Q Clear Time (g_c+I1), s		24.6				63.0		7.5
Green Ext Time (p_c), s		32.0				0.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	253	144	237	1012	629	350
Future Volume (veh/h)	253	144	237	1012	629	350
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	275	157	258	1100	684	380
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	321	287	368	1234	1234	1049
Arrive On Green	0.19	0.19	0.70	0.70	0.70	0.70
Sat Flow, veh/h	1681	1500	528	1765	1765	1500
Grp Volume(v), veh/h	275	157	258	1100	684	380
Grp Sat Flow(s),veh/h/ln	1681	1500	528	1765	1765	1500
Q Serve(g_s), s	11.5	6.9	34.2	36.3	13.9	7.4
Cycle Q Clear(g_c), s	11.5	6.9	48.1	36.3	13.9	7.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	321	287	368	1234	1234	1049
V/C Ratio(X)	0.86	0.55	0.70	0.89	0.55	0.36
Avail Cap(c_a), veh/h	369	329	368	1235	1235	1050
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	26.6	17.2	8.8	5.4	4.4
Incr Delay (d2), s/veh	16.1	1.6	5.9	8.5	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	3.0	5.5	20.0	6.8	3.1
LnGrp Delay(d),s/veh	44.6	28.3	23.1	17.2	5.9	4.6
LnGrp LOS	D	C	C	B	A	A
Approach Vol, veh/h	432			1358	1064	
Approach Delay, s/veh	38.7			18.3	5.5	
Approach LOS	D			B	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		55.0		17.9		55.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		51.0		16.0		51.0		
Max Q Clear Time (g_c+I1), s		50.1		13.5		15.9		
Green Ext Time (p_c), s		0.9		0.4		26.5		

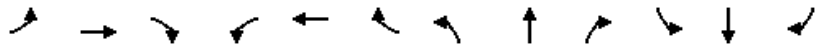
Intersection Summary	
HCM 2010 Ctrl Delay	16.6
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	502	131	412	1280	713	289	1794	236	449	982	414
Future Volume (veh/h)	395	502	131	412	1280	713	289	1794	236	449	982	414
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	429	546	142	448	1391	775	314	1950	257	488	1067	450
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	419	695	298	419	695	297	335	1337	174	372	1103	465
Arrive On Green	0.13	0.21	0.21	0.13	0.21	0.21	0.20	0.31	0.31	0.22	0.33	0.33
Sat Flow, veh/h	3261	3353	1436	3261	3353	1433	1681	4302	560	1681	3315	1398
Grp Volume(v), veh/h	429	546	142	448	1391	775	314	1449	758	488	1034	483
Grp Sat Flow(s),veh/h/ln	1630	1676	1436	1630	1676	1433	1681	1606	1650	1681	1606	1502
Q Serve(g_s), s	18.0	21.6	12.2	18.0	29.0	29.0	25.8	43.5	43.5	31.0	44.3	44.3
Cycle Q Clear(g_c), s	18.0	21.6	12.2	18.0	29.0	29.0	25.8	43.5	43.5	31.0	44.3	44.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.34	1.00		0.93
Lane Grp Cap(c), veh/h	419	695	298	419	695	297	335	998	513	372	1069	500
V/C Ratio(X)	1.02	0.79	0.48	1.07	2.00	2.61	0.94	1.45	1.48	1.31	0.97	0.97
Avail Cap(c_a), veh/h	419	695	298	419	695	297	372	998	513	372	1069	500
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.0	52.6	48.8	61.0	55.5	55.5	55.2	48.3	48.3	54.5	46.0	46.0
Incr Delay (d2), s/veh	50.0	5.5	0.4	63.5	456.4	734.3	28.4	209.2	225.2	158.1	20.7	33.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	10.5	4.9	11.8	57.4	72.0	14.6	48.3	51.9	30.7	22.7	23.0
LnGrp Delay(d),s/veh	111.0	58.0	49.3	124.5	511.9	789.8	83.6	257.4	273.5	212.6	66.7	78.9
LnGrp LOS	F	E	D	F	F	F	F	F	F	F	E	E
Approach Vol, veh/h		1117			2614			2521			2005	
Approach Delay, s/veh		77.3			527.9			240.6			105.1	
Approach LOS		E			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.9	52.1	22.0	34.0	35.0	49.0	22.0	34.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	31.0	43.5	18.0	29.0	31.0	43.5	18.0	29.0
Max Q Clear Time (g_c+I1), s	27.8	46.3	20.0	23.6	33.0	45.5	20.0	31.0
Green Ext Time (p_c), s	0.2	0.0	0.0	4.4	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	276.6
HCM 2010 LOS	F



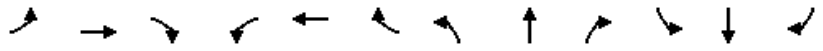
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	457	1681	140	85	1243	374	257	103	136	436	59	532
Future Volume (veh/h)	457	1681	140	85	1243	374	257	103	136	436	59	532
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	476	1751	0	89	1295	0	268	107	0	454	61	554
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	1	2
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	530	2455	764	226	2005	624	319	464	207	503	344	935
Arrive On Green	0.16	0.51	0.00	0.07	0.42	0.00	0.10	0.14	0.00	0.15	0.19	0.19
Sat Flow, veh/h	3261	4818	1500	3261	4818	1500	3261	3353	1500	3261	1765	2595
Grp Volume(v), veh/h	476	1751	0	89	1295	0	268	107	0	454	61	554
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	1630	1606	1500	1630	1676	1500	1630	1765	1298
Q Serve(g_s), s	20.0	39.2	0.0	3.7	30.1	0.0	11.3	4.0	0.0	19.2	4.0	24.4
Cycle Q Clear(g_c), s	20.0	39.2	0.0	3.7	30.1	0.0	11.3	4.0	0.0	19.2	4.0	24.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	530	2455	764	226	2005	624	319	464	207	503	344	935
V/C Ratio(X)	0.90	0.71	0.00	0.39	0.65	0.00	0.84	0.23	0.00	0.90	0.18	0.59
Avail Cap(c_a), veh/h	745	2455	764	303	2005	624	606	730	327	606	378	985
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.49	0.49	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.5	26.5	0.0	62.4	32.6	0.0	62.1	53.7	0.0	58.1	47.0	36.7
Incr Delay (d2), s/veh	8.4	1.8	0.0	0.2	0.3	0.0	2.3	0.1	0.0	13.6	0.1	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	9.7	17.8	0.0	1.7	13.4	0.0	5.2	1.8	0.0	9.6	2.0	8.8
LnGrp Delay(d),s/veh	65.9	28.3	0.0	62.6	32.9	0.0	64.4	53.8	0.0	71.7	47.1	37.3
LnGrp LOS	E	C		E	C		E	D		E	D	D
Approach Vol, veh/h		2227			1384			375			1069	
Approach Delay, s/veh		36.3			34.8			61.3			52.5	
Approach LOS		D			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	76.3	17.7	32.3	26.8	63.3	25.6	24.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	* 5
Max Green Setting (Gmax), s	13.0	53.0	26.0	30.0	32.0	34.0	26.0	* 31
Max Q Clear Time (g_c+I1), s	5.7	41.2	13.3	26.4	22.0	32.1	21.2	6.0
Green Ext Time (p_c), s	0.1	9.9	0.4	0.9	0.7	1.8	0.5	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.2
HCM 2010 LOS	D

Notes

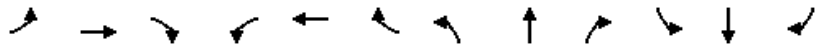
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	1845	705	0	783	257	478	658	320	131	468	162
Future Volume (veh/h)	297	1845	705	0	783	257	478	658	320	131	468	162
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	0	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	323	2005	0	0	851	0	520	715	348	142	509	176
Adj No. of Lanes	2	3	1	0	3	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	367	2148	669	0	1425	0	575	729	354	168	862	379
Arrive On Green	0.11	0.45	0.00	0.00	0.30	0.00	0.18	0.33	0.33	0.10	0.26	0.26
Sat Flow, veh/h	3261	4818	1500	0	5135	0	3261	2187	1063	1681	3353	1476
Grp Volume(v), veh/h	323	2005	0	0	851	0	520	548	515	142	509	176
Grp Sat Flow(s),veh/h/ln	1630	1606	1500	0	1606	0	1630	1676	1574	1681	1676	1476
Q Serve(g_s), s	11.7	47.4	0.0	0.0	18.1	0.0	18.8	38.9	38.9	10.0	16.0	12.1
Cycle Q Clear(g_c), s	11.7	47.4	0.0	0.0	18.1	0.0	18.8	38.9	38.9	10.0	16.0	12.1
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.68	1.00		1.00
Lane Grp Cap(c), veh/h	367	2148	669	0	1425	0	575	559	525	168	862	379
V/C Ratio(X)	0.88	0.93	0.00	0.00	0.60	0.00	0.90	0.98	0.98	0.85	0.59	0.46
Avail Cap(c_a), veh/h	367	2148	669	0	1425	0	611	559	525	217	922	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.64	0.64	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	31.6	0.0	0.0	36.1	0.0	48.4	39.6	39.6	53.1	39.0	37.6
Incr Delay (d2), s/veh	14.8	5.7	0.0	0.0	1.9	0.0	16.5	33.1	34.5	21.8	1.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	22.1	0.0	0.0	8.3	0.0	9.8	23.1	21.9	5.6	7.5	5.1
LnGrp Delay(d),s/veh	67.3	37.3	0.0	0.0	38.0	0.0	64.9	72.7	74.2	74.9	40.2	38.9
LnGrp LOS	E	D			D		E	E	E	E	D	D
Approach Vol, veh/h		2328			851			1583			827	
Approach Delay, s/veh		41.5			38.0			70.6			45.9	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	18.0	40.5	25.7	35.8		58.5	16.5	45.0
Change Period (Y+Rc), s	4.5	5.0	4.5	5.0		5.0	4.5	5.0
Max Green Setting (Gmax), s	13.5	32.0	22.5	33.0		50.0	15.5	40.0
Max Q Clear Time (g_c+I1), s	13.7	20.1	20.8	18.0		49.4	12.0	40.9
Green Ext Time (p_c), s	0.0	11.5	0.4	11.4		0.6	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.8
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	731	176	116	354	353	138	1353	241	234	1143	35
Future Volume (veh/h)	262	731	176	116	354	353	138	1353	241	234	1143	35
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		0.98	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	276	769	185	122	373	372	145	1424	254	246	1203	37
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	839	202	140	1057	462	170	1182	210	273	1174	514
Arrive On Green	0.08	0.32	0.32	0.08	0.32	0.32	0.10	0.29	0.29	0.16	0.35	0.35
Sat Flow, veh/h	1681	2660	640	1681	3353	1467	1681	4087	728	1681	3353	1469
Grp Volume(v), veh/h	276	485	469	122	373	372	145	1119	559	246	1203	37
Grp Sat Flow(s),veh/h/ln	1681	1676	1624	1681	1676	1467	1681	1606	1603	1681	1676	1469
Q Serve(g_s), s	10.0	33.4	33.4	8.6	10.3	27.9	10.2	34.7	34.7	17.2	42.0	2.0
Cycle Q Clear(g_c), s	10.0	33.4	33.4	8.6	10.3	27.9	10.2	34.7	34.7	17.2	42.0	2.0
Prop In Lane	1.00		0.39	1.00		1.00	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	140	528	512	140	1057	462	170	929	463	273	1174	514
V/C Ratio(X)	1.97	0.92	0.92	0.87	0.35	0.80	0.85	1.20	1.21	0.90	1.03	0.07
Avail Cap(c_a), veh/h	140	528	512	140	1057	462	252	929	463	392	1174	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	39.6	39.6	54.4	31.7	37.7	53.0	42.7	42.7	49.3	39.0	26.0
Incr Delay (d2), s/veh	461.5	23.2	23.8	37.9	0.2	9.5	11.2	102.3	112.0	14.4	32.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.6	18.9	18.4	5.5	4.8	12.5	5.2	28.5	29.7	9.1	24.7	0.8
LnGrp Delay(d),s/veh	516.5	62.8	63.3	92.3	31.8	47.2	64.3	145.0	154.7	63.7	71.8	26.0
LnGrp LOS	F	E	E	F	C	D	E	F	F	E	F	C
Approach Vol, veh/h		1230			867			1823			1486	
Approach Delay, s/veh		164.8			46.9			141.5			69.4	
Approach LOS		F			D			F			E	

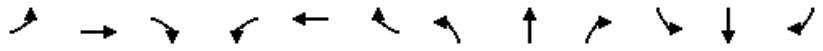
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	42.8	16.2	47.0	14.0	42.8	23.5	39.7
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	32.0	18.0	42.0	10.0	32.0	28.0	32.0
Max Q Clear Time (g_c+I1), s	12.0	35.4	12.2	44.0	12.0	29.9	19.2	36.7
Green Ext Time (p_c), s	0.0	0.0	0.1	0.0	0.0	1.7	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	111.8
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	211	0	0	481	118	396	1257	15	0	0	0
Future Volume (vph)	10	211	0	0	481	118	396	1257	15	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.97		1.00	1.00				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1676	1765			3241		1442	4536				
Flt Permitted	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	1676	1765			3241		1442	4536				
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)	11	229	0	0	523	128	430	1366	16	0	0	0
RTOR Reduction (vph)	0	0	0	0	26	0	0	1	0	0	0	0
Lane Group Flow (vph)	11	229	0	0	625	0	387	1424	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			23	23		
Confl. Bikes (#/hr)			3			1			1			
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.3	27.5			22.2		52.0	52.0				
Effective Green, g (s)	1.3	27.5			22.2		52.0	52.0				
Actuated g/C Ratio	0.01	0.31			0.25		0.58	0.58				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	24	539			799		833	2620				
v/s Ratio Prot	0.01	c0.13			c0.19		0.27	c0.31				
v/s Ratio Perm												
v/c Ratio	0.46	0.42			0.78		0.46	0.54				
Uniform Delay, d1	44.0	24.9			31.6		11.0	11.7				
Progression Factor	1.00	1.00			1.64		1.00	1.00				
Incremental Delay, d2	5.0	0.2			4.1		1.9	0.8				
Delay (s)	49.0	25.1			55.9		12.8	12.5				
Level of Service	D	C			E		B	B				
Approach Delay (s)		26.2			55.9			12.6			0.0	
Approach LOS		C			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	52.7%	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)	314	231	132	197	169	85	169	2028	411	137	799	185
Future Volume (veh/h)	314	231	132	197	169	85	169	2028	411	137	799	185
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	324	238	136	203	174	88	174	2091	424	141	824	191
Adj No. of Lanes	1	2	0	1	2	1	1	3	0	1	3	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	940	518	123	1333	594	196	1006	197	163	898	207
Arrive On Green	0.13	0.45	0.45	0.07	0.40	0.40	0.12	0.25	0.25	0.10	0.23	0.23
Sat Flow, veh/h	1681	2085	1149	1681	3353	1494	1681	4041	792	1681	3912	900
Grp Volume(v), veh/h	324	190	184	203	174	88	174	1647	868	141	675	340
Grp Sat Flow(s),veh/h/ln	1681	1676	1557	1681	1676	1494	1681	1606	1621	1681	1606	1600
Q Serve(g_s), s	19.0	10.5	11.1	11.0	4.9	5.7	15.3	37.4	37.4	12.4	30.8	31.1
Cycle Q Clear(g_c), s	19.0	10.5	11.1	11.0	4.9	5.7	15.3	37.4	37.4	12.4	30.8	31.1
Prop In Lane	1.00		0.74	1.00		1.00	1.00		0.49	1.00		0.56
Lane Grp Cap(c), veh/h	213	756	702	123	1333	594	196	800	404	163	737	367
V/C Ratio(X)	1.52	0.25	0.26	1.65	0.13	0.15	0.89	2.06	2.15	0.87	0.92	0.92
Avail Cap(c_a), veh/h	213	756	702	123	1333	594	314	800	404	403	824	411
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.09	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.5	25.5	25.7	69.5	28.7	28.9	65.3	56.3	56.3	66.8	56.4	56.5
Incr Delay (d2), s/veh	257.4	0.8	0.9	324.5	0.1	0.2	1.2	476.8	518.6	5.3	13.2	23.9
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	24.0	5.0	4.9	16.2	2.3	2.4	7.2	69.5	74.8	6.0	15.0	16.2
LnGrp Delay(d),s/veh	322.9	26.3	26.6	394.0	28.8	29.1	66.5	533.2	574.9	72.1	69.6	80.4
LnGrp LOS	F	C	C	F	C	C	E	F	F	E	E	F
Approach Vol, veh/h		698			465			2689			1156	
Approach Delay, s/veh		164.0			188.3			516.4			73.1	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	73.6	21.5	39.9	23.0	65.6	18.5	42.9
Change Period (Y+Rc), s	4.0	6.0	4.0	5.5	4.0	6.0	4.0	5.5
Max Green Setting (Gmax), s	11.0	53.0	28.0	38.5	19.0	45.0	36.0	30.5
Max Q Clear Time (g_c+I1), s	13.0	13.1	17.3	33.1	21.0	7.7	14.4	39.4
Green Ext Time (p_c), s	0.0	5.9	0.2	1.3	0.0	5.9	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	334.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	505	776	70	421	562	220	192	1733	867	369	462	209
Future Volume (vph)	505	776	70	421	562	220	192	1733	867	369	462	209
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.5	6.5	5.0	6.5		5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3252	4818	1459	3252	4590		3252	4818	1471	3252	4818	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3252	4818	1459	3252	4590		3252	4818	1471	3252	4818	1468
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	537	826	74	448	598	234	204	1844	922	393	491	222
RTOR Reduction (vph)	0	0	57	0	48	0	0	0	341	0	0	144
Lane Group Flow (vph)	537	826	17	448	784	0	204	1844	581	393	491	78
Confl. Peds. (#/hr)	5		10	10		5	6		4	4		6
Confl. Bikes (#/hr)			2						2			
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8						6			2
Actuated Green, G (s)	28.3	34.7	34.7	25.5	31.9		13.8	46.0	46.0	20.3	52.5	52.5
Effective Green, g (s)	28.3	34.7	34.7	25.5	31.9		13.8	46.0	46.0	20.3	52.5	52.5
Actuated g/C Ratio	0.19	0.23	0.23	0.17	0.21		0.09	0.31	0.31	0.14	0.35	0.35
Clearance Time (s)	5.0	6.5	6.5	5.0	6.5		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	613	1114	337	552	976		299	1477	451	440	1686	513
v/s Ratio Prot	c0.17	c0.17		0.14	c0.17		0.06	0.38		c0.12	0.10	
v/s Ratio Perm			0.01						c0.39			0.05
v/c Ratio	0.88	0.74	0.05	0.81	0.80		0.68	1.25	1.29	0.89	0.29	0.15
Uniform Delay, d1	59.1	53.5	44.8	59.9	56.1		66.0	52.0	52.0	63.8	35.3	33.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.51	0.79	1.87
Incremental Delay, d2	12.9	2.9	0.1	8.4	5.1		5.0	117.6	145.5	9.2	0.2	0.3
Delay (s)	72.1	56.4	44.9	68.3	61.2		71.0	169.6	197.5	105.3	28.1	62.7
Level of Service	E	E	D	E	E		E	F	F	F	C	E
Approach Delay (s)		61.6			63.7			171.5			62.5	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	110.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	23.5
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Long-term + Project	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	1766	272	9600	2000	0.16	0.14	69.3	-	6.4	-	A

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1494	7200	0.16	71.7	6.6	A

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	2170	676	9600	2000	0.12	0.34	69.6	-	7.8	-	A

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2344	2352	1.34	13.1	45.0	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2204	7200	0.38	66.5	9.7	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2751	4249	0.67	57.1	12.4	B

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	2023	1731	9600	2000	0.26	0.87	57.4	55.9	8.8	13.0	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	47.4	11.5	11.5	3.2	F

Facility Overall Results

Space Mean Speed, mi/h	47.4	Density, veh/mi/ln	11.5
Average Travel Time, min	3.2	Density, pc/mi/ln	11.5

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Long-term + Project	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	6032	6300	1.07	40.8	49.3	F

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	6265	6761	0.93	59.0	26.5	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5358	8400	0.77	21.5	62.4	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5656	7010	1.00	21.2	66.7	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3752	6300	0.86	13.6	92.1	F

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3700	207	6300	2000	0.90	0.10	12.3	62.4	100.1	27.5	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4445	1025	4774	2000	1.40	0.51	66.1	63.7	22.4	24.1	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	24.4	60.4	60.0	5.5	F

Facility Overall Results

Space Mean Speed, mi/h	24.4	Density, veh/mi/ln	60.0
Average Travel Time, min	5.5	Density, pc/mi/ln	60.4

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak Hour
Analysis Year	Cumulative + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	4
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	4
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	4
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	4
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	5841	201	8400	2000	0.95	0.10	16.4	60.5	89.2	28.1	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5444	598	8400	2000	0.89	0.30	15.8	-	86.1	-	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4729	6300	1.09	23.2	67.9	F

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5726	1404	8400	2000	0.82	0.70	16.8	-	85.1	-	F

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5668	532	6300	2000	1.30	0.27	34.0	59.5	55.6	44.4	F

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5034	6300	1.22	24.1	69.6	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5864	832	6300	2000	1.22	0.42	43.4	-	45.0	-	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5749	8400	1.01	20.8	69.2	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4878	6279	1.51	21.7	74.8	F

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5866	1694	6300	2000	1.51	0.85	61.2	-	32.0	-	F

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7451	1585	8400	2000	1.32	0.79	64.6	-	28.8	-	F

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	7451	1790	10500	2000	1.20	0.90	63.8	55.7	23.4	28.1	F

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5661	4179	10500	4000	1.04	1.04	46.7	-	45.0	-	F

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1482	9600	0.72	69.8	4.9	A

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1631	149	9600	2000	0.74	0.07	70.5	66.2	5.8	6.9	A

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1610	1610	1.49	8.9	45.0	F

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2020	9600	0.78	67.1	6.7	A

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	1119	1119	2.44	6.2	45.0	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	24.2	45.8	45.6	17.8	F

Facility Overall Results

Space Mean Speed, mi/h	24.2	Density, veh/mi/ln	45.6
Average Travel Time, min	17.8	Density, pc/mi/ln	45.8

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	AM Peak
Analysis Year	Long-term + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	4
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	4
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	4
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	4
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	4
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	5
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	5
8	Basic	Basic	Lane Drop to Port Chicago On	1680	5
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	5
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	3429	582	8400	2000	0.41	0.29	68.4	59.4	12.5	12.7	B
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2710		8400		0.32		71.3		9.5		A
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2999		7665		0.39		63.5		11.8		B
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2288	542	9600	2000	0.24	0.27	67.7	59.5	8.4	8.3	A
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1772		9600		0.18		70.5		6.3		A
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3000		5986		0.50		55.7		10.8		B
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2941		12000		0.25		70.5		8.3		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2941		12000		0.25		70.5		8.3		A
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3391		9350		0.36		65.6		10.3		B
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2915		7176		0.41		69.2		14.0		B
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3575		5128		0.70		61.5		14.5		B
Segment 12: Basic															

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2442		7200		0.34		70.5		11.5		B

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2741	299	7200	2000	0.38	0.15	68.4	65.8	13.4	14.2	B

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3162	435	7200	2000	0.38	0.22	75.4	-	12.1	-	B

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3141	415	9600	2000	0.33	0.21	69.2	59.9	11.3	10.8	B

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2746	303	9600	2000	0.29	0.15	75.4	-	9.1	-	A

Segment 17: Basic

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2458		7200		0.34		71.3		11.5		B

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3397	939	7200	2000	0.34	0.47	75.4	-	10.9	-	A

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3352	0	9600	2000	0.35	0.00	71.7	61.1	11.7	9.6	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.4	11.2	11.2	6.8	B

Facility Overall Results

Space Mean Speed, mi/h	67.4	Density, veh/mi/ln	11.2

Average Travel Time, min	6.8	Density, pc/mi/ln	11.2

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term + Project	Date	6/11/2019
Project Description	Pittsburg Faria - Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Basic	I-680 to Clayton Rd off	1500	4
2	Basic	Basic	Clayton Rd off to Concord Ave Loop On	4880	3
3	Merge	Basic	Concord Ave Loop On to Concord Ave Diag On	920	4
4	Weaving	Weaving	Concord Ave Diag On to Grant St Off	1030	4
5	Basic	Basic	Grant St Off to Grant St On	1960	3
6	Weaving	Weaving	Grant St On to Oliviera Rd Off	1420	4
7	Diverge	Diverge	Oliviera Rd Off to SR-4 Off	1500	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	6571	1072	8400	2000	0.70	0.54	66.8	-	24.6	-	C

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4531	6300	0.73	27.4	55.1	F

Segment 3: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4579	351	8400	2000	0.54	0.18	12.6	-	91.1	-	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	5031	7070	0.83	15.0	84.0	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4224	6300	0.85	16.7	84.4	F

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4132	7504	0.76	10.0	102.9	F

Segment 7: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	0.94	1.000	1.000	3754	899	4032	2000	1.31	0.45	66.8	58.4	14.1	15.5	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	21.7	60.9	60.8	6.9	F

Facility Overall Results

Space Mean Speed, mi/h	21.7	Density, veh/mi/ln	60.8
Average Travel Time, min	6.9	Density, pc/mi/ln	60.9

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term + Project	Date	6/14/2019
Project Description	Faria Freeway Analysis		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Begin to Olivera Rd On	2250	3
2	Weaving	Weaving	Olivera Rd On to Solano Way Off	1220	4
3	Basic	Basic	Solano Way Off to Solano Way On	1990	4
4	Weaving	Weaving	Solano Way On to Concord Ave Off	1373	4
5	Basic	Basic	Concord Ave Off to Concord Ave On	1927	3
6	Merge	Merge	Concord Ave On to Clayton Rd On	1500	3
7	Merge	Merge	Clayton Rd On to End	1500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.952	4425	6300	0.70	67.1	22.0	C

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4596	7371	0.62	62.3	18.4	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4277	8400	0.51	71.4	15.0	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4700	5834	0.81	54.0	21.8	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3432	6300	0.54	70.8	16.2	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	3600	168	6300	2000	0.57	0.08	67.8	65.3	17.7	17.8	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	1.000	4432	832	6300	2000	0.70	0.42	66.3	63.9	22.3	23.5	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.5	18.8	18.7	2.0	C

Facility Overall Results

Space Mean Speed, mi/h	65.5	Density, veh/mi/ln	18.7
Average Travel Time, min	2.0	Density, pc/mi/ln	18.8

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	18
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	Railroad ave On to Bailey Rd Diag Off	920	4
2	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1010	4
3	Basic	Basic	Bailey Rd Loop Off to Bailey Rd On	1450	3
4	Merge	Basic	Bailey Rd On to Lane Drop	1080	4
5	Diverge	Diverge	Lane Drop to San Marco Blvd Off	1500	3
6	Basic	Basic	San Marco Blvd Off to Willow Pass Rd Loop On	1530	3
7	Merge	Basic	San Marco Loop On to San Marco Diag On	1260	3
8	Weaving	Weaving	San Marco Diag On to Willow Pass Rd Off	6550	4
9	Basic	Basic	Willow Pass Rd Off to Willow Pass Rd On	3340	3
10	Merge	Basic	Willow Pass Rd On to HOV Lane Add	1260	3
11	Merge	Basic	HOV Lane Add to Add Lane	1500	4
12	Diverge	Diverge	Add Lane to Port Chicago Hwy Off	1250	5
13	Diverge	Basic	Port Chicago Hwy Off to SR-242 Off	1020	5
14	Basic	Basic	SR-242 Off to Port Chicago Hwy On	4960	4
15	Merge	Merge	Port Chicago Hwy On to SR-242 On	1250	4
16	Weaving	Weaving	SR-242 On to Arnold Industrial Off	1470	4
17	Basic	Basic	Arnold Industrial On to Arnold Industrial Off	1990	4
18	Weaving	Weaving	Arnold Industrial On to I-680 Off	4440	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.952	0.952	4206	438	8400	2000	0.50	0.22	69.5	59.8	15.1	14.9	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3587	1246	8400	2000	0.43	0.62	75.1	-	11.9	-	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2401	6300	0.38	71.7	11.2	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3166	765	8400	2000	0.29	0.38	75.4	-	8.0	-	A

Segment 5: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3129	465	6300	2000	0.50	0.23	64.9	59.7	16.1	16.2	B

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2686	6300	0.43	70.5	12.7	B

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	3673	987	6300	2000	0.43	0.49	75.1	-	11.9	-	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	4223	8400	0.43	75.0	12.1	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3610	6279	0.57	68.0	17.7	B

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4149	539	6300	2000	0.57	0.27	72.2	-	16.7	-	B

Segment 11: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5069	946	8400	2000	0.49	0.47	74.2	-	13.9	-	B

Segment 12: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	5024	322	10500	2000	0.48	0.16	69.9	60.1	14.4	15.6	B

Segment 13: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4717	2762	10500	4000	0.45	0.69	74.8	-	12.6	-	B

Segment 14: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2088	9600	0.22	70.0	7.5	A

Segment 15: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	2621	533	9600	2000	0.27	0.27	70.0	66.0	9.4	11.1	B

Segment 16: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3127	8298	0.38	63.9	12.2	B

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	2844	9600	0.30	70.9	10.0	A

Segment 18: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	3464	9409	0.37	66.6	13.0	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	71.0	12.1	12.1	6.1	B

Facility Overall Results

Space Mean Speed, mi/h	71.0	Density, veh/mi/ln	12.1
Average Travel Time, min	6.1	Density, pc/mi/ln	12.1

Copyright © 2019 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	Ben Huie	Agency	Kimley-Horn
Jurisdiction	Contra Costa County	Time Period Analyzed	PM Peak Hour
Analysis Year	Long-term + Project	Date	6/14/2019
Project Description	Faria TIA		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	19
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Diverge	Diverge	I-680 to Arnold Industrial Off	4250	4
2	Basic	Basic	Arnold Industrial Off to Arnold Industrial On	1780	4
3	Weaving	Weaving	Arnold Industrial On to SR-242 Off	1870	4
4	Diverge	Diverge	SR-242 Off to Port Chicago Off	930	4
5	Basic	Basic	Port Chicago Off to SR-242 On	2470	4
6	Weaving	Weaving	SR-242 On to HOV Lane Begins	1220	5
7	Basic	Basic	HOV Lane Begins to Lane Drop	1500	5
8	Basic	Basic	Lane Drop to Port Chicago On	1680	5
9	Weaving	Weaving	Port Chicago On to Willow Pass Off	4300	5
10	Basic	Basic	Willow Pass Off to Willow Pass On	3400	3
11	Weaving	Weaving	Willow Pass On to San Marco Blvd Off	6230	4
12	Basic	Basic	San Marco Blvd Off to San Marco Blvd Loop On	1720	3
13	Merge	Merge	San Marco Blvd Loop On to San Marco Blvd Diag On	1310	3
14	Merge	Basic	San Marco Blvd Diag On to Add Lane	1500	3
15	Diverge	Diverge	Add Lane to Bailey Rd Diag Off	900	4
16	Diverge	Basic	Bailey Rd Diag Off to Bailey Rd Loop Off	1410	4
17	Basic	Basic	Bailey Rd Loop Off to Bailey Rd Diag On	1360	3
18	Merge	Basic	Bailey Rd Diag On to Add Lane	1500	3
19	Diverge	Diverge	Add Lane to Railroad Ave Off	1210	4

Facility Segment Data

Segment 1: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	1.00	1.00	0.952	0.952	5468	174	8400	2000	0.91	0.09	18.4	60.6	74.4	26.5	F
Segment 2: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		4753		8400		0.84		11.8		100.3		F
Segment 3: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		4945		7727		1.01		13.6		91.2		F
Segment 4: Diverge															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	4601	305	8400	2000	0.91	0.15	11.6	60.2	99.3	27.2	F
Segment 5: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		3588		8400		0.88		7.5		118.9		F
Segment 6: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		996		1070		5.42		4.8		45.0		F
Segment 7: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2512		10500		0.94		63.2		6.7		A
Segment 8: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2512		10500		0.94		69.9		6.7		A
Segment 9: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		1194		1194		2.81		5.3		45.0		F
Segment 10: Basic															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		2251		6279		1.53		69.1		9.9		F
Segment 11: Weaving															
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
1	1.00		1.000		658		658		4.58		3.7		45.0		F
Segment 12: Basic															

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	808	6300	1.29	70.4	3.6	F

Segment 13: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1041	233	6300	2000	1.33	0.12	68.9	66.3	5.0	6.0	F

Segment 14: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1100	59	6300	2000	1.33	0.03	69.5	-	5.3	-	F

Segment 15: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1122	1117	8400	2000	1.00	0.56	57.7	57.7	4.9	6.7	F

Segment 16: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	685	685	8400	2000	0.88	0.34	59.0	-	2.9	-	A

Segment 17: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	1.000	0	6300	1.07	70.0	0.0	F

Segment 18: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1329	1329	6300	2000	1.07	0.66	66.0	-	6.7	-	F

Segment 19: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	1.000	0.952	1329	0	8400	2000	0.95	0.00	71.7	61.1	4.6	2.0	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	13.0	43.3	42.7	35.4	F

Facility Overall Results

Space Mean Speed, mi/h	13.0	Density, veh/mi/ln	42.7

Average Travel Time, min	35.4	Density, pc/mi/ln	43.3

Copyright © 2019 University of Florida. All Rights Reserved.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = 578 veh/h
	Freeway Volume, V_F: 2246	
	Ramp Volume, V_R: 433	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2246	0.92	Level	6	0	0.971	1.00	2515
Ramp	433	0.92	Level	6	0	0.971	1.00	485
UpStream								
DownStream	578	0.92	Level	6	0	0.971	1.00	647

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1370 pc/h

V_3 or V_{av34} 572 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2515	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2030	Exhibit 13-8	9400	No
V_R	485	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1370	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 8.8 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.472 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 60.8 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	WB SR-4
Junction	NB Bailey Rd Diagonal Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	650
Freeway Volume, V_F	5353
Ramp Volume, V_R	191
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1155 ft
V_D = 417 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5353	0.92	Level	5	0	0.976	1.00	5964
Ramp	191	0.92	Level	5	0	0.976	1.00	213
UpStream								
DownStream	417	0.92	Level	5	0	0.976	1.00	465

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = 528.47 (Equation 13-12 or 13-13)
P_{FD} = 0.601 using Equation 9 (Exhibit 13-7)
V_{12} = 3670 pc/h
V_3 or V_{av34} 2294 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5964	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	5751	Exhibit 13-8	7050	No
V_R	213	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3670	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 30.0 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.447 (Exhibit 13-12)
S_R= 54.7 mph (Exhibit 13-12)
S_0= 66.3 mph (Exhibit 13-12)
S = 58.6 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3420 ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	485
Deceleration Lane Length L_D	
Freeway Volume, V_F	1813
Ramp Volume, V_R	578
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1813	0.92	Level	6	0	0.971	1.00	2030
Ramp	578	0.92	Level	6	0	0.971	1.00	647
UpStream		0.92	Level	6	0	0.971	1.00	469
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.291 using Equation 0 (Exhibit 13-6)
V_{12} = 462 pc/h
V_3 or V_{av34} = 561 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 633 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2231	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1280	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 12.1 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.301 (Exibit 13-11)
S_R = 58.1 mph (Exhibit 13-11)
S_0 = 65.0 mph (Exhibit 13-11)
S = 60.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	320
Freeway Volume, V_F	5162
Ramp Volume, V_R	569
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1265 ft
V_D = 1186 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5162	0.92	Level	5	0	0.976	1.00	5751
Ramp	569	0.92	Level	5	0	0.976	1.00	634
UpStream								
DownStream	1186	0.92	Level	5	0	0.976	1.00	1321

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2865 pc/h
V_3 or V_{av34} 1443 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5751	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5117	Exhibit 13-8	9400	No
V_R	634	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2865	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.0 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.485 (Exhibit 13-12)
S_R= 53.8 mph (Exhibit 13-12)
S_0= 69.6 mph (Exhibit 13-12)
S = 60.7 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	5	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	475	L_{down} =	1360 ft
V_u =	veh/h	Freeway Volume, V_F	2577	V_D =	285 veh/h
		Ramp Volume, V_R	1051		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2577	0.92	Level	6	0	0.971	1.00	2885
Ramp	1051	0.92	Level	6	0	0.971	1.00	1177
UpStream								
DownStream	285	0.92	Level	6	0	0.971	1.00	319

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1922 pc/h

V_3 or V_{av34} 481 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2885	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1708	Exhibit 13-8	9400	No
V_R	1177	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1922	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.534 (Exhibit 13-12)

S_R= 52.7 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 57.7 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1265 ft	Acceleration Lane Length, L_A: 415	L_{down} = ft
V_u = 569 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4593	
	Ramp Volume, V_R: 1337	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4593	0.92	Level	5	0	0.976	1.00	5117
Ramp	1337	0.92	Level	5	0	0.976	1.00	1490
UpStream	569	0.92	Level	5	0	0.976	1.00	634
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1026.36 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)

V_{12} = 3015 pc/h

V_3 or V_{av34} = 2102 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3015 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6607	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4505	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 37.3 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.645 (Exibit 13-11)

S_R = 50.2 mph (Exhibit 13-11)

S_0 = 59.2 mph (Exhibit 13-11)

S = 52.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 414 veh/h
	Freeway Volume, V_F: 1526	
	Ramp Volume, V_R: 285	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1526	0.92	Level	6	0	0.971	1.00	1708
Ramp	285	0.92	Level	6	0	0.971	1.00	319
UpStream								
DownStream	414	0.92	Level	6	0	0.971	1.00	463

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.321 using Equation 0 (Exhibit 13-6)

V_{12} = 549 pc/h

V_3 or V_{av34} = 579 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 683 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2027	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1002	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 10.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.300 (Exibit 13-11)

S_R = 58.1 mph (Exhibit 13-11)

S_0 = 65.0 mph (Exhibit 13-11)

S = 61.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	WB SR-4
Junction	San Marco Blvd Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	685
Freeway Volume, V_F	5970
Ramp Volume, V_R	506
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1520 ft
V_D = 792 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5970	0.92	Level	6	0	0.971	1.00	6684
Ramp	506	0.92	Level	6	0	0.971	1.00	566
UpStream								
DownStream	792	0.92	Level	6	0	0.971	1.00	887

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.567 using Equation 9 (Exhibit 13-7)
V_{12} = 4034 pc/h
V_3 or V_{av34} 2650 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6684	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	6118	Exhibit 13-8	7050	No
V_R	566	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4034	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 32.8 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.479 (Exhibit 13-12)
S_R= 54.0 mph (Exhibit 13-12)
S_0= 64.9 mph (Exhibit 13-12)
S = 57.8 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1300 ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = 285 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1811	
	Ramp Volume, V_R: 414	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1811	0.92	Level	6	0	0.971	1.00	2028
Ramp	414	0.92	Level	6	0	0.971	1.00	463
UpStream	285	0.92	Level	6	0	0.971	1.00	319
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.478 using Equation 0 (Exhibit 13-6)

V_{12} = 970 pc/h

V_3 or V_{av34} = 529 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 970 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2491	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1433	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 10.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.267 (Exibit 13-11)

S_R = 58.9 mph (Exhibit 13-11)

S_0 = 64.9 mph (Exhibit 13-11)

S = 61.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp	Freeway Number of Lanes, N	3	Downstream Adj Ramp
☐ Yes ☐ On	Ramp Number of Lanes, N	1	☑ Yes ☑ On
☑ No ☐ Off	Acceleration Lane Length, L_A	380	☐ No ☐ Off
L_{up} = ft	Deceleration Lane Length L_D		L_{down} = 1270 ft
V_u = veh/h	Freeway Volume, V_F	5464	V_D = 1625 veh/h
	Ramp Volume, V_R	792	
	Freeway Free-Flow Speed, S_{FF}	65.0	
	Ramp Free-Flow Speed, S_{FR}	35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5464	0.92	Level	6	0	0.971	1.00	6117
Ramp	792	0.92	Level	6	0	0.971	1.00	887
UpStream								
DownStream	1625	0.92	Level	6	0	0.971	1.00	1819

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)

L_{EQ} =

P_{FM} = 0.588 using Equation 3 (Exhibit 13-6)

V_{12} = 3598 pc/h

V_3 or V_{av34} 2519 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7004	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4485	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 37.7 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.640 (Exibit 13-11)

S_R = 50.3 mph (Exhibit 13-11)

S_0 = 57.2 mph (Exhibit 13-11)

S = 52.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)

L_{EQ} =

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	5	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☑ Off
L_{up} =	ft	Deceleration Lane Length L_D	570	L_{down} =	1410 ft
V_u =	veh/h	Freeway Volume, V_F	2092	V_D =	288 veh/h
		Ramp Volume, V_R	395		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2092	0.92	Level	6	0	0.971	1.00	2342
Ramp	395	0.92	Level	6	0	0.971	1.00	442
UpStream								
DownStream	288	0.92	Level	6	0	0.971	1.00	322

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1270 pc/h

V_3 or V_{av34} 536 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2342	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1900	Exhibit 13-8	9400	No
V_R	442	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1270	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 10.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.468 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 60.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 6:25 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1270 ft	Acceleration Lane Length, L_A: 950	L_{down} = ft
V_u = 792 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 6256	
	Ramp Volume, V_R: 1625	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6256	0.92	Level	6	0	0.971	1.00	7004
Ramp	1625	0.92	Level	6	0	0.971	1.00	1819
UpStream	792	0.92	Level	6	0	0.971	1.00	887
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.604 using Equation 3 (Exhibit 13-6)

V_{12} = 4231 pc/h

V_3 or V_{av34} = 2773 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 4304 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8823	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6123	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 46.4 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 2.034 (Exibit 13-11)

S_R= 18.2 mph (Exhibit 13-11)

S_0= 56.1 mph (Exhibit 13-11)

S = 23.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	EB SR-4
Junction	NB Bailey Rd Loop Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	285
Freeway Volume, V_F	1697
Ramp Volume, V_R	288
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1310 ft
V_D = 894 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1697	0.92	Level	6	0	0.971	1.00	1900
Ramp	288	0.92	Level	6	0	0.971	1.00	322
UpStream								
DownStream	894	0.92	Level	6	0	0.971	1.00	1001

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 1010 pc/h
V_3 or V_{av34} 445 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1900	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	1578	Exhibit 13-8	9400	No
V_R	322	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1010	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 10.4 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.457 (Exhibit 13-12)
S_R= 54.5 mph (Exhibit 13-12)
S_0= 71.3 mph (Exhibit 13-12)
S = 61.3 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3055 ft
V_u = veh/h	Deceleration Lane Length L_D: 700	V_D = veh/h
	Freeway Volume, V_F: 8081	
	Ramp Volume, V_R: 626	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	8081	0.92	Level	6	0	0.971	1.00	9047
Ramp	626	0.92	Level	6	0	0.971	1.00	701
UpStream								
DownStream		0.92	Level	6	0	0.971	1.00	2579

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 4340 pc/h

V_3 or V_{av34} 2353 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	9047	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	8346	Exhibit 13-8	9400	No
V_R	701	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4340	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 35.3 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

D_s = 0.491 (Exhibit 13-12)

S_R= 53.7 mph (Exhibit 13-12)

S_0= 66.0 mph (Exhibit 13-12)

S = 59.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1310 ft	Acceleration Lane Length, L_A: 400	L_{down} = ft
V_u = 288 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1409	
	Ramp Volume, V_R: 894	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1409	0.92	Level	6	0	0.971	1.00	1577
Ramp	894	0.92	Level	6	0	0.971	1.00	1001
UpStream	288	0.92	Level	6	0	0.971	1.00	322
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.220 using Equation 0 (Exhibit 13-6)

V_{12} = 347 pc/h

V_3 or V_{av34} = 615 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 630 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2578	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1631	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 15.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.313 (Exibit 13-11)

S_R = 57.8 mph (Exhibit 13-11)

S_0 = 65.0 mph (Exhibit 13-11)

S = 60.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	AM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3055 ft
V_u = 626 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	450
Deceleration Lane Length L_D	
Freeway Volume, V_F	7455
Ramp Volume, V_R	1613
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7455	0.92	Level	6	0	0.971	1.00	8346
Ramp	1613	0.92	Level	6	0	0.971	1.00	1806
UpStream	626	0.92	Level	6	0	0.971	1.00	701
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1800.53 (Equation 13-6 or 13-7)
P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)
V_{12} = 4925 pc/h
V_3 or V_{av34} = 3421 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 5646 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	10152	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	7452	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 59.9 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 7.010 (Exibit 13-11)
S_R = -96.2 mph (Exhibit 13-11)
S_0 = 56.1 mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3420 ft
V_u = veh/h	Deceleration Lane Length L_D: 800	V_D = 628 veh/h
	Freeway Volume, V_F: 9157	
	Ramp Volume, V_R: 1019	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	9157	0.92	Level	6	0	0.971	1.00	10252
Ramp	1019	0.92	Level	6	0	0.971	1.00	1141
UpStream								
DownStream	628	0.92	Level	6	0	0.971	1.00	703

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 5113 pc/h

V_3 or V_{av34} 2569 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	10252	Exhibit 13-8	9400	Yes
$V_{FO} = V_F - V_R$	9111	Exhibit 13-8	9400	No
V_R	1141	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5113	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 41.0 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.531 (Exhibit 13-12)

S_R= 52.8 mph (Exhibit 13-12)

S_0= 65.2 mph (Exhibit 13-12)

S = 58.4 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 6:29 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	650
Freeway Volume, V_F	4004
Ramp Volume, V_R	417
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1155 ft
V_D = 1186 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4004	0.92	Level	5	0	0.976	1.00	4461
Ramp	417	0.92	Level	5	0	0.976	1.00	465
UpStream								
DownStream	1186	0.92	Level	5	0	0.976	1.00	1321

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2207 pc/h
V_3 or V_{av34} 1127 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4461	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3996	Exhibit 13-8	9400	No
V_R	465	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2207	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 17.4 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.470 (Exhibit 13-12)
S_R= 54.2 mph (Exhibit 13-12)
S_0= 70.8 mph (Exhibit 13-12)
S = 61.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3420 ft
V_u = 1019 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	485
Deceleration Lane Length L_D	
Freeway Volume, V_F	8138
Ramp Volume, V_R	328
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	8138	0.92	Level	6	0	0.971	1.00	9111
Ramp	328	0.92	Level	6	0	0.971	1.00	367
UpStream	1019	0.92	Level	6	0	0.971	1.00	1141
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.172 using Equation 0 (Exhibit 13-6)
V_{12} = 1566 pc/h
V_3 or V_{av34} = 3772 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 3711 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9478	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4078	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 34.1 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 0.517 (Exibit 13-11)
S_R = 53.1 mph (Exhibit 13-11)
S_0 = 56.1 mph (Exhibit 13-11)
S = 54.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	5
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	320
Freeway Volume, V_F	3587
Ramp Volume, V_R	1186
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1265 ft
V_D = 728 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3587	0.92	Level	5	0	0.976	1.00	3996
Ramp	1186	0.92	Level	5	0	0.976	1.00	1321
UpStream								
DownStream	728	0.92	Level	5	0	0.976	1.00	811

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 2487 pc/h
V_3 or V_{av34} 754 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3996	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2675	Exhibit 13-8	9400	No
V_R	1321	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2487	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.8 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.547 (Exhibit 13-12)
S_R= 52.4 mph (Exhibit 13-12)
S_0= 71.3 mph (Exhibit 13-12)
S = 58.2 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KHA
Agency or Company	KHA
Date Performed	9/21/2017
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	EB SR-4
Junction	San Marco Blvd Off-ramp
Jurisdiction	Contra Costa County
Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	475
Freeway Volume, V_F	7858
Ramp Volume, V_R	2071
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1360 ft
V_D = 222 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7858	0.92	Level	6	0	0.971	1.00	8798
Ramp	2071	0.92	Level	6	0	0.971	1.00	2319
UpStream								
DownStream	222	0.92	Level	6	0	0.971	1.00	249

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 5144 pc/h
V_3 or V_{av34} 1827 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8798	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	6479	Exhibit 13-8	9400	No
V_R	2319	Exhibit 13-10	2000	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5144	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 44.2 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.637 (Exhibit 13-12)
S_R= 50.4 mph (Exhibit 13-12)
S_0= 68.1 mph (Exhibit 13-12)
S = 56.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1265 ft	Acceleration Lane Length, L_A: 415	L_{down} = ft
V_u = 1186 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2401	
	Ramp Volume, V_R: 728	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2401	0.92	Level	5	0	0.976	1.00	2675
Ramp	728	0.92	Level	5	0	0.976	1.00	811
UpStream	1186	0.92	Level	5	0	0.976	1.00	1321
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.116 using Equation 0 (Exhibit 13-6)

V_{12} = 311 pc/h

V_3 or V_{av34} = 1182 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1070 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3486	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1881	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.318 (Exibit 13-11)

S_R = 57.7 mph (Exhibit 13-11)

S_0 = 63.9 mph (Exhibit 13-11)

S = 60.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 450	L_{down} = 1300 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 56 veh/h
	Freeway Volume, V_F: 5787	
	Ramp Volume, V_R: 222	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5787	0.92	Level	6	0	0.971	1.00	6479
Ramp	222	0.92	Level	6	0	0.971	1.00	249
UpStream								
DownStream	56	0.92	Level	6	0	0.971	1.00	63

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge Areas)

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.590 using Equation 3 (Exhibit 13-6)

V_{12} = 3823 pc/h

V_3 or V_{av34} = 2656 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12} (Diverge Areas)

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks (Merge Areas)

	Actual	Capacity		LOS F?
V_{FO}	6728	Exhibit 13-8		No

Capacity Checks (Diverge Areas)

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4072	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F) (Merge Areas)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 34.3 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Level of Service Determination (if not F) (Diverge Areas)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination (Merge Areas)

M_S = 0.518 (Exibit 13-11)

S_R = 53.1 mph (Exhibit 13-11)

S_0 = 56.3 mph (Exhibit 13-11)

S = 54.3 mph (Exhibit 13-13)

Speed Determination (Diverge Areas)

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	9/21/2017	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	San Marco Blvd Off-ramp
Date Performed	8/26/2014	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1520 ft
V_u = veh/h	Deceleration Lane Length L_D: 685	V_D = 940 veh/h
	Freeway Volume, V_F: 4246	
	Ramp Volume, V_R: 443	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4246	0.92	Level	6	0	0.971	1.00	4754
Ramp	443	0.92	Level	6	0	0.971	1.00	496
UpStream								
DownStream	940	0.92	Level	6	0	0.971	1.00	1052

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2352 pc/h

V_3 or V_{av34} 1201 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4754	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4258	Exhibit 13-8	9400	No
V_R	496	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2352	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 18.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.473 (Exhibit 13-12)

S_R= 54.1 mph (Exhibit 13-12)

S_0= 70.5 mph (Exhibit 13-12)

S = 61.3 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

HCS2010™ Version 6.65 Generated: 9/21/2017 6:37 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1300 ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = 222 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 6009	
	Ramp Volume, V_R: 56	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6009	0.92	Level	6	0	0.971	1.00	6727
Ramp	56	0.92	Level	6	0	0.971	1.00	63
UpStream	222	0.92	Level	6	0	0.971	1.00	249
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.605 using Equation 3 (Exhibit 13-6)

V_{12} = 4073 pc/h

V_3 or V_{av34} = 2654 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 4073 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6790	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4136	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 31.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.495 (Exibit 13-11)

S_R = 53.6 mph (Exhibit 13-11)

S_0 = 56.3 mph (Exhibit 13-11)

S = 54.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	NB San Marco Blvd Loop On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 380	L_{down} = 1270 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 542 veh/h
	Freeway Volume, V_F: 3803	
	Ramp Volume, V_R: 940	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3803	0.92	Level	6	0	0.971	1.00	4258
Ramp	940	0.92	Level	6	0	0.971	1.00	1052
UpStream								
DownStream	542	0.92	Level	6	0	0.971	1.00	607

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.086 using Equation 0 (Exhibit 13-6)

V_{12} = 367 pc/h

V_3 or V_{av34} = 1945 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1703 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5310	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2755	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 24.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.356 (Exibit 13-11)

S_R = 56.8 mph (Exhibit 13-11)

S_0 = 62.2 mph (Exhibit 13-11)

S = 59.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	SB Bailey Rd Diagonal Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	570
Freeway Volume, V_F	6120
Ramp Volume, V_R	1063
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1410 ft
V_D = 652 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6120	0.92	Level	6	0	0.971	1.00	6852
Ramp	1063	0.92	Level	6	0	0.971	1.00	1190
UpStream								
DownStream	652	0.92	Level	6	0	0.971	1.00	730

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)
V_{12} = 3659 pc/h
V_3 or V_{av34} 1596 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6852	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5662	Exhibit 13-8	9400	No
V_R	1190	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3659	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 30.6 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.535 (Exhibit 13-12)
S_R= 52.7 mph (Exhibit 13-12)
S_0= 69.0 mph (Exhibit 13-12)
S = 59.2 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	SB San Marco Blvd Diag On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1270 ft	Acceleration Lane Length, L_A: 950	L_{down} = ft
V_u = 940 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4743	
	Ramp Volume, V_R: 542	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4743	0.92	Level	6	0	0.971	1.00	5310
Ramp	542	0.92	Level	6	0	0.971	1.00	607
UpStream	940	0.92	Level	6	0	0.971	1.00	1052
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.142 using Equation 0 (Exhibit 13-6)

V_{12} = 754 pc/h

V_3 or V_{av34} = 2278 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2124 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5917	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2731	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.314 (Exibit 13-11)

S_R = 57.8 mph (Exhibit 13-11)

S_0 = 61.1 mph (Exhibit 13-11)

S = 59.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	NB Bailey Rd Loop Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1310 ft
V_u = veh/h	Deceleration Lane Length L_D: 285	V_D = 1265 veh/h
	Freeway Volume, V_F: 5057	
	Ramp Volume, V_R: 652	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5057	0.92	Level	6	0	0.971	1.00	5662
Ramp	652	0.92	Level	6	0	0.971	1.00	730
UpStream								
DownStream	1265	0.92	Level	6	0	0.971	1.00	1416

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2880 pc/h

V_3 or V_{av34} 1391 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5662	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4932	Exhibit 13-8	9400	No
V_R	730	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2880	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.494 (Exhibit 13-12)

S_R= 53.6 mph (Exhibit 13-12)

S_0= 69.8 mph (Exhibit 13-12)

S = 60.5 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd Off-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 5	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 3055 ft
V_u = veh/h	Deceleration Lane Length L_D: 700	V_D = 513 veh/h
	Freeway Volume, V_F: 5487	
	Ramp Volume, V_R: 558	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5487	0.92	Level	6	0	0.971	1.00	6143
Ramp	558	0.92	Level	6	0	0.971	1.00	625
UpStream								
DownStream	513	0.92	Level	6	0	0.971	1.00	574

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2629 pc/h

V_3 or V_{av34} 1296 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5222	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	4597	Exhibit 13-8	9400	No
V_R	625	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2629	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.484 (Exhibit 13-12)

S_R= 53.9 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 60.9 mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	EB SR-4
Agency or Company	KHA	Junction	Bailey Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1310 ft	Acceleration Lane Length, L_A: 400	L_{down} = ft
V_u = 652 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4405	
	Ramp Volume, V_R: 1265	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4405	0.92	Level	6	0	0.971	1.00	4932
Ramp	1265	0.92	Level	6	0	0.971	1.00	1416
UpStream	652	0.92	Level	6	0	0.971	1.00	730
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 964.27 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation 3 (Exhibit 13-6)

V_{12} = 2903 pc/h

V_3 or V_{av34} = 2029 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2903 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6348	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4319	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 36.0 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.586 (Exibit 13-11)

S_R = 51.5 mph (Exhibit 13-11)

S_0 = 59.5 mph (Exhibit 13-11)

S = 53.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KHA	Freeway/Dir of Travel	WB SR-4
Agency or Company	KHA	Junction	Willow Pass Rd On-ramp
Date Performed	9/21/2017	Jurisdiction	Contra Costa County
Analysis Time Period	PM Peak	Analysis Year	Long-term (2035) + Project

Project Description Pittsburg Faria Annexation

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 3055 ft
V_u = 558 veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	450
Deceleration Lane Length L_D	
Freeway Volume, V_F	4929
Ramp Volume, V_R	513
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4929	0.92	Level	6	0	0.971	1.00	5518
Ramp	513	0.92	Level	6	0	0.971	1.00	574
UpStream	558	0.92	Level	6	0	0.971	1.00	625
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = 0.146 using Equation 0 (Exhibit 13-6)
V_{12} = 806 pc/h
V_3 or V_{av34} = 2356 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 2207 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6092	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2781	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 24.1 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.352 (Exibit 13-11)
S_R = 56.9 mph (Exhibit 13-11)
S_0 = 60.8 mph (Exhibit 13-11)
S = 59.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

Copyright © 2014 University of Florida, All Rights Reserved

Arterial Level of Service Analysis

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	III	35	12.7	66.0	78.7	0.09	4.3	F
Concord Blvd	III	35	78.0	75.1	153.1	0.76	17.8	D
Total	III		90.7	141.1	231.8	0.85	13.2	E

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	111.1	170.3	0.49	10.4	E
Clayton Rd	III	35	78.0	54.6	132.6	0.76	20.6	C
Total	III		137.2	165.7	302.9	1.25	14.9	D

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	31.5	99.8	0.76	27.4	C
Bailey Rd	II	40	54.0	6.8	60.8	0.60	35.5	A
Ygnacio Valley Rd	II	40	136.4	53.1	189.5	1.52	28.8	B
Total	II		258.7	91.4	350.1	2.87	29.6	B

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	28.2	164.6	1.52	33.2	B
Denkinger Rd	II	40	54.0	29.1	83.1	0.60	26.0	C
Total	II		190.4	57.3	247.7	2.12	30.8	B

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	40.3	201.2	1.79	32.0	B
Clayton Rd	II	34	86.0	66.4	152.4	0.82	19.4	D
Total	II		246.9	106.7	353.6	2.61	26.6	C

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	62.2	149.0	0.82	19.9	C
Oak Grove Rd	III	36	179.4	35.5	214.9	1.79	30.0	B
Total	III		266.2	97.7	363.9	2.61	25.8	B

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	22.7	47.7	0.24	18.1	D
Oakhurst Dr	II	45	41.4	49.3	90.7	0.46	18.1	D
Total	II		66.4	72.0	138.4	0.70	18.1	D

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	64.9	106.3	0.46	15.4	E
Total	II		41.4	64.9	106.3	0.46	15.4	E

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	78.0	75.3	153.3	0.76	17.8	D
Total	III		78.0	75.3	153.3	0.76	17.8	D

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	97.8	157.0	0.49	11.3	E
Clayton Rd	III	35	78.0	59.6	137.6	0.76	19.8	C
Total	III		137.2	157.4	294.6	1.25	15.3	D

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	48.1	116.4	0.76	23.5	C
Bailey Rd	II	40	54.0	25.8	79.8	0.60	27.1	C
Ygnacio Valley Rd	II	40	136.4	51.5	187.9	1.52	29.0	B
Total	II		258.7	125.4	384.1	2.87	26.9	C

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	33.9	170.3	1.52	32.0	B
Denkinger Rd	II	40	54.0	35.1	89.1	0.60	24.2	C
Total	II		190.4	69.0	259.4	2.12	29.4	B

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	33.5	194.4	1.79	33.1	B
Clayton Rd	II	34	86.0	59.6	145.6	0.82	20.4	D
Total	II		246.9	93.1	340.0	2.61	27.6	C

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	13.2	100.0	0.82	29.6	B
Oak Grove Rd	III	36	179.4	50.4	229.8	1.79	28.0	B
Total	III		266.2	63.6	329.8	2.61	28.5	B

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	38.9	63.9	0.24	13.5	E
Oakhurst Dr	II	45	41.4	529.4	570.8	0.46	2.9	F
Total	II		66.4	568.3	634.7	0.70	3.9	F

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	15.7	57.1	0.46	28.7	B
Total	II		41.4	15.7	57.1	0.46	28.7	B

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	78.0	77.4	155.4	0.76	17.6	D
Total	III		78.0	77.4	155.4	0.76	17.6	D

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	235.0	294.2	0.49	6.0	F
Clayton Rd	III	35	78.0	47.4	125.4	0.76	21.8	C
Total	III		137.2	282.4	419.6	1.25	10.7	E

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	33.5	101.8	0.76	26.8	C
	II	40	54.0	10.3	64.3	0.60	33.6	B
Ygnacio Valley Rd	II	40	136.4	53.1	189.5	1.52	28.8	B
Total	II		258.7	96.9	355.6	2.87	29.1	B

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	37.9	174.3	1.52	31.3	B
Denkinger Rd	II	40	54.0	33.4	87.4	0.60	24.7	C
Total	II		190.4	71.3	261.7	2.12	29.1	B

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	41.4	202.3	1.79	31.8	B
Clayton Rd	II	34	86.0	66.4	152.4	0.82	19.4	D
Total	II		246.9	107.8	354.7	2.61	26.5	C

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	72.1	158.9	0.82	18.7	C
Oak Grove Rd	III	36	179.4	36.0	215.4	1.79	29.9	B
Total	III		266.2	108.1	374.3	2.61	25.1	B

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	22.7	47.7	0.24	18.1	D
Oakhurst Dr	II	45	41.4	49.4	90.8	0.46	18.0	D
Total	II		66.4	72.1	138.5	0.70	18.1	D

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	64.8	106.2	0.46	15.4	E
Total	II		41.4	64.8	106.2	0.46	15.4	E

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	78.0	133.2	211.2	0.76	12.9	E
Total	III		78.0	133.2	211.2	0.76	12.9	E

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	125.8	185.0	0.49	9.6	F
Clayton Rd	III	35	78.0	59.6	137.6	0.76	19.8	C
Total	III		137.2	185.4	322.6	1.25	14.0	E

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	53.5	121.8	0.76	22.4	C
Private Driveway	II	40	54.0	25.2	79.2	0.60	27.3	C
Ygnacio Valley Rd	II	40	136.4	51.5	187.9	1.52	29.0	B
Total	II		258.7	130.2	388.9	2.87	26.6	C

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	37.8	174.2	1.52	31.3	B
Denkinger Rd	II	40	54.0	41.4	95.4	0.60	22.6	C
Total	II		190.4	79.2	269.6	2.12	28.3	B

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	48.0	208.9	1.79	30.8	B
Clayton Rd	II	34	86.0	57.1	143.1	0.82	20.7	D
Total	II		246.9	105.1	352.0	2.61	26.7	C

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	13.1	99.9	0.82	29.7	B
Oak Grove Rd	III	36	179.4	51.5	230.9	1.79	27.9	B
Total	III		266.2	64.6	330.8	2.61	28.4	B

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	39.1	64.1	0.24	13.5	E
Oakhurst Dr	II	45	41.4	535.2	576.6	0.46	2.8	F
Total	II		66.4	574.3	640.7	0.70	3.9	F

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	16.1	57.5	0.46	28.5	B
Total	II		41.4	16.1	57.5	0.46	28.5	B

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	78.0	77.7	155.7	0.76	17.5	D
Total	III		78.0	77.7	155.7	0.76	17.5	D

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	447.7	506.9	0.49	3.5	F
Clayton Rd	III	35	78.0	46.0	124.0	0.76	22.0	C
Total	III		137.2	493.7	630.9	1.25	7.1	F

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	64.5	132.8	0.76	20.6	D
	II	40	54.0	8.7	62.7	0.60	34.4	B
Ygnacio Valley Rd	II	40	136.4	58.1	194.5	1.52	28.1	B
Total	II		258.7	131.3	390.0	2.87	26.5	C

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	45.8	182.2	1.52	30.0	B
Denkinger Rd	II	40	54.0	109.0	163.0	0.60	13.2	E
Total	II		190.4	154.8	345.2	2.12	22.1	C

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	33.3	194.2	1.79	33.1	B
Clayton Rd	II	34	86.0	66.9	152.9	0.82	19.4	D
Total	II		246.9	100.2	347.1	2.61	27.1	C

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	88.2	175.0	0.82	16.9	D
Oak Grove Rd	III	36	179.4	61.9	241.3	1.79	26.7	B
Total	III		266.2	150.1	416.3	2.61	22.6	C

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	28.9	53.9	0.24	16.0	E
Oakhurst Dr	II	45	41.4	53.9	95.3	0.46	17.2	D
Total	II		66.4	82.8	149.2	0.70	16.8	E

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	72.1	113.5	0.46	14.4	E
Total	II		41.4	72.1	113.5	0.46	14.4	E

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	78.0	106.0	184.0	0.76	14.8	D
Total	III		78.0	106.0	184.0	0.76	14.8	D

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	115.6	174.8	0.49	10.2	E
Clayton Rd	III	35	78.0	60.1	138.1	0.76	19.8	C
Total	III		137.2	175.7	312.9	1.25	14.4	D

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	170.4	238.7	0.76	11.4	F
Private Driveway	II	40	54.0	28.9	82.9	0.60	26.0	C
Ygnacio Valley Rd	II	40	136.4	58.1	194.5	1.52	28.1	B
Total	II		258.7	257.4	516.1	2.87	20.1	D

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	38.8	175.2	1.52	31.2	B
Denkinger Rd	II	40	54.0	49.0	103.0	0.60	21.0	D
Total	II		190.4	87.8	278.2	2.12	27.4	C

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	121.8	282.7	1.79	22.8	C
Clayton Rd	II	34	86.0	60.0	146.0	0.82	20.3	D
Total	II		246.9	181.8	428.7	2.61	21.9	D

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	15.5	102.3	0.82	29.0	B
Oak Grove Rd	III	36	179.4	71.1	250.5	1.79	25.7	B
Total	III		266.2	86.6	352.8	2.61	26.6	B

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	154.5	179.5	0.24	4.8	F
Oakhurst Dr	II	45	41.4	502.4	543.8	0.46	3.0	F
Total	II		66.4	656.9	723.3	0.70	3.5	F

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	29.2	70.6	0.46	23.2	C
Total	II		41.4	29.2	70.6	0.46	23.2	C

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	78.0	80.3	158.3	0.76	17.2	D
Total	III		78.0	80.3	158.3	0.76	17.2	D

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	614.3	673.5	0.49	2.6	F
Clayton Rd	III	35	78.0	46.0	124.0	0.76	22.0	C
Total	III		137.2	660.3	797.5	1.25	5.6	F

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	84.0	152.3	0.76	17.9	D
Bailey Rd	II	40	54.0	8.2	62.2	0.60	34.7	B
Ygnacio Valley Rd	II	40	136.4	58.1	194.5	1.52	28.1	B
Total	II		258.7	150.3	409.0	2.87	25.3	C

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	49.0	185.4	1.52	29.4	B
Denkinger Rd	II	40	54.0	114.1	168.1	0.60	12.8	F
Total	II		190.4	163.1	353.5	2.12	21.5	D

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	34.0	194.9	1.79	33.0	B
Clayton Rd	II	34	86.0	66.9	152.9	0.82	19.4	D
Total	II		246.9	100.9	347.8	2.61	27.0	C

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	102.5	189.3	0.82	15.7	D
Oak Grove Rd	III	36	179.4	73.8	253.2	1.79	25.4	B
Total	III		266.2	176.3	442.5	2.61	21.2	C

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	28.9	53.9	0.24	16.0	E
Oakhurst Dr	II	45	41.4	53.9	95.3	0.46	17.2	D
Total	II		66.4	82.8	149.2	0.70	16.8	E

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	72.0	113.4	0.46	14.4	E
Total	II		41.4	72.0	113.4	0.46	14.4	E

Arterial Level of Service: NB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	78.0	153.6	231.6	0.76	11.8	E
Total	III		78.0	153.6	231.6	0.76	11.8	E

Arterial Level of Service: SB Bailey Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Concord Blvd	III	35	59.2	167.5	226.7	0.49	7.8	F
Clayton Rd	III	35	78.0	60.1	138.1	0.76	19.8	C
Total	III		137.2	227.6	364.8	1.25	12.4	E

Arterial Level of Service: EB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Treat Blvd	II	40	68.3	225.8	294.1	0.76	9.3	F
Private Driveway	II	40	54.0	27.8	81.8	0.60	26.4	C
Ygnacio Valley Rd	II	40	136.4	58.1	194.5	1.52	28.1	B
Total	II		258.7	311.7	570.4	2.87	18.1	D

Arterial Level of Service: WB Clayton Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Bailey Rd	II	40	136.4	43.2	179.6	1.52	30.4	B
Denkinger Rd	II	40	54.0	54.1	108.1	0.60	20.0	D
Total	II		190.4	97.3	287.7	2.12	26.5	C

Arterial Level of Service: NB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	II	40	160.9	139.7	300.6	1.79	21.4	D
Clayton Rd	II	34	86.0	60.2	146.2	0.82	20.3	D
Total	II		246.9	199.9	446.8	2.61	21.0	D

Arterial Level of Service: SB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cowell Rd	III	34	86.8	15.8	102.6	0.82	28.9	B
Oak Grove Rd	III	36	179.4	75.2	254.6	1.79	25.3	B
Total	III		266.2	91.0	357.2	2.61	26.3	B

Arterial Level of Service: NB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
	II	45	25.0	158.8	183.8	0.24	4.7	F
Oakhurst Dr	II	45	41.4	504.1	545.5	0.46	3.0	F
Total	II		66.4	662.9	729.3	0.70	3.4	F

Arterial Level of Service: SB Ygnacio Valley Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Clayton Rd	II	45	41.4	29.4	70.8	0.46	23.1	C
Total	II		41.4	29.4	70.8	0.46	23.1	C

Mitigated Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	769	108	108	230	264	0	0	277	880
Future Volume (vph)	0	0	0	769	108	108	230	264	0	0	277	880
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.99	1.00	1.00			1.00	0.99
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1593	1616	1481	1676	3353			3353	1481
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1593	1616	1481	1676	3353			3353	1481
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	785	110	110	235	269	0	0	283	898
RTOR Reduction (vph)	0	0	0	0	0	73	0	0	0	0	0	315
Lane Group Flow (vph)	0	0	0	447	448	37	235	269	0	0	283	583
Confl. Peds. (#/hr)							1		1	1		1
Confl. Bikes (#/hr)						1						
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				1	1		3	8			4	
Permitted Phases						1						4
Actuated Green, G (s)				26.0	26.0	26.0	13.5	51.0			32.0	32.0
Effective Green, g (s)				26.0	26.0	26.0	13.5	51.0			32.0	32.0
Actuated g/C Ratio				0.29	0.29	0.29	0.15	0.57			0.36	0.36
Clearance Time (s)				7.0	7.0	7.0	5.5	6.0			6.0	6.0
Vehicle Extension (s)				4.5	4.5	4.5	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				460	466	427	251	1900			1192	526
v/s Ratio Prot				c0.28	0.28		c0.14	0.08			0.08	
v/s Ratio Perm						0.02						c0.39
v/c Ratio				0.97	0.96	0.09	0.94	0.14			0.24	1.11
Uniform Delay, d1				31.6	31.5	23.3	37.8	9.2			20.4	29.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				34.8	32.1	0.2	39.4	0.0			0.1	72.3
Delay (s)				66.4	63.6	23.5	77.2	9.2			20.5	101.3
Level of Service				E	E	C	E	A			C	F
Approach Delay (s)		0.0			60.5			40.9			81.9	
Approach LOS		A			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	66.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	112.0%	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)	4	283	46	18	826	4	61	11	102	38	24	31
Future Volume (veh/h)	4	283	46	18	826	4	61	11	102	38	24	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	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	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	289	47	18	843	4	62	11	104	39	24	32
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	777	126	20	942	4	79	14	133	78	48	64
Arrive On Green	0.00	0.53	0.53	0.01	0.54	0.54	0.15	0.15	0.15	0.12	0.12	0.12
Sat Flow, veh/h	1681	1474	240	1681	1755	8	538	96	903	659	406	541
Grp Volume(v), veh/h	4	0	336	18	0	847	177	0	0	95	0	0
Grp Sat Flow(s),veh/h/ln	1681	0	1714	1681	0	1763	1537	0	0	1606	0	0
Q Serve(g_s), s	0.2	0.0	9.4	0.9	0.0	35.1	9.1	0.0	0.0	4.5	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	9.4	0.9	0.0	35.1	9.1	0.0	0.0	4.5	0.0	0.0
Prop In Lane	1.00		0.14	1.00		0.00	0.35		0.59	0.41		0.34
Lane Grp Cap(c), veh/h	4	0	904	20	0	946	226	0	0	190	0	0
V/C Ratio(X)	1.02	0.00	0.37	0.91	0.00	0.90	0.78	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	226	0	1068	226	0	1099	301	0	0	314	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.8	0.0	11.4	40.4	0.0	16.9	33.6	0.0	0.0	33.8	0.0	0.0
Incr Delay (d2), s/veh	219.1	0.0	0.3	70.4	0.0	8.8	9.3	0.0	0.0	2.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.2	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	4.5	0.8	0.0	19.3	4.4	0.0	0.0	2.1	0.0	0.0
LnGrp Delay(d),s/veh	260.1	0.0	11.6	110.8	0.0	25.7	43.0	0.0	0.0	35.8	0.0	0.0
LnGrp LOS	F		B	F		C	D			D		
Approach Vol, veh/h		340			865			177			95	
Approach Delay, s/veh		14.6			27.5			43.0			35.8	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		16.0	5.0	47.1		13.7	4.2	47.9
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	11.0	51.0		16.0	11.0	51.0
Max Q Clear Time (g_c+I1), s		11.1	2.9	11.4		6.5	2.2	37.1
Green Ext Time (p_c), s		0.4	0.0	10.7		0.3	0.0	6.8

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	356	3	4	1724	2	62	0	4	2	0	9
Future Volume (veh/h)	3	356	3	4	1724	2	62	0	4	2	0	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	440	4	5	2128	2	77	0	5	2	0	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	1926	18	554	1945	2	202	0	101	60	8	73
Arrive On Green	0.55	0.57	0.55	0.55	0.57	0.55	0.07	0.00	0.07	0.07	0.00	0.07
Sat Flow, veh/h	189	3405	31	940	3437	3	1572	0	1480	76	118	1065
Grp Volume(v), veh/h	4	217	227	5	1038	1092	77	0	5	13	0	0
Grp Sat Flow(s),veh/h/ln	189	1676	1759	940	1676	1764	1572	0	1480	1259	0	0
Q Serve(g_s), s	0.0	4.9	4.9	0.2	43.0	43.0	0.0	0.0	0.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	42.0	4.9	4.9	5.1	43.0	43.0	3.4	0.0	0.2	3.4	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.15		0.85
Lane Grp Cap(c), veh/h	95	949	995	554	949	998	202	0	101	141	0	0
V/C Ratio(X)	0.04	0.23	0.23	0.01	1.09	1.09	0.38	0.00	0.05	0.09	0.00	0.00
Avail Cap(c_a), veh/h	95	949	995	554	949	998	563	0	487	523	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	0.61	0.61	0.61	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	38.0	8.2	8.2	10.0	16.5	16.5	34.6	0.0	33.1	33.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.0	53.0	52.8	0.4	0.0	0.1	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.2	2.4	0.1	33.5	35.1	1.6	0.0	0.1	0.3	0.0	0.0
LnGrp Delay(d),s/veh	38.1	8.3	8.3	10.0	69.5	69.3	35.0	0.0	33.2	33.4	0.0	0.0
LnGrp LOS	D	A	A	B	F	F	D		C	C		
Approach Vol, veh/h		448			2135			82			13	
Approach Delay, s/veh		8.6			69.3			34.9			33.4	
Approach LOS		A			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		47.0		9.2		47.0		9.2
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		42.0		25.0		42.0		25.0
Max Q Clear Time (g_c+I1), s		44.0		5.4		45.0		5.4
Green Ext Time (p_c), s		0.0		0.1		0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	57.9
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	327	17	3	1586	12	73	1	16	23	0	16
Future Volume (veh/h)	3	327	17	3	1586	12	73	1	16	23	0	16
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	389	20	4	1888	14	87	1	19	27	0	19
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1623	83	12	1705	13	183	2	24	135	15	61
Arrive On Green	0.01	0.50	0.49	0.01	1.00	0.98	0.09	0.09	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1681	3245	166	1681	3411	25	1204	19	264	780	160	662
Grp Volume(v), veh/h	4	200	209	4	927	975	107	0	0	46	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1735	1681	1676	1760	1487	0	0	1602	0	0
Q Serve(g_s), s	0.2	6.1	6.2	0.2	45.0	45.0	3.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	6.1	6.2	0.2	45.0	45.0	6.2	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.01	0.81		0.18	0.59		0.41
Lane Grp Cap(c), veh/h	12	838	868	12	838	880	209	0	0	210	0	0
V/C Ratio(X)	0.32	0.24	0.24	0.32	1.11	1.11	0.51	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	187	838	868	187	838	880	439	0	0	444	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.68	0.68	0.68	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	12.8	12.8	44.1	0.0	0.0	39.8	0.0	0.0	38.2	0.0	0.0
Incr Delay (d2), s/veh	14.1	0.1	0.1	9.8	59.7	60.4	1.9	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.8	3.0	0.1	13.9	14.8	2.7	0.0	0.0	1.1	0.0	0.0
LnGrp Delay(d),s/veh	58.5	12.9	13.0	53.9	59.7	60.4	41.8	0.0	0.0	38.7	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D			D		
Approach Vol, veh/h		413			1906			107			46	
Approach Delay, s/veh		13.4			60.1			41.8			38.7	
Approach LOS		B			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	49.0		12.3	4.7	49.0		12.3
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	44.0		23.0	10.0	44.0		23.0
Max Q Clear Time (g_c+I1), s	2.2	8.2		4.3	2.2	47.0		8.2
Green Ext Time (p_c), s	0.0	16.4		0.5	0.0	0.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	51.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	527	62	38	1275	43	143	6	97	88	20	46
Future Volume (veh/h)	9	527	62	38	1275	43	143	6	97	88	20	46
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		0.99	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	9	555	65	40	1342	45	151	6	102	93	21	48
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	19	902	105	59	1066	36	182	198	157	117	35	79
Arrive On Green	0.01	0.30	0.29	0.04	0.32	0.31	0.11	0.11	0.11	0.07	0.07	0.07
Sat Flow, veh/h	1681	3022	353	1681	3307	111	1681	1765	1479	1681	471	1076
Grp Volume(v), veh/h	9	307	313	40	680	707	151	6	102	93	0	69
Grp Sat Flow(s),veh/h/ln	1681	1676	1699	1681	1676	1741	1681	1765	1479	1681	0	1546
Q Serve(g_s), s	0.5	14.2	14.3	2.1	29.0	29.0	7.9	0.3	6.0	4.9	0.0	3.9
Cycle Q Clear(g_c), s	0.5	14.2	14.3	2.1	29.0	29.0	7.9	0.3	6.0	4.9	0.0	3.9
Prop In Lane	1.00		0.21	1.00		0.06	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	19	500	507	59	540	561	182	198	157	117	0	114
V/C Ratio(X)	0.48	0.61	0.62	0.68	1.26	1.26	0.83	0.03	0.65	0.80	0.00	0.61
Avail Cap(c_a), veh/h	187	522	529	205	540	561	205	471	386	205	0	412
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.41	0.41	0.41	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.2	27.1	27.3	42.9	30.5	30.5	39.3	35.6	38.6	41.2	0.0	40.6
Incr Delay (d2), s/veh	6.4	2.3	2.3	2.1	122.4	123.5	19.9	0.0	1.7	4.6	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	0.3	6.9	7.0	1.0	31.7	33.1	4.7	0.1	2.5	2.4	0.0	1.7
LnGrp Delay(d),s/veh	50.7	29.4	29.6	45.0	152.9	154.0	59.3	35.6	40.3	45.8	0.0	42.5
LnGrp LOS	D	C	C	D	F	F	E	D	D	D		D
Approach Vol, veh/h		629			1427			259			162	
Approach Delay, s/veh		29.8			150.4			51.2			44.4	
Approach LOS		C			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	30.8	10.3	14.1	5.0	33.0	13.7	10.6
Change Period (Y+Rc), s	4.0	5.0	4.0	4.5	4.0	5.0	4.0	4.5
Max Green Setting (Gmax), s	11.0	27.0	11.0	23.5	10.0	28.0	11.0	23.5
Max Q Clear Time (g_c+I1), s	4.1	16.3	6.9	8.0	2.5	31.0	9.9	5.9
Green Ext Time (p_c), s	0.0	8.3	0.0	0.3	0.0	0.0	0.0	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	102.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	209	25	118	1111	45	33	138	12	113	372	657
Future Volume (vph)	139	209	25	118	1111	45	33	138	12	113	372	657
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.95	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	3292		1676	3330		1676	1744		1676	1590	1403
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1676	3292		1676	3330		1676	1744		1676	1590	1403
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	153	230	27	130	1221	49	36	152	13	124	409	722
RTOR Reduction (vph)	0	6	0	0	2	0	0	2	0	0	12	160
Lane Group Flow (vph)	153	251	0	130	1268	0	36	163	0	124	585	374
Confl. Peds. (#/hr)	1					1	2					2
Confl. Bikes (#/hr)			2			2						
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												8
Actuated Green, G (s)	11.0	46.5		13.6	49.1		3.5	34.5		13.1	44.1	44.1
Effective Green, g (s)	11.0	46.5		13.6	49.1		3.5	34.5		13.1	44.1	44.1
Actuated g/C Ratio	0.09	0.36		0.11	0.38		0.03	0.27		0.10	0.35	0.35
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	144	1198		178	1280		45	471		171	549	484
v/s Ratio Prot	c0.09	0.08		0.08	c0.38		0.02	0.09		c0.07	c0.37	
v/s Ratio Perm												0.27
v/c Ratio	1.06	0.21		0.73	0.99		0.80	0.35		0.73	1.06	0.77
Uniform Delay, d1	58.4	27.9		55.3	39.1		61.8	37.5		55.6	41.8	37.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	92.6	0.1		12.4	22.8		61.0	0.2		12.1	56.8	6.8
Delay (s)	151.0	28.1		67.7	61.8		122.8	37.7		67.7	98.6	44.2
Level of Service	F	C		E	E		F	D		E	F	D
Approach Delay (s)		73.9			62.4			52.9			72.4	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	67.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	127.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	52	46	259	64	123	1076
Future Volume (vph)	52	46	259	64	123	1076
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0		5.0		5.0	5.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.94		0.97		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1610		1717		1676	1765
Flt Permitted	0.97		1.00		0.95	1.00
Satd. Flow (perm)	1610		1717		1676	1765
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	58	52	291	72	138	1209
RTOR Reduction (vph)	41	0	10	0	0	0
Lane Group Flow (vph)	69	0	353	0	138	1209
Turn Type	Prot		NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	7.0		40.4		8.3	53.7
Effective Green, g (s)	7.0		40.4		8.3	53.7
Actuated g/C Ratio	0.10		0.57		0.12	0.76
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	159		981		196	1340
v/s Ratio Prot	c0.04		0.21		0.08	c0.69
v/s Ratio Perm						
v/c Ratio	0.43		0.36		0.70	0.90
Uniform Delay, d1	30.0		8.2		30.0	6.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.9		0.2		10.9	8.7
Delay (s)	31.9		8.4		40.9	15.2
Level of Service	C		A		D	B
Approach Delay (s)	31.9		8.4			17.8
Approach LOS	C		A			B

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.4%	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)	110	242	336	603	483	59	80	369	148	43	1424	118
Future Volume (veh/h)	110	242	336	603	483	59	80	369	148	43	1424	118
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	116	255	354	635	508	62	84	388	156	45	1499	124
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	158	693	309	587	1018	124	102	1529	683	57	1439	635
Arrive On Green	0.05	0.21	0.21	0.18	0.34	0.34	0.06	0.46	0.46	0.03	0.43	0.43
Sat Flow, veh/h	3261	3353	1496	3261	3010	366	1681	3353	1498	1681	3353	1479
Grp Volume(v), veh/h	116	255	354	635	282	288	84	388	156	45	1499	124
Grp Sat Flow(s),veh/h/ln	1630	1676	1496	1630	1676	1699	1681	1676	1498	1681	1676	1479
Q Serve(g_s), s	5.3	9.8	31.0	27.0	20.1	20.2	7.4	10.7	9.5	4.0	64.4	7.8
Cycle Q Clear(g_c), s	5.3	9.8	31.0	27.0	20.1	20.2	7.4	10.7	9.5	4.0	64.4	7.8
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	158	693	309	587	567	575	102	1529	683	57	1439	635
V/C Ratio(X)	0.74	0.37	1.15	1.08	0.50	0.50	0.82	0.25	0.23	0.79	1.04	0.20
Avail Cap(c_a), veh/h	217	693	309	587	567	575	112	1529	683	112	1439	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	51.1	59.5	61.5	39.5	39.5	69.6	25.1	24.8	71.9	42.8	26.7
Incr Delay (d2), s/veh	4.4	0.1	96.5	61.3	0.3	0.3	31.3	0.4	0.8	8.8	35.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.5	21.1	17.1	9.4	9.6	4.3	5.0	4.1	2.0	36.8	3.2
LnGrp Delay(d),s/veh	74.8	51.2	156.0	122.8	39.7	39.8	101.0	25.5	25.5	80.7	78.2	26.9
LnGrp LOS	E	D	F	F	D	D	F	C	C	F	F	C
Approach Vol, veh/h		725			1205			628			1668	
Approach Delay, s/veh		106.1			83.5			35.6			74.5	
Approach LOS		F			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	73.9	11.2	55.8	13.1	69.9	31.0	36.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	10.0	63.5	10.0	48.0	10.0	63.5	27.0	31.0
Max Q Clear Time (g_c+I1), s	6.0	12.7	7.3	22.2	9.4	66.4	29.0	33.0
Green Ext Time (p_c), s	0.0	34.2	0.0	4.1	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	76.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	684	92	308	611	140	115	321	322	422	1704	136
Future Volume (veh/h)	109	684	92	308	611	140	115	321	322	422	1704	136
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		0.91	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	116	728	98	328	650	149	122	341	343	449	1813	145
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	738	289	369	953	387	143	849	386	469	2083	166
Arrive On Green	0.05	0.22	0.22	0.11	0.28	0.28	0.09	0.26	0.26	0.28	0.46	0.46
Sat Flow, veh/h	3261	3353	1313	3261	3353	1361	1681	3212	1461	1681	4544	362
Grp Volume(v), veh/h	116	728	98	328	650	149	122	341	343	449	1280	678
Grp Sat Flow(s),veh/h/ln	1630	1676	1313	1630	1676	1361	1681	1606	1461	1681	1606	1694
Q Serve(g_s), s	5.3	32.4	9.4	14.9	25.8	13.2	10.7	13.1	33.9	39.4	53.8	54.2
Cycle Q Clear(g_c), s	5.3	32.4	9.4	14.9	25.8	13.2	10.7	13.1	33.9	39.4	53.8	54.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	159	738	289	369	953	387	143	849	386	469	1472	777
V/C Ratio(X)	0.73	0.99	0.34	0.89	0.68	0.39	0.85	0.40	0.89	0.96	0.87	0.87
Avail Cap(c_a), veh/h	391	738	289	391	953	387	269	849	386	560	1472	777
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	58.3	49.3	65.6	47.7	43.1	67.7	45.4	53.1	53.2	36.6	36.7
Incr Delay (d2), s/veh	2.4	29.7	0.3	19.7	1.7	0.2	5.4	0.4	21.9	24.0	7.2	13.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	18.1	3.5	7.7	12.1	5.0	5.2	5.9	16.0	21.5	25.3	28.1
LnGrp Delay(d),s/veh	72.7	88.0	49.6	85.3	49.3	43.4	73.1	45.9	74.9	77.2	43.8	49.7
LnGrp LOS	E	F	D	F	D	D	E	D	E	E	D	D
Approach Vol, veh/h		942			1127			806			2407	
Approach Delay, s/veh		82.1			59.0			62.4			51.7	
Approach LOS		F			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.8	74.3	21.0	38.0	45.9	45.1	11.3	47.6
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	24.0	56.5	18.0	33.0	50.0	30.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	12.7	56.2	16.9	34.4	41.4	35.9	7.3	27.8
Green Ext Time (p_c), s	0.1	0.3	0.1	0.0	0.5	0.0	0.1	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.3
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	352	5	31	0	0	0	0	356	1266	88	411	0
Future Volume (veh/h)	352	5	31	0	0	0	0	356	1266	88	411	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		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1800	1765	1765				0	1765	1765	1800	1765	0
Adj Flow Rate, veh/h	356	5	0				0	360	0	89	415	0
Adj No. of Lanes	0	1	1				0	2	1	0	2	0
Peak Hour Factor	0.99	0.99	0.99				0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	566	8	512				0	962	430	0	962	0
Arrive On Green	0.34	0.34	0.00				0.00	0.29	0.00	0.00	0.29	0.00
Sat Flow, veh/h	1658	23	1500				0	3441	1500	0	3441	0
Grp Volume(v), veh/h	361	0	0				0	360	0	0	415	0
Grp Sat Flow(s),veh/h/ln	1682	0	1500				0	1676	1500	0	1676	0
Q Serve(g_s), s	6.3	0.0	0.0				0.0	3.0	0.0	0.0	3.5	0.0
Cycle Q Clear(g_c), s	6.3	0.0	0.0				0.0	3.0	0.0	0.0	3.5	0.0
Prop In Lane	0.99		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	574	0	512				0	962	430	0	962	0
V/C Ratio(X)	0.63	0.00	0.00				0.00	0.37	0.00	0.00	0.43	0.00
Avail Cap(c_a), veh/h	1779	0	1587				0	1534	686	0	2876	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	9.7	0.0	0.0				0.0	10.0	0.0	0.0	10.1	0.0
Incr Delay (d2), s/veh	1.9	0.0	0.0				0.0	0.2	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0				0.0	1.4	0.0	0.0	1.7	0.0
LnGrp Delay(d),s/veh	11.6	0.0	0.0				0.0	10.2	0.0	0.0	10.5	0.0
LnGrp LOS	B							B			B	
Approach Vol, veh/h		361						360			415	
Approach Delay, s/veh		11.6						10.2			10.5	
Approach LOS		B						B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		18.9		16.0			0.0	16.0
Change Period (Y+Rc), s		7.0		6.0			5.5	6.0
Max Green Setting (Gmax), s		37.0		30.0			8.5	16.0
Max Q Clear Time (g_c+I1), s		8.3		5.5			0.0	5.0
Green Ext Time (p_c), s		4.0		4.5			0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	10.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	356	3	4	1724	2	62	0	4	2	0	9
Future Volume (veh/h)	3	356	3	4	1724	2	62	0	4	2	0	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	440	4	5	2128	2	77	0	5	2	0	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	1850	17	9	1871	2	180	0	126	50	12	90
Arrive On Green	0.00	0.54	0.53	0.01	1.00	1.00	0.08	0.00	0.08	0.08	0.00	0.08
Sat Flow, veh/h	1681	3405	31	1681	3437	3	1177	0	1484	48	144	1059
Grp Volume(v), veh/h	4	217	227	5	1038	1092	77	0	5	13	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1759	1681	1676	1764	1177	0	1484	1252	0	0
Q Serve(g_s), s	0.2	6.1	6.1	0.3	49.0	49.0	0.1	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	6.1	6.1	0.3	49.0	49.0	6.1	0.0	0.3	6.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.15		0.85
Lane Grp Cap(c), veh/h	7	911	956	9	913	960	180	0	126	153	0	0
V/C Ratio(X)	0.56	0.24	0.24	0.57	1.14	1.14	0.43	0.00	0.04	0.09	0.00	0.00
Avail Cap(c_a), veh/h	75	913	958	75	913	960	448	0	412	436	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	0.61	0.61	0.61	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.7	10.8	10.8	44.4	0.0	0.0	40.5	0.0	37.8	38.0	0.0	0.0
Incr Delay (d2), s/veh	46.4	0.1	0.1	30.9	70.3	70.1	0.6	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.8	3.0	0.2	17.8	18.7	1.9	0.0	0.1	0.3	0.0	0.0
LnGrp Delay(d),s/veh	91.1	10.9	10.9	75.3	70.3	70.1	41.1	0.0	37.9	38.1	0.0	0.0
LnGrp LOS	F	B	B	E	F	F	D		D	D		
Approach Vol, veh/h		448			2135			82			13	
Approach Delay, s/veh		11.6			70.3			40.9			38.1	
Approach LOS		B			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	52.9		11.7	4.4	53.0		11.7
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	4.0	48.0		25.0	4.0	48.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	8.1		8.0	2.2	51.0		8.1
Green Ext Time (p_c), s	0.0	1.2		0.0	0.0	0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	59.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	387	867	67	27	400	114	54	412	42	83	190	133
Future Volume (veh/h)	387	867	67	27	400	114	54	412	42	83	190	133
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		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	407	913	71	28	421	120	57	434	44	87	200	140
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	347	1248	97	57	578	163	87	434	44	109	510	432
Arrive On Green	0.21	0.40	0.40	0.03	0.22	0.22	0.05	0.28	0.28	0.06	0.29	0.29
Sat Flow, veh/h	1681	3147	245	1681	2582	729	1681	1576	160	1681	1765	1495
Grp Volume(v), veh/h	407	486	498	28	272	269	57	0	478	87	200	140
Grp Sat Flow(s),veh/h/ln	1681	1676	1715	1681	1676	1634	1681	0	1736	1681	1765	1495
Q Serve(g_s), s	18.0	21.5	21.5	1.4	13.1	13.3	2.9	0.0	24.0	4.5	7.9	6.4
Cycle Q Clear(g_c), s	18.0	21.5	21.5	1.4	13.1	13.3	2.9	0.0	24.0	4.5	7.9	6.4
Prop In Lane	1.00		0.14	1.00		0.45	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	347	665	680	57	375	366	87	0	478	109	510	432
V/C Ratio(X)	1.17	0.73	0.73	0.49	0.72	0.74	0.66	0.00	1.00	0.80	0.39	0.32
Avail Cap(c_a), veh/h	347	665	680	116	423	412	116	0	478	116	510	432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.6	22.4	22.4	41.4	31.3	31.4	40.6	0.0	31.6	40.2	24.9	24.3
Incr Delay (d2), s/veh	104.2	4.5	4.4	2.4	6.1	6.7	3.2	0.0	41.3	27.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.3	10.7	10.9	0.7	6.7	6.7	1.4	0.0	16.9	2.9	3.9	2.7
LnGrp Delay(d),s/veh	138.8	26.8	26.8	43.8	37.4	38.1	43.7	0.0	72.9	67.3	25.1	24.5
LnGrp LOS	F	C	C	D	D	D	D		F	E	C	C
Approach Vol, veh/h		1391			569			535			427	
Approach Delay, s/veh		59.6			38.1			69.8			33.5	
Approach LOS		E			D			E			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	8.0	39.6	10.7	29.0	23.0	24.5	9.5	30.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	34.0	6.0	24.0	18.0	22.0	6.0	24.0
Max Q Clear Time (g_c+I1), s	3.4	23.5	6.5	26.0	20.0	15.3	4.9	9.9
Green Ext Time (p_c), s	0.0	7.8	0.0	0.0	0.0	4.2	0.0	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	53.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	1392	171	360	648	77	248	486	547	138	262	55
Future Volume (veh/h)	127	1392	171	360	648	77	248	486	547	138	262	55
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	135	1481	182	383	689	0	264	517	582	147	279	59
Adj No. of Lanes	1	3	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	156	1946	239	429	2344	0	312	626	474	169	528	110
Arrive On Green	0.09	0.45	0.45	0.13	0.49	0.00	0.10	0.19	0.19	0.10	0.19	0.19
Sat Flow, veh/h	1681	4345	534	3261	4976	0	3261	3353	1483	1681	2758	574
Grp Volume(v), veh/h	135	1094	569	383	689	0	264	517	582	147	168	170
Grp Sat Flow(s),veh/h/ln	1681	1606	1667	1630	1606	0	1630	1676	1483	1681	1676	1656
Q Serve(g_s), s	11.9	42.8	42.9	17.3	12.9	0.0	12.0	22.2	28.0	12.9	13.5	13.9
Cycle Q Clear(g_c), s	11.9	42.8	42.9	17.3	12.9	0.0	12.0	22.2	28.0	12.9	13.5	13.9
Prop In Lane	1.00		0.32	1.00		0.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	156	1438	746	429	2344	0	312	626	474	169	321	317
V/C Ratio(X)	0.87	0.76	0.76	0.89	0.29	0.00	0.85	0.83	1.23	0.87	0.52	0.54
Avail Cap(c_a), veh/h	235	1438	746	543	2344	0	609	626	474	314	321	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.84	0.84	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.1	34.7	34.7	64.1	23.1	0.0	66.7	58.7	51.2	66.5	54.5	54.6
Incr Delay (d2), s/veh	11.4	3.3	6.2	10.9	0.1	0.0	2.5	8.4	119.7	5.2	0.7	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	19.7	21.0	8.5	5.7	0.0	5.5	11.1	35.4	6.2	6.3	6.5
LnGrp Delay(d),s/veh	78.5	37.9	40.9	75.0	23.1	0.0	69.2	67.0	170.9	71.7	55.2	55.6
LnGrp LOS	E	D	D	E	C		E	E	F	E	E	E
Approach Vol, veh/h		1798			1072			1363			485	
Approach Delay, s/veh		41.9			41.7			111.8			60.4	
Approach LOS		D			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.7	72.2	19.3	33.7	18.9	78.0	20.1	33.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	49.0	28.0	28.0	21.0	53.0	28.0	28.0
Max Q Clear Time (g_c+I1), s	19.3	44.9	14.0	15.9	13.9	14.9	14.9	30.0
Green Ext Time (p_c), s	0.4	3.9	0.4	4.0	0.1	30.0	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	63.9
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	306	667	126	222	295	95	257	1416	744	89	514	153
Future Volume (veh/h)	306	667	126	222	295	95	257	1416	744	89	514	153
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	340	741	140	247	328	106	286	1573	827	99	571	170
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	349	766	336	256	499	158	309	1642	720	119	1264	561
Arrive On Green	0.11	0.23	0.23	0.08	0.20	0.20	0.18	0.49	0.49	0.07	0.38	0.38
Sat Flow, veh/h	3261	3353	1471	3261	2493	791	1681	3353	1470	1681	3353	1489
Grp Volume(v), veh/h	340	741	140	247	219	215	286	1573	827	99	571	170
Grp Sat Flow(s),veh/h/ln	1630	1676	1471	1630	1676	1607	1681	1676	1470	1681	1676	1489
Q Serve(g_s), s	14.6	30.6	11.4	10.6	16.8	17.3	23.4	63.1	68.6	8.1	17.9	11.2
Cycle Q Clear(g_c), s	14.6	30.6	11.4	10.6	16.8	17.3	23.4	63.1	68.6	8.1	17.9	11.2
Prop In Lane	1.00		1.00	1.00		0.49	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	349	766	336	256	335	321	309	1642	720	119	1264	561
V/C Ratio(X)	0.97	0.97	0.42	0.96	0.65	0.67	0.93	0.96	1.15	0.83	0.45	0.30
Avail Cap(c_a), veh/h	349	766	336	256	335	321	432	1642	720	120	1264	561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.3	53.5	46.0	64.3	51.5	51.7	56.2	34.3	35.7	64.2	32.8	30.7
Incr Delay (d2), s/veh	40.7	24.4	0.3	45.9	3.5	4.3	17.9	14.2	82.6	34.6	0.4	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	8.5	16.8	4.7	6.4	8.1	8.1	12.4	32.3	44.2	4.9	8.4	4.7
LnGrp Delay(d),s/veh	103.0	77.9	46.3	110.2	55.1	56.1	74.1	48.5	118.3	98.8	33.1	31.1
LnGrp LOS	F	E	D	F	E	E	E	D	F	F	C	C
Approach Vol, veh/h		1221			681			2686			840	
Approach Delay, s/veh		81.3			75.4			72.7			40.5	
Approach LOS		F			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.9	74.1	19.0	33.0	29.7	58.3	15.0	37.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	10.0	68.5	15.0	28.0	36.0	42.5	11.0	32.0
Max Q Clear Time (g_c+I1), s	10.1	70.6	16.6	19.3	25.4	19.9	12.6	32.6
Green Ext Time (p_c), s	0.0	0.0	0.0	3.7	0.3	21.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	70.0
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	492	131	265	539	446	185	1708	179	191	553	149
Future Volume (veh/h)	395	492	131	265	539	446	185	1708	179	191	553	149
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.95	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	429	535	142	288	586	485	201	1857	195	208	601	162
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	419	737	316	332	647	276	224	1880	196	204	1566	414
Arrive On Green	0.13	0.22	0.22	0.10	0.19	0.19	0.13	0.43	0.43	0.12	0.41	0.41
Sat Flow, veh/h	3261	3353	1439	3261	3353	1430	1681	4422	461	1681	3790	1001
Grp Volume(v), veh/h	429	535	142	288	586	485	201	1345	707	208	507	256
Grp Sat Flow(s),veh/h/ln	1630	1676	1439	1630	1676	1430	1681	1606	1672	1681	1606	1579
Q Serve(g_s), s	18.0	20.7	12.0	12.2	23.9	27.0	16.5	58.0	58.9	17.0	15.4	15.9
Cycle Q Clear(g_c), s	18.0	20.7	12.0	12.2	23.9	27.0	16.5	58.0	58.9	17.0	15.4	15.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.28	1.00		0.63
Lane Grp Cap(c), veh/h	419	737	316	332	647	276	224	1365	711	204	1327	652
V/C Ratio(X)	1.02	0.73	0.45	0.87	0.91	1.76	0.90	0.99	0.99	1.02	0.38	0.39
Avail Cap(c_a), veh/h	419	737	316	349	647	276	324	1365	711	204	1327	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.0	50.7	47.3	62.0	55.3	56.5	59.7	39.8	40.1	61.5	28.6	28.8
Incr Delay (d2), s/veh	50.0	3.1	0.4	18.5	16.1	356.0	15.8	20.9	32.3	68.1	0.8	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	0.2	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	9.9	4.8	6.3	12.5	37.9	8.6	29.6	33.5	11.7	7.0	7.2
LnGrp Delay(d),s/veh	111.0	53.8	47.7	80.5	71.4	412.5	75.6	60.8	72.3	129.7	29.5	30.5
LnGrp LOS	F	D	D	F	E	F	E	E	E	F	C	C
Approach Vol, veh/h		1106			1359			2253			971	
Approach Delay, s/veh		75.2			195.1			65.7			51.2	
Approach LOS		E			F			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.6	63.4	18.2	35.8	21.0	65.0	22.0	32.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	27.0	49.5	15.0	30.0	17.0	59.5	18.0	27.0
Max Q Clear Time (g_c+I1), s	18.5	17.9	14.2	22.7	19.0	60.9	20.0	29.0
Green Ext Time (p_c), s	0.2	28.5	0.1	3.8	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	96.0
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	365	144	117	367	288	0	0	235	1885
Future Volume (vph)	0	0	0	365	144	117	367	288	0	0	235	1885
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				7.0	7.0	7.0	5.5	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.99	1.00	1.00			1.00	0.99
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1593	1640	1481	1676	3353			3353	1482
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1593	1640	1481	1676	3353			3353	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	372	147	119	374	294	0	0	240	1923
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	257	262	27	374	294	0	0	240	1923
Confl. Peds. (#/hr)							1		1	1		1
Confl. Bikes (#/hr)						1						
Turn Type				Split	NA	Perm	Prot	NA			NA	Free
Protected Phases				1	1		3	8			4	
Permitted Phases						1						Free
Actuated Green, G (s)				12.7	12.7	12.7	16.1	31.1			9.5	56.8
Effective Green, g (s)				12.7	12.7	12.7	16.1	31.1			9.5	56.8
Actuated g/C Ratio				0.22	0.22	0.22	0.28	0.55			0.17	1.00
Clearance Time (s)				7.0	7.0	7.0	5.5	6.0			6.0	
Vehicle Extension (s)				4.5	4.5	4.5	3.0	3.0			3.0	
Lane Grp Cap (vph)				356	366	331	475	1835			560	1482
v/s Ratio Prot				0.16	0.16		0.22	0.09			0.07	
v/s Ratio Perm						0.02						c1.30
v/c Ratio				0.72	0.72	0.08	0.79	0.16			0.43	1.30
Uniform Delay, d1				20.4	20.4	17.4	18.8	6.4			21.2	28.4
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				8.0	7.4	0.2	8.4	0.0			0.5	139.0
Delay (s)				28.4	27.8	17.6	27.2	6.4			21.7	167.4
Level of Service				C	C	B	C	A			C	F
Approach Delay (s)		0.0			26.1			18.0			151.2	
Approach LOS		A			C			B			F	

Intersection Summary			
HCM 2000 Control Delay	102.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.92		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	18.5
Intersection Capacity Utilization	65.0%	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 (vph)	339	0	709	0	0	0	0	1499	379	0	330	285
Future Volume (vph)	339	0	709	0	0	0	0	1499	379	0	330	285
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	4.5	4.5					6.0			6.0	4.0
Lane Util. Factor	0.95	0.91	0.95					0.91			0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00					1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00					1.00			1.00	1.00
Frt	1.00	0.86	0.85					0.97			1.00	0.85
Flt Protected	0.95	1.00	1.00					1.00			1.00	1.00
Satd. Flow (prot)	1593	1380	1425					4652			3353	1500
Flt Permitted	0.95	1.00	1.00					1.00			1.00	1.00
Satd. Flow (perm)	1593	1380	1425					4652			3353	1500
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	373	0	779	0	0	0	0	1647	416	0	363	313
RTOR Reduction (vph)	0	269	291	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	336	142	114	0	0	0	0	2063	0	0	363	313
Confl. Peds. (#/hr)									1	1		
Turn Type	Split	NA	Perm					NA			NA	Free
Protected Phases	4	4						2			6	
Permitted Phases			4									Free
Actuated Green, G (s)	16.0	16.0	16.0					30.3			30.3	56.8
Effective Green, g (s)	16.0	16.0	16.0					30.3			30.3	56.8
Actuated g/C Ratio	0.28	0.28	0.28					0.53			0.53	1.00
Clearance Time (s)	4.5	4.5	4.5					6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)	448	388	401					2481			1788	1500
v/s Ratio Prot	c0.21	0.10						c0.44			0.11	
v/s Ratio Perm			0.08									0.21
v/c Ratio	0.75	0.37	0.28					0.83			0.20	0.21
Uniform Delay, d1	18.6	16.3	15.9					11.1			6.9	0.0
Progression Factor	1.00	1.00	1.00					1.00			1.00	1.00
Incremental Delay, d2	6.9	0.6	0.4					2.5			0.1	0.3
Delay (s)	25.5	16.9	16.3					13.6			7.0	0.3
Level of Service	C	B	B					B			A	A
Approach Delay (s)		19.2			0.0			13.6			3.9	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	10.5
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	926	54	125	1183	182	500
Future Volume (vph)	926	54	125	1183	182	500
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.4	4.4	4.4	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3315		1676	3353	1676	1479
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3315		1676	3353	1676	1479
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1064	62	144	1360	209	575
RTOR Reduction (vph)	5	0	0	0	0	463
Lane Group Flow (vph)	1121	0	144	1360	209	112
Confl. Peds. (#/hr)		14	14		1	1
Confl. Bikes (#/hr)		2				
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	3 6	4	
Permitted Phases						4
Actuated Green, G (s)	29.0		7.0	65.7	13.0	13.0
Effective Green, g (s)	30.0		7.6	66.3	13.6	13.0
Actuated g/C Ratio	0.34		0.09	0.75	0.15	0.15
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	2.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1121		143	2506	256	216
v/s Ratio Prot	c0.34		c0.09	c0.41	c0.12	
v/s Ratio Perm						0.08
v/c Ratio	1.00		1.01	0.54	0.82	0.52
Uniform Delay, d1	29.4		40.6	4.8	36.3	35.0
Progression Factor	1.00		1.28	0.46	1.00	1.00
Incremental Delay, d2	27.0		75.8	0.2	17.9	2.3
Delay (s)	56.3		127.7	2.4	54.2	37.2
Level of Service	E		F	A	D	D
Approach Delay (s)	56.3			14.4	41.8	
Approach LOS	E			B	D	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	17.2
Intersection Capacity Utilization	69.2%	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)	409	435	670	316	1198	738	145	677	160	304	575	189
Future Volume (veh/h)	409	435	670	316	1198	738	145	677	160	304	575	189
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	454	483	744	351	1331	820	161	752	178	338	639	210
Adj No. of Lanes	2	2	1	1	2	1	1	2	1	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	376	954	398	271	1109	673	139	986	419	419	599	678
Arrive On Green	0.12	0.28	0.27	0.16	0.33	0.33	0.08	0.30	0.29	0.17	0.46	0.46
Sat Flow, veh/h	3261	3353	1459	1681	3353	1436	1648	3288	1453	3198	1731	1456
Grp Volume(v), veh/h	454	483	744	351	1331	820	161	752	178	338	639	210
Grp Sat Flow(s),veh/h/ln	1630	1676	1459	1681	1676	1436	1648	1644	1453	1599	1731	1456
Q Serve(g_s), s	15.0	15.7	35.5	21.0	43.0	43.0	11.0	27.0	12.9	13.2	45.0	10.3
Cycle Q Clear(g_c), s	15.0	15.7	35.5	21.0	43.0	43.0	11.0	27.0	12.9	13.2	45.0	10.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	954	398	271	1109	673	139	986	419	419	599	678
V/C Ratio(X)	1.21	0.51	1.87	1.29	1.20	1.22	1.15	0.76	0.43	0.81	1.07	0.31
Avail Cap(c_a), veh/h	376	954	398	271	1109	673	139	986	419	531	599	678
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.99	0.99	0.99	0.09	0.09	0.09	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	57.5	38.9	47.2	54.5	43.5	35.0	59.5	41.3	37.5	52.1	35.1	17.6
Incr Delay (d2), s/veh	115.3	0.2	399.8	134.4	90.9	99.8	123.7	5.6	3.1	6.1	53.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	7.3	58.6	19.9	33.9	42.7	9.8	13.0	5.5	6.2	30.2	4.3
LnGrp Delay(d),s/veh	172.8	39.1	447.1	188.9	134.4	134.7	183.2	46.9	40.7	58.2	88.0	18.6
LnGrp LOS	F	D	F	F	F	F	F	D	D	E	F	B
Approach Vol, veh/h		1681			2502			1091			1187	
Approach Delay, s/veh		255.8			142.2			66.0			67.3	
Approach LOS		F			F			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	43.0	25.0	41.0	15.0	49.0	19.0	47.0
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	20.5	32.9	19.9	35.5	9.9	43.5	13.9	41.5
Max Q Clear Time (g_c+I1), s	15.2	29.0	23.0	37.5	13.0	47.0	17.0	45.0
Green Ext Time (p_c), s	0.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	145.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	835	3	4	2268	2	66	5	4	2	5	9
Future Volume (veh/h)	3	835	3	4	2268	2	66	5	4	2	5	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	1031	4	5	2800	2	81	6	5	2	6	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	1938	8	293	1945	1	201	8	118	56	41	62
Arrive On Green	0.55	0.57	0.55	0.55	0.57	0.55	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	97	3425	13	543	3438	2	1384	102	1483	49	520	782
Grp Volume(v), veh/h	4	505	530	5	1365	1437	87	0	5	19	0	0
Grp Sat Flow(s),veh/h/ln	97	1676	1762	543	1676	1764	1486	0	1483	1350	0	0
Q Serve(g_s), s	0.0	14.2	14.2	0.4	43.0	43.0	0.0	0.0	0.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	42.0	14.2	14.2	14.7	43.0	43.0	4.2	0.0	0.2	4.2	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.93		1.00	0.11		0.58
Lane Grp Cap(c), veh/h	95	949	997	293	949	998	209	0	118	160	0	0
V/C Ratio(X)	0.04	0.53	0.53	0.02	1.44	1.44	0.42	0.00	0.04	0.12	0.00	0.00
Avail Cap(c_a), veh/h	95	949	997	293	949	998	559	0	488	546	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	38.0	10.2	10.3	15.4	16.5	16.5	34.2	0.0	32.3	32.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.0	198.2	198.3	0.5	0.0	0.1	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	6.5	6.9	0.1	71.7	75.5	1.8	0.0	0.1	0.4	0.0	0.0
LnGrp Delay(d),s/veh	38.1	10.6	10.6	15.4	214.7	214.8	34.6	0.0	32.4	32.7	0.0	0.0
LnGrp LOS	D	B	B	B	F	F	C		C	C		
Approach Vol, veh/h		1039			2807			92			19	
Approach Delay, s/veh		10.7			214.4			34.5			32.7	
Approach LOS		B			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		47.0		10.0		47.0		10.0
Change Period (Y+Rc), s		5.0		4.0		5.0		4.0
Max Green Setting (Gmax), s		42.0		25.0		42.0		25.0
Max Q Clear Time (g_c+I1), s		44.0		6.2		45.0		6.2
Green Ext Time (p_c), s		0.0		0.1		0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	155.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	801	27	5	2094	12	83	1	45	24	5	16
Future Volume (veh/h)	3	801	27	5	2094	12	83	1	45	24	5	16
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	4	954	32	6	2493	14	99	1	54	29	6	19
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	1644	55	18	1709	10	181	7	66	147	38	67
Arrive On Green	0.01	0.50	0.49	0.02	1.00	0.98	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1681	3311	111	1681	3418	19	909	57	521	670	299	526
Grp Volume(v), veh/h	4	483	503	6	1221	1286	154	0	0	54	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1745	1681	1676	1761	1486	0	0	1495	0	0
Q Serve(g_s), s	0.2	18.3	18.4	0.3	45.0	45.0	6.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	18.3	18.4	0.3	45.0	45.0	9.0	0.0	0.0	2.8	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.01	0.64		0.35	0.54		0.35
Lane Grp Cap(c), veh/h	12	832	867	18	838	880	255	0	0	252	0	0
V/C Ratio(X)	0.32	0.58	0.58	0.33	1.46	1.46	0.60	0.00	0.00	0.21	0.00	0.00
Avail Cap(c_a), veh/h	187	838	873	187	838	880	437	0	0	435	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.35	0.35	0.35	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	16.0	16.0	43.7	0.0	0.0	38.0	0.0	0.0	35.4	0.0	0.0
Incr Delay (d2), s/veh	13.1	0.9	0.9	3.6	208.0	209.4	2.3	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	8.7	9.0	0.2	48.4	51.2	3.9	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	57.6	16.9	16.9	47.3	208.0	209.4	40.3	0.0	0.0	35.9	0.0	0.0
LnGrp LOS	E	B	B	D	F	F	D			D		
Approach Vol, veh/h		990			2513			154			54	
Approach Delay, s/veh		17.1			208.3			40.3			35.9	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.0	48.7		15.5	4.7	49.0		15.5
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	44.0		23.0	10.0	44.0		23.0
Max Q Clear Time (g_c+I1), s	2.3	20.4		4.8	2.2	47.0		11.0
Green Ext Time (p_c), s	0.0	20.5		0.8	0.0	0.0		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	147.8
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1041	40	2	1751	10	116	5	9	12	1	31
Future Volume (veh/h)	7	1041	40	2	1751	10	116	5	9	12	1	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1800	1800	1765	1800
Adj Flow Rate, veh/h	7	1052	40	2	1769	10	117	5	9	12	1	31
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	15	1593	61	5	1633	9	220	6	11	79	24	126
Arrive On Green	0.01	0.48	0.47	0.01	0.96	0.93	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1681	3292	125	1681	3418	19	1299	55	100	257	217	1131
Grp Volume(v), veh/h	7	536	556	2	867	912	131	0	0	44	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1741	1681	1676	1761	1454	0	0	1605	0	0
Q Serve(g_s), s	0.4	21.8	21.8	0.1	43.0	43.0	5.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	21.8	21.8	0.1	43.0	43.0	7.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.01	0.89		0.07	0.27		0.70
Lane Grp Cap(c), veh/h	15	811	842	5	801	841	238	0	0	230	0	0
V/C Ratio(X)	0.47	0.66	0.66	0.44	1.08	1.08	0.55	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	187	811	842	187	801	841	468	0	0	474	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.44	0.44	0.44	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.4	17.6	17.6	44.7	2.0	2.0	38.8	0.0	0.0	36.6	0.0	0.0
Incr Delay (d2), s/veh	6.9	1.5	1.5	10.5	47.3	47.5	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	10.3	10.7	0.1	20.8	21.8	3.2	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	51.2	19.1	19.1	55.2	49.3	49.5	39.6	0.0	0.0	36.7	0.0	0.0
LnGrp LOS	D	B	B	E	F	F	D			D		
Approach Vol, veh/h		1099			1781			131			44	
Approach Delay, s/veh		19.3			49.4			39.6			36.7	
Approach LOS		B			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	47.6		14.0	4.8	47.0		14.0
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	10.0	42.0		25.0	10.0	42.0		25.0
Max Q Clear Time (g_c+I1), s	2.1	23.8		4.3	2.4	45.0		9.8
Green Ext Time (p_c), s	0.0	11.1		0.3	0.0	0.0		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	38.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	937	91	38	1694	59	148	6	97	94	20	60
Future Volume (veh/h)	21	937	91	38	1694	59	148	6	97	94	20	60
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		0.99	1.00		0.97	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	22	986	96	40	1783	62	156	6	102	99	21	63
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	80	1474	144	195	1578	55	187	216	173	124	33	98
Arrive On Green	0.47	0.48	0.47	0.47	0.48	0.47	0.11	0.12	0.12	0.07	0.09	0.08
Sat Flow, veh/h	250	3086	300	519	3303	114	1681	1765	1481	1681	384	1152
Grp Volume(v), veh/h	22	536	546	40	900	945	156	6	102	99	0	84
Grp Sat Flow(s),veh/h/ln	250	1676	1710	519	1676	1741	1681	1765	1481	1681	0	1535
Q Serve(g_s), s	0.0	22.1	22.1	5.9	43.0	43.0	8.2	0.3	5.9	5.2	0.0	4.8
Cycle Q Clear(g_c), s	42.0	22.1	22.1	28.0	43.0	43.0	8.2	0.3	5.9	5.2	0.0	4.8
Prop In Lane	1.00		0.18	1.00		0.07	1.00		1.00	1.00		0.75
Lane Grp Cap(c), veh/h	80	801	817	195	801	832	187	216	173	124	0	131
V/C Ratio(X)	0.27	0.67	0.67	0.21	1.12	1.14	0.84	0.03	0.59	0.80	0.00	0.64
Avail Cap(c_a), veh/h	80	801	817	195	801	832	205	471	387	205	0	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.64	0.64	0.64	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.0	18.0	18.1	29.6	23.5	23.5	39.2	34.8	37.7	41.0	0.0	40.0
Incr Delay (d2), s/veh	1.7	1.6	1.5	0.2	57.5	62.8	21.2	0.0	1.2	4.4	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	0.6	10.5	10.7	0.8	32.6	35.1	4.9	0.1	2.5	2.6	0.0	2.1
LnGrp Delay(d),s/veh	46.7	19.6	19.6	29.8	81.0	86.3	60.4	34.8	38.9	45.4	0.0	42.0
LnGrp LOS	D	B	B	C	F	F	E	C	D	D		D
Approach Vol, veh/h		1104			1885			264			183	
Approach Delay, s/veh		20.2			82.6			51.5			43.8	
Approach LOS		C			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		47.0	10.6	15.0		47.0	14.0	11.7
Change Period (Y+Rc), s		5.0	4.0	4.5		5.0	4.0	4.5
Max Green Setting (Gmax), s		42.0	11.0	23.5		42.0	11.0	23.5
Max Q Clear Time (g_c+I1), s		44.0	7.2	7.9		45.0	10.2	6.8
Green Ext Time (p_c), s		0.0	0.0	0.3		0.0	0.0	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	58.1
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	238	89	168	1275	44	59	138	12	110	651	985
Future Volume (veh/h)	165	238	89	168	1275	44	59	138	12	110	651	985
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	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	181	262	98	185	1401	48	65	152	13	121	715	1082
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	123	679	247	206	1102	38	67	602	52	142	741	629
Arrive On Green	0.07	0.28	0.28	0.12	0.33	0.33	0.04	0.38	0.38	0.08	0.42	0.42
Sat Flow, veh/h	1681	2393	870	1681	3305	113	1681	1603	137	1681	1765	1498
Grp Volume(v), veh/h	181	181	179	185	710	739	65	0	165	121	715	1082
Grp Sat Flow(s),veh/h/ln	1681	1676	1586	1681	1676	1742	1681	0	1740	1681	1765	1498
Q Serve(g_s), s	11.0	13.0	13.6	16.3	50.0	50.0	5.8	0.0	9.8	10.7	59.3	63.0
Cycle Q Clear(g_c), s	11.0	13.0	13.6	16.3	50.0	50.0	5.8	0.0	9.8	10.7	59.3	63.0
Prop In Lane	1.00		0.55	1.00		0.06	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	123	476	450	206	559	581	67	0	654	142	741	629
V/C Ratio(X)	1.47	0.38	0.40	0.90	1.27	1.27	0.97	0.00	0.25	0.85	0.96	1.72
Avail Cap(c_a), veh/h	123	476	450	303	559	581	67	0	654	213	741	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.5	43.1	43.4	64.8	50.0	50.0	71.9	0.0	32.3	67.8	42.4	43.5
Incr Delay (d2), s/veh	249.5	0.7	0.8	16.0	135.0	136.2	97.4	0.0	0.1	12.8	24.4	330.7
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	13.6	6.1	6.1	8.5	44.1	46.0	4.5	0.0	4.7	5.4	33.8	83.8
LnGrp Delay(d),s/veh	319.0	43.8	44.2	80.8	185.0	186.2	169.3	0.0	32.4	80.6	66.9	374.2
LnGrp LOS	F	D	D	F	F	F	F		C	F	E	F
Approach Vol, veh/h		541			1634			230			1918	
Approach Delay, s/veh		136.0			173.8			71.1			241.1	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.4	47.6	17.6	61.4	16.0	55.0	11.0	68.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	27.0	34.0	19.0	50.0	11.0	50.0	6.0	63.0
Max Q Clear Time (g_c+I1), s	18.3	15.6	12.7	11.8	13.0	52.0	7.8	65.0
Green Ext Time (p_c), s	0.2	14.2	0.1	8.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	193.4
HCM 2010 LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	52	46	258	65	766	1675
Future Volume (vph)	52	46	258	65	766	1675
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0		5.0		5.0	5.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.94		0.97		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1610		1717		1676	1765
Flt Permitted	0.97		1.00		0.95	1.00
Satd. Flow (perm)	1610		1717		1676	1765
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	58	52	290	73	861	1882
RTOR Reduction (vph)	21	0	6	0	0	0
Lane Group Flow (vph)	89	0	357	0	861	1882
Turn Type	Prot		NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	10.0		42.2		82.8	130.0
Effective Green, g (s)	10.0		42.2		82.8	130.0
Actuated g/C Ratio	0.07		0.28		0.55	0.87
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	107		483		925	1529
v/s Ratio Prot	c0.06		0.21		0.51	c1.07
v/s Ratio Perm						
v/c Ratio	0.83		0.74		0.93	1.23
Uniform Delay, d1	69.1		48.9		31.0	10.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	38.4		5.9		15.5	109.8
Delay (s)	107.6		54.8		46.5	119.8
Level of Service	F		D		D	F
Approach Delay (s)	107.6		54.8			96.8
Approach LOS	F		D			F

Intersection Summary			
HCM 2000 Control Delay	92.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	109.7%	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 (vph)	110	665	232	633	1825	37	291	190	216	90	607	90
Future Volume (vph)	110	665	232	633	1825	37	291	190	216	90	607	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4598		3252	4802		1526	3147	1491	1676	3282	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4598		3252	4802		1526	3147	1491	1676	3282	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	731	255	696	2005	41	320	209	237	99	667	99
RTOR Reduction (vph)	0	45	0	0	1	0	0	0	149	0	8	0
Lane Group Flow (vph)	121	941	0	696	2045	0	173	356	88	99	758	0
Confl. Peds. (#/hr)	2		7	7		2	1		2	2		1
Confl. Bikes (#/hr)			2									
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	10.0	32.1		30.9	53.0		20.9	20.9	51.8	36.1	36.1	
Effective Green, g (s)	10.0	32.1		30.9	53.0		20.9	20.9	51.8	36.1	36.1	
Actuated g/C Ratio	0.07	0.23		0.22	0.38		0.15	0.15	0.37	0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	119	1054		717	1817		227	469	551	432	846	
v/s Ratio Prot	0.07	0.20		c0.21	c0.43		c0.11	0.11	0.04	0.06	c0.23	
v/s Ratio Perm									0.02			
v/c Ratio	1.02	0.89		0.97	1.13		0.76	0.76	0.16	0.23	0.90	
Uniform Delay, d1	65.0	52.3		54.1	43.5		57.2	57.1	29.5	41.0	50.1	
Progression Factor	1.26	0.58		1.32	0.99		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	85.2	11.1		5.1	57.2		12.7	6.2	0.0	0.1	11.7	
Delay (s)	167.1	41.3		76.3	100.4		69.9	63.3	29.6	41.1	61.9	
Level of Service	F	D		E	F		E	E	C	D	E	
Approach Delay (s)		55.1			94.3			54.4			59.5	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	75.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.6%	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 (vph)	150	671	0	13	1858	47	3	0	0	125	1	938
Future Volume (vph)	150	671	0	13	1858	47	3	0	0	125	1	938
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00			0.95	0.91	0.95
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	0.96	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00			1.00	0.85	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95			0.95	1.00	1.00
Satd. Flow (prot)	1676	4818		1676	4798		1676			1593	1321	1372
Flt Permitted	0.95	1.00		0.95	1.00		0.95			0.95	1.00	1.00
Satd. Flow (perm)	1676	4818		1676	4798		1676			1593	1321	1372
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	176	789	0	15	2186	55	4	0	0	147	1	1104
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	157	157
Lane Group Flow (vph)	176	789	0	15	2239	0	4	0	0	132	400	406
Confl. Peds. (#/hr)	3		9	9		3	17					17
Confl. Bikes (#/hr)						4						
Turn Type	Prot	NA		Prot	NA		Split			Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												4
Actuated Green, G (s)	14.0	73.1		2.4	62.0		6.0			38.5	38.5	38.5
Effective Green, g (s)	14.0	73.1		2.4	62.0		6.0			38.5	38.5	38.5
Actuated g/C Ratio	0.10	0.52		0.02	0.44		0.04			0.28	0.28	0.28
Clearance Time (s)	4.0	5.5		4.0	5.0		5.0			5.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	167	2515		28	2124		71			438	363	377
v/s Ratio Prot	c0.10	0.16		0.01	c0.47		c0.00			0.08	c0.30	
v/s Ratio Perm												0.30
v/c Ratio	1.05	0.31		0.54	1.05		0.06			0.30	1.10	1.08
Uniform Delay, d1	63.0	19.1		68.2	39.0		64.3			40.1	50.8	50.8
Progression Factor	0.56	0.80		1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	72.7	0.2		9.5	35.7		0.1			0.1	77.3	68.2
Delay (s)	108.1	15.4		77.8	74.7		64.4			40.3	128.0	118.9
Level of Service	F	B		E	E		E			D	F	F
Approach Delay (s)		32.3			74.7			64.4			114.7	
Approach LOS		C			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	76.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.5%	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)	110	245	336	663	618	77	80	379	163	59	1548	149
Future Volume (veh/h)	110	245	336	663	618	77	80	379	163	59	1548	149
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	116	258	354	698	651	81	84	399	172	62	1629	157
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	158	693	378	587	1016	126	102	1488	665	78	1439	635
Arrive On Green	0.05	0.21	0.21	0.18	0.34	0.34	0.06	0.44	0.44	0.05	0.43	0.43
Sat Flow, veh/h	3261	3353	1496	3261	3002	373	1681	3353	1498	1681	3353	1479
Grp Volume(v), veh/h	116	258	354	698	363	369	84	399	172	62	1629	157
Grp Sat Flow(s),veh/h/ln	1630	1676	1496	1630	1676	1698	1681	1676	1498	1681	1676	1479
Q Serve(g_s), s	5.3	9.9	31.0	27.0	27.5	27.5	7.4	11.3	10.8	5.5	64.4	10.2
Cycle Q Clear(g_c), s	5.3	9.9	31.0	27.0	27.5	27.5	7.4	11.3	10.8	5.5	64.4	10.2
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	158	693	378	587	567	575	102	1488	665	78	1439	635
V/C Ratio(X)	0.74	0.37	0.94	1.19	0.64	0.64	0.82	0.27	0.26	0.80	1.13	0.25
Avail Cap(c_a), veh/h	217	693	378	587	567	575	112	1488	665	134	1439	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.4	51.1	54.8	61.5	41.9	41.9	69.6	26.3	26.2	70.8	42.8	27.3
Incr Delay (d2), s/veh	4.4	0.1	29.9	101.4	1.9	1.9	31.3	0.4	0.9	6.8	68.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.6	17.5	20.4	13.0	13.2	4.3	5.3	4.6	2.7	43.5	4.2
LnGrp Delay(d),s/veh	74.8	51.3	84.8	162.9	43.8	43.8	101.0	26.8	27.2	77.7	111.6	27.6
LnGrp LOS	E	D	F	F	D	D	F	C	C	E	F	C
Approach Vol, veh/h		728			1430			655			1848	
Approach Delay, s/veh		71.3			101.9			36.4			103.3	
Approach LOS		E			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	72.1	11.2	55.8	13.1	69.9	31.0	36.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	12.0	61.5	10.0	48.0	10.0	63.5	27.0	31.0
Max Q Clear Time (g_c+I1), s	7.5	13.3	7.3	29.5	9.4	66.4	29.0	33.0
Green Ext Time (p_c), s	0.0	36.1	0.0	4.6	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	88.5
HCM 2010 LOS	F

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	336	204	88	657	1453	169
Future Volume (veh/h)	336	204	88	657	1453	169
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	365	222	96	714	1579	184
Adj No. of Lanes	1	1	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	406	363	121	2219	1815	812
Arrive On Green	0.24	0.24	0.07	0.66	0.54	0.54
Sat Flow, veh/h	1681	1500	1681	3441	3441	1500
Grp Volume(v), veh/h	365	222	96	714	1579	184
Grp Sat Flow(s),veh/h/ln	1681	1500	1681	1676	1676	1500
Q Serve(g_s), s	17.4	10.9	4.7	7.6	33.8	5.3
Cycle Q Clear(g_c), s	17.4	10.9	4.7	7.6	33.8	5.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	406	363	121	2219	1815	812
V/C Ratio(X)	0.90	0.61	0.79	0.32	0.87	0.23
Avail Cap(c_a), veh/h	446	398	203	2429	1862	833
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	28.0	37.8	6.0	16.5	9.9
Incr Delay (d2), s/veh	19.6	2.4	10.9	0.1	4.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	9.2	2.5	3.5	16.5	2.2
LnGrp Delay(d),s/veh	50.0	30.3	48.7	6.1	21.2	10.1
LnGrp LOS	D	C	D	A	C	B
Approach Vol, veh/h	587			810	1763	
Approach Delay, s/veh	42.6			11.2	20.0	
Approach LOS	D			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		58.8		24.0	10.0	48.8		
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0		
Max Green Setting (Gmax), s		60.0		22.0	10.0	46.0		
Max Q Clear Time (g_c+I1), s		9.6		19.4	6.7	35.8		
Green Ext Time (p_c), s		32.7		0.6	0.1	9.0		

Intersection Summary	
HCM 2010 Ctrl Delay	21.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	688	1584	209	308	611	202	119	427	322	465	1842	264
Future Volume (veh/h)	688	1584	209	308	611	202	119	427	322	465	1842	264
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.88	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	732	1685	222	328	650	215	127	454	343	495	1960	281
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	739	1252	516	239	738	292	101	739	335	336	1575	222
Arrive On Green	0.23	0.37	0.37	0.07	0.22	0.22	0.06	0.23	0.23	0.20	0.37	0.37
Sat Flow, veh/h	3261	3353	1381	3261	3353	1325	1681	3212	1455	1681	4256	601
Grp Volume(v), veh/h	732	1685	222	328	650	215	127	454	343	495	1472	769
Grp Sat Flow(s),veh/h/ln	1630	1676	1381	1630	1676	1325	1681	1606	1455	1681	1606	1645
Q Serve(g_s), s	33.6	56.0	18.0	11.0	28.1	22.7	9.0	19.0	34.5	30.0	55.5	55.5
Cycle Q Clear(g_c), s	33.6	56.0	18.0	11.0	28.1	22.7	9.0	19.0	34.5	30.0	55.5	55.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.37
Lane Grp Cap(c), veh/h	739	1252	516	239	738	292	101	739	335	336	1188	609
V/C Ratio(X)	0.99	1.35	0.43	1.37	0.88	0.74	1.26	0.61	1.02	1.47	1.24	1.26
Avail Cap(c_a), veh/h	739	1252	516	239	738	292	101	739	335	336	1188	609
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.8	47.0	35.1	69.5	56.6	54.5	70.5	51.8	57.8	60.0	47.3	47.3
Incr Delay (d2), s/veh	30.6	161.1	0.2	191.6	11.6	8.4	174.7	1.8	55.7	228.2	114.8	131.3
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	18.3	53.9	6.9	11.3	14.2	9.0	9.1	8.6	19.0	35.2	43.5	47.4
LnGrp Delay(d),s/veh	88.4	208.1	35.3	261.1	68.2	62.8	245.2	53.6	113.5	288.2	162.0	178.5
LnGrp LOS	F	F	D	F	E	E	F	D	F	F	F	F
Approach Vol, veh/h		2639			1193			924			2736	
Approach Delay, s/veh		160.4			120.3			102.2			189.5	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	61.0	15.0	61.0	34.0	40.0	38.0	38.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	9.0	55.5	11.0	56.0	30.0	34.5	34.0	33.0
Max Q Clear Time (g_c+I1), s	11.0	57.5	13.0	58.0	32.0	36.5	35.6	30.1
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	157.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	164	0	0	1310	295	679	383	378	0	0	0
Future Volume (vph)	3	164	0	0	1310	295	679	383	378	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	5.5			5.5		5.0	5.0				
Lane Util. Factor	1.00	1.00			0.95		0.86	0.86				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.99				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.97		1.00	0.95				
Flt Protected	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (prot)	1676	1765			3249		1442	4199				
Flt Permitted	0.95	1.00			1.00		0.95	0.99				
Satd. Flow (perm)	1676	1765			3249		1442	4199				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	169	0	0	1351	304	700	395	390	0	0	0
RTOR Reduction (vph)	0	0	0	0	21	0	0	101	0	0	0	0
Lane Group Flow (vph)	3	169	0	0	1634	0	378	1006	0	0	0	0
Confl. Peds. (#/hr)	5		1	1		5			16	16		
Confl. Bikes (#/hr)						1						1
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	3	8			4		2	2				
Permitted Phases												
Actuated Green, G (s)	1.2	50.5			45.3		29.0	29.0				
Effective Green, g (s)	1.2	50.5			45.3		29.0	29.0				
Actuated g/C Ratio	0.01	0.56			0.50		0.32	0.32				
Clearance Time (s)	4.0	5.5			5.5		5.0	5.0				
Vehicle Extension (s)	2.0	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	22	990			1635		464	1353				
v/s Ratio Prot	0.00	c0.10			c0.50		c0.26	0.24				
v/s Ratio Perm												
v/c Ratio	0.14	0.17			1.00		0.81	0.74				
Uniform Delay, d1	43.9	9.6			22.3		28.0	27.2				
Progression Factor	1.00	1.00			0.92		1.00	1.00				
Incremental Delay, d2	1.0	0.0			16.8		14.5	3.7				
Delay (s)	44.9	9.6			37.3		42.6	30.9				
Level of Service	D	A			D		D	C				
Approach Delay (s)		10.2			37.3			33.9			0.0	
Approach LOS		B			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	364	173	1065	1017	382	531
Future Volume (veh/h)	364	173	1065	1017	382	531
Number	1	16	8	18	7	4
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	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	379	180	1109	1059	398	553
Adj No. of Lanes	2	1	2	1	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	545	251	1391	873	428	2408
Arrive On Green	0.17	0.17	0.41	0.41	0.25	0.72
Sat Flow, veh/h	3261	1500	3441	1500	1681	3441
Grp Volume(v), veh/h	379	180	1109	1059	398	553
Grp Sat Flow(s),veh/h/ln	1630	1500	1676	1500	1681	1676
Q Serve(g_s), s	12.4	12.9	32.8	47.0	26.2	6.3
Cycle Q Clear(g_c), s	12.4	12.9	32.8	47.0	26.2	6.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	545	251	1391	873	428	2408
V/C Ratio(X)	0.70	0.72	0.80	1.21	0.93	0.23
Avail Cap(c_a), veh/h	1433	659	1391	873	515	2580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	44.7	29.0	23.7	41.2	5.4
Incr Delay (d2), s/veh	2.7	6.4	3.4	106.5	21.3	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	5.8	10.8	15.7	64.7	14.7	2.9
LnGrp Delay(d),s/veh	47.2	51.1	32.4	130.2	62.5	5.4
LnGrp LOS	D	D	C	F	E	A
Approach Vol, veh/h	559		2168			951
Approach Delay, s/veh	48.5		80.2			29.3
Approach LOS	D		F			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				87.4		25.9	34.4	53.0
Change Period (Y+Rc), s				6.0		7.0	5.5	6.0
Max Green Setting (Gmax), s				87.2		49.8	34.7	47.0
Max Q Clear Time (g_c+I1), s				8.3		14.9	28.2	49.0
Green Ext Time (p_c), s				33.5		4.1	0.7	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.2
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	928	0	1140	0	0	0	0	1067	146	0	460	222
Future Volume (vph)	928	0	1140	0	0	0	0	1067	146	0	460	222
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	4.5	4.5					6.0			6.0	4.0
Lane Util. Factor	0.95	0.91	0.95					0.91			0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00					1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00					1.00			1.00	1.00
Frt	1.00	0.89	0.85					0.98			1.00	0.85
Flt Protected	0.95	0.99	1.00					1.00			1.00	1.00
Satd. Flow (prot)	1593	1416	1425					4718			3353	1469
Flt Permitted	0.95	0.99	1.00					1.00			1.00	1.00
Satd. Flow (perm)	1593	1416	1425					4718			3353	1469
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	987	0	1213	0	0	0	0	1135	155	0	489	236
RTOR Reduction (vph)	0	65	65	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	770	661	639	0	0	0	0	1290	0	0	489	236
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)												2
Turn Type	Split	NA	Perm					NA			NA	Free
Protected Phases	4	4						2			6	
Permitted Phases			4									Free
Actuated Green, G (s)	36.4	36.4	36.4					21.5			21.5	68.4
Effective Green, g (s)	36.4	36.4	36.4					21.5			21.5	68.4
Actuated g/C Ratio	0.53	0.53	0.53					0.31			0.31	1.00
Clearance Time (s)	4.5	4.5	4.5					6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0			3.0	
Lane Grp Cap (vph)	847	753	758					1482			1053	1469
v/s Ratio Prot	c0.48	0.47						c0.27			0.15	
v/s Ratio Perm			0.45									0.16
v/c Ratio	0.91	0.88	0.84					0.87			0.46	0.16
Uniform Delay, d1	14.5	14.0	13.6					22.1			18.8	0.0
Progression Factor	1.00	1.00	1.00					1.00			1.00	1.00
Incremental Delay, d2	13.4	11.2	8.4					5.9			0.3	0.2
Delay (s)	27.9	25.3	22.0					28.0			19.2	0.2
Level of Service	C	C	C					C			B	A
Approach Delay (s)		25.2			0.0			28.0			13.0	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	68.4	Sum of lost time (s)	10.5
Intersection Capacity Utilization	73.4%	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)	377	798	194	111	328	262	328	598	268	737	633	453
Future Volume (veh/h)	377	798	194	111	328	262	328	598	268	737	633	453
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1731	1731	1731	1731	1731	1731
Adj Flow Rate, veh/h	401	849	206	118	349	279	349	636	285	784	673	482
Adj No. of Lanes	2	2	1	1	2	1	1	2	1	2	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	4	4	4	4	4	4
Cap, veh/h	351	849	357	124	735	728	292	912	389	872	646	710
Arrive On Green	0.11	0.25	0.24	0.07	0.22	0.22	0.18	0.28	0.27	0.09	0.12	0.12
Sat Flow, veh/h	3261	3353	1478	1681	3353	1462	1648	3288	1465	3198	1731	1466
Grp Volume(v), veh/h	401	849	206	118	349	279	349	636	285	784	673	482
Grp Sat Flow(s),veh/h/ln	1630	1676	1478	1681	1676	1462	1648	1644	1465	1599	1731	1466
Q Serve(g_s), s	14.0	32.9	16.0	9.1	11.8	15.5	23.0	22.5	23.1	31.6	48.5	34.6
Cycle Q Clear(g_c), s	14.0	32.9	16.0	9.1	11.8	15.5	23.0	22.5	23.1	31.6	48.5	34.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	351	849	357	124	735	728	292	912	389	872	646	710
V/C Ratio(X)	1.14	1.00	0.58	0.95	0.47	0.38	1.20	0.70	0.73	0.90	1.04	0.68
Avail Cap(c_a), veh/h	351	849	357	124	735	728	292	912	389	898	646	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	0.97	0.97	0.97	0.98	0.98	0.98	1.00	1.00	1.00	0.45	0.45	0.45
Uniform Delay (d), s/veh	58.0	48.5	43.4	60.0	44.2	20.5	53.5	42.1	43.5	57.4	57.0	36.7
Incr Delay (d2), s/veh	91.9	30.6	1.7	64.6	0.3	0.2	116.9	4.4	11.6	5.9	35.6	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	10.8	18.8	6.7	6.5	5.5	6.3	19.9	10.8	10.5	14.7	29.6	14.5
LnGrp Delay(d),s/veh	149.9	79.2	45.1	124.5	44.5	20.7	170.4	46.5	55.1	63.2	92.6	39.1
LnGrp LOS	F	F	D	F	D	C	F	D	E	E	F	D
Approach Vol, veh/h		1456			746			1270			1939	
Approach Delay, s/veh		93.8			48.2			82.5			67.4	
Approach LOS		F			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.5	40.0	13.6	36.9	27.0	52.5	18.0	32.5
Change Period (Y+Rc), s	5.1	5.5	5.1	5.5	5.1	5.5	5.1	5.5
Max Green Setting (Gmax), s	35.4	33.5	8.5	31.4	21.9	47.0	12.9	27.0
Max Q Clear Time (g_c+I1), s	33.6	25.1	11.1	34.9	25.0	50.5	16.0	17.5
Green Ext Time (p_c), s	0.8	4.7	0.0	0.0	0.0	0.0	0.0	4.1

Intersection Summary	
HCM 2010 Ctrl Delay	75.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	835	3	4	2268	2	66	5	4	2	5	9
Future Volume (veh/h)	3	835	3	4	2268	2	66	5	4	2	5	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1800	1765	1765	1800	1765	1800
Adj Flow Rate, veh/h	4	1031	4	5	2800	2	81	6	5	2	6	11
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	1862	7	9	1872	1	172	10	179	47	63	90
Arrive On Green	0.00	0.54	0.53	0.01	1.00	1.00	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1681	3425	13	1681	3438	2	791	83	1489	20	526	752
Grp Volume(v), veh/h	4	505	530	5	1365	1437	87	0	5	19	0	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1762	1681	1676	1764	874	0	1489	1298	0	0
Q Serve(g_s), s	0.2	17.7	17.7	0.3	49.0	48.0	0.2	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	17.7	17.7	0.3	49.0	48.0	9.6	0.0	0.3	9.5	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.93		1.00	0.11		0.58
Lane Grp Cap(c), veh/h	7	911	958	9	913	961	182	0	179	201	0	0
V/C Ratio(X)	0.56	0.55	0.55	0.57	1.50	1.50	0.48	0.00	0.03	0.09	0.00	0.00
Avail Cap(c_a), veh/h	75	913	959	75	913	961	404	0	414	445	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.7	13.4	13.4	44.4	0.0	0.0	39.0	0.0	34.9	35.3	0.0	0.0
Incr Delay (d2), s/veh	47.5	0.5	0.5	5.1	223.5	223.7	0.7	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	8.3	8.7	0.1	56.7	59.7	2.2	0.0	0.1	0.4	0.0	0.0
LnGrp Delay(d),s/veh	92.2	13.9	13.9	49.6	223.5	223.7	39.7	0.0	35.0	35.3	0.0	0.0
LnGrp LOS	F	B	B	D	F	F	D		C	D		
Approach Vol, veh/h		1039			2807			92			19	
Approach Delay, s/veh		14.2			223.3			39.5			35.3	
Approach LOS		B			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	52.9		14.9	4.4	53.0		14.9
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0
Max Green Setting (Gmax), s	4.0	48.0		25.0	4.0	48.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	19.7		11.5	2.2	51.0		11.6
Green Ext Time (p_c), s	0.0	3.3		0.0	0.0	0.0		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		163.2
HCM 2010 LOS		F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1236	144	104	629	78	92	19	77	66	14	19
Future Volume (veh/h)	20	1236	144	104	629	78	92	19	77	66	14	19
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	21	1274	148	107	648	80	95	20	79	68	14	20
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	388	1734	201	159	1720	212	118	143	113	86	40	57
Arrive On Green	0.56	0.57	0.56	0.56	0.57	0.56	0.07	0.08	0.08	0.05	0.06	0.06
Sat Flow, veh/h	724	3028	350	376	3004	370	1681	1765	1476	1681	642	917
Grp Volume(v), veh/h	21	703	719	107	361	367	95	20	79	68	0	34
Grp Sat Flow(s),veh/h/ln	724	1676	1701	376	1676	1698	1681	1765	1476	1681	0	1558
Q Serve(g_s), s	1.8	33.9	34.5	27.5	12.9	13.0	6.1	1.2	5.7	4.4	0.0	2.3
Cycle Q Clear(g_c), s	14.8	33.9	34.5	62.0	12.9	13.0	6.1	1.2	5.7	4.4	0.0	2.3
Prop In Lane	1.00		0.21	1.00		0.22	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	388	960	974	159	960	972	118	143	113	86	0	97
V/C Ratio(X)	0.05	0.73	0.74	0.67	0.38	0.38	0.81	0.14	0.70	0.79	0.00	0.35
Avail Cap(c_a), veh/h	388	960	974	159	960	972	168	385	315	168	0	340
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.77	0.77	0.77	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	17.3	17.5	42.9	12.8	12.9	50.4	47.0	49.6	51.6	0.0	49.6
Incr Delay (d2), s/veh	0.1	2.5	2.6	15.9	0.9	0.9	11.3	0.2	2.9	6.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	16.3	16.7	3.9	6.2	6.3	3.2	0.6	2.4	2.2	0.0	1.0
LnGrp Delay(d),s/veh	17.5	19.8	20.1	58.8	13.7	13.7	61.7	47.1	52.5	57.6	0.0	50.4
LnGrp LOS	B	B	C	E	B	B	E	D	D	E		D
Approach Vol, veh/h		1443			835			194			102	
Approach Delay, s/veh		19.9			19.5			56.4			55.2	
Approach LOS		B			B			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		67.0	9.6	12.9		67.0	11.7	10.8
Change Period (Y+Rc), s		5.0	4.0	4.5		5.0	4.0	4.5
Max Green Setting (Gmax), s		62.0	11.0	23.5		62.0	11.0	23.5
Max Q Clear Time (g_c+I1), s		36.5	6.4	7.7		64.0	8.1	4.3
Green Ext Time (p_c), s		19.3	0.0	0.2		0.0	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	23.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	1426	96	150	536	498	60	310	143	400	658	45
Future Volume (veh/h)	68	1426	96	150	536	498	60	310	143	400	658	45
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1765	1765	1765	1765	1765	1765	1800
Adj Flow Rate, veh/h	70	1470	99	155	553	513	62	320	147	412	678	0
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	2	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	88	1527	102	161	1752	771	78	420	186	466	743	0
Arrive On Green	0.05	0.48	0.48	0.10	0.52	0.52	0.05	0.13	0.13	0.14	0.22	0.00
Sat Flow, veh/h	1681	3186	214	1681	3353	1476	1681	3353	1486	3261	3441	0
Grp Volume(v), veh/h	70	770	799	155	553	513	62	320	147	412	678	0
Grp Sat Flow(s),veh/h/ln	1681	1676	1723	1681	1676	1476	1681	1676	1486	1630	1676	0
Q Serve(g_s), s	4.7	50.8	51.7	10.6	10.8	29.2	4.2	10.6	11.0	14.2	22.7	0.0
Cycle Q Clear(g_c), s	4.7	50.8	51.7	10.6	10.8	29.2	4.2	10.6	11.0	14.2	22.7	0.0
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	88	803	826	161	1752	771	78	420	186	466	743	0
V/C Ratio(X)	0.79	0.96	0.97	0.96	0.32	0.67	0.79	0.76	0.79	0.88	0.91	0.00
Avail Cap(c_a), veh/h	146	817	840	161	1752	771	146	496	220	511	743	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.8	28.8	29.0	51.7	15.7	20.1	54.2	48.6	48.8	48.3	43.6	0.0
Incr Delay (d2), s/veh	5.9	21.8	23.1	59.4	0.1	2.2	6.6	4.6	12.5	14.7	15.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	28.2	29.7	7.5	5.0	12.3	2.1	5.2	5.2	7.4	12.0	0.0
LnGrp Delay(d),s/veh	59.7	50.6	52.2	111.1	15.8	22.2	60.8	53.1	61.3	63.0	58.8	0.0
LnGrp LOS	E	D	D	F	B	C	E	D	E	E	E	
Approach Vol, veh/h		1639			1221			529			1090	
Approach Delay, s/veh		51.8			30.6			56.3			60.4	
Approach LOS		D			C			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	60.0	9.4	30.5	10.0	65.0	20.4	19.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	11.0	56.0	10.0	25.0	10.0	57.0	18.0	17.0
Max Q Clear Time (g_c+I1), s	12.6	53.7	6.2	24.7	6.7	31.2	16.2	13.0
Green Ext Time (p_c), s	0.0	1.4	0.0	0.2	0.0	19.5	0.2	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	48.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	792	867	71	27	405	111	79	414	42	91	227	403
Future Volume (veh/h)	792	867	71	27	405	111	79	414	42	91	227	403
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		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1800	1765	1765	1800	1765	1765	1800	1765	1765	1765
Adj Flow Rate, veh/h	834	913	75	28	426	117	83	436	44	96	239	424
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	706	1772	146	46	451	123	101	368	37	67	376	319
Arrive On Green	0.42	0.57	0.57	0.03	0.17	0.17	0.06	0.23	0.23	0.04	0.21	0.21
Sat Flow, veh/h	1681	3132	257	1681	2605	709	1681	1577	159	1681	1765	1494
Grp Volume(v), veh/h	834	489	499	28	273	270	83	0	480	96	239	424
Grp Sat Flow(s),veh/h/ln	1681	1676	1713	1681	1676	1637	1681	0	1736	1681	1765	1494
Q Serve(g_s), s	63.0	26.8	26.8	2.5	24.1	24.5	7.3	0.0	35.0	6.0	18.5	32.0
Cycle Q Clear(g_c), s	63.0	26.8	26.8	2.5	24.1	24.5	7.3	0.0	35.0	6.0	18.5	32.0
Prop In Lane	1.00		0.15	1.00		0.43	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	706	949	969	46	291	284	101	0	405	67	376	319
V/C Ratio(X)	1.18	0.52	0.52	0.60	0.94	0.95	0.82	0.00	1.19	1.43	0.63	1.33
Avail Cap(c_a), veh/h	706	949	969	67	291	284	101	0	405	67	376	319
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.5	20.0	20.0	72.1	61.2	61.4	69.7	0.0	57.5	72.0	53.7	59.0
Incr Delay (d2), s/veh	95.8	0.7	0.6	4.7	37.1	40.8	37.9	0.0	105.7	259.0	2.7	168.8
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	48.0	12.5	12.8	1.2	14.1	14.3	4.5	0.0	28.7	7.6	9.3	28.1
LnGrp Delay(d),s/veh	139.3	20.6	20.6	76.8	98.3	102.1	107.7	0.0	163.2	331.0	56.4	227.8
LnGrp LOS	F	C	C	E	F	F	F		F	F	E	F
Approach Vol, veh/h		1822			571			563			759	
Approach Delay, s/veh		75.0			99.0			155.0			186.9	
Approach LOS		E			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	89.9	11.0	40.0	68.0	31.0	14.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	83.0	6.0	35.0	63.0	26.0	9.0	32.0
Max Q Clear Time (g_c+I1), s	4.5	28.8	8.0	37.0	65.0	26.5	9.3	34.0
Green Ext Time (p_c), s	0.0	21.6	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	113.7
HCM 2010 LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	557	1250	74	31	638
Future Volume (vph)	48	557	1250	74	31	638
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0		5.0		5.0	5.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.88		0.99		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1539		1751		1676	1765
Flt Permitted	1.00		1.00		0.95	1.00
Satd. Flow (perm)	1539		1751		1676	1765
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	52	599	1344	80	33	686
RTOR Reduction (vph)	86	0	2	0	0	0
Lane Group Flow (vph)	565	0	1422	0	33	686
Turn Type	Prot		NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	40.0		89.1		4.7	98.8
Effective Green, g (s)	40.0		89.1		4.7	98.8
Actuated g/C Ratio	0.27		0.60		0.03	0.66
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	413		1048		52	1171
v/s Ratio Prot	c0.37		c0.81		0.02	c0.39
v/s Ratio Perm						
v/c Ratio	1.37		1.36		0.63	0.59
Uniform Delay, d1	54.4		29.9		71.2	13.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	180.2		167.0		22.6	0.8
Delay (s)	234.6		196.9		93.8	14.5
Level of Service	F		F		F	B
Approach Delay (s)	234.6		196.9			18.1
Approach LOS	F		F			B

Intersection Summary			
HCM 2000 Control Delay	159.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	148.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	121.7%	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 (vph)	171	1680	224	375	862	83	353	559	561	177	364	97
Future Volume (vph)	171	1680	224	375	862	83	353	559	561	177	364	97
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		0.97	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	4719		3252	4742		1526	3197	1488	1676	3232	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	4719		3252	4742		1526	3197	1488	1676	3232	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	1787	238	399	917	88	376	595	597	188	387	103
RTOR Reduction (vph)	0	12	0	0	7	0	0	0	84	0	17	0
Lane Group Flow (vph)	182	2013	0	399	998	0	316	655	513	188	473	0
Confl. Peds. (#/hr)	9		7	7		9	7		1	1		7
Confl. Bikes (#/hr)						2						
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		3	3	1	4	4	
Permitted Phases									3			
Actuated Green, G (s)	19.1	48.0		19.4	48.3		28.0	28.0	47.4	24.6	24.6	
Effective Green, g (s)	19.1	48.0		19.4	48.3		28.0	28.0	47.4	24.6	24.6	
Actuated g/C Ratio	0.14	0.34		0.14	0.34		0.20	0.20	0.34	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	228	1617		450	1635		305	639	503	294	567	
v/s Ratio Prot	0.11	c0.43		0.12	0.21		c0.21	0.20	c0.14	0.11	c0.15	
v/s Ratio Perm									0.20			
v/c Ratio	0.80	1.25		0.89	0.61		1.04	1.03	1.02	0.64	0.83	
Uniform Delay, d1	58.6	46.0		59.2	38.0		56.0	56.0	46.3	53.6	55.7	
Progression Factor	1.02	0.98		1.28	1.11		0.74	0.74	1.92	1.00	1.00	
Incremental Delay, d2	7.3	112.5		14.2	0.6		25.8	17.8	17.4	3.3	9.8	
Delay (s)	67.1	157.6		90.0	43.0		67.1	59.2	106.3	56.9	65.5	
Level of Service	E	F		F	D		E	E	F	E	E	
Approach Delay (s)		150.1			56.3			78.7			63.1	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	98.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	104.9%	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)	333	693	145	246	295	99	269	1627	820	104	658	170
Future Volume (veh/h)	333	693	145	246	295	99	269	1627	820	104	658	170
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1800	1765	1765	1765	1765	1765	1765
Adj Flow Rate, veh/h	370	770	161	273	328	110	299	1808	911	116	731	189
Adj No. of Lanes	2	2	1	2	2	0	1	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	742	433	256	493	162	322	1664	730	120	1262	560
Arrive On Green	0.10	0.22	0.22	0.08	0.20	0.20	0.19	0.50	0.50	0.07	0.38	0.38
Sat Flow, veh/h	3261	3353	1471	3261	2467	812	1681	3353	1470	1681	3353	1489
Grp Volume(v), veh/h	370	770	161	273	221	217	299	1808	911	116	731	189
Grp Sat Flow(s),veh/h/ln	1630	1676	1471	1630	1676	1603	1681	1676	1470	1681	1676	1489
Q Serve(g_s), s	14.0	31.0	12.2	11.0	17.0	17.6	24.5	69.5	69.5	9.6	24.3	12.7
Cycle Q Clear(g_c), s	14.0	31.0	12.2	11.0	17.0	17.6	24.5	69.5	69.5	9.6	24.3	12.7
Prop In Lane	1.00		1.00	1.00		0.51	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	742	433	256	335	321	322	1664	730	120	1262	560
V/C Ratio(X)	1.13	1.04	0.37	1.07	0.66	0.68	0.93	1.09	1.25	0.97	0.58	0.34
Avail Cap(c_a), veh/h	326	742	433	256	335	321	444	1664	730	120	1262	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	54.5	39.3	64.5	51.6	51.8	55.7	35.3	35.3	64.8	34.8	31.2
Incr Delay (d2), s/veh	91.5	43.0	0.2	74.7	3.8	4.6	18.5	49.5	123.0	71.0	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	18.8	5.0	7.6	8.2	8.2	13.0	43.6	53.0	6.8	11.4	5.3
LnGrp Delay(d),s/veh	154.5	97.5	39.5	139.2	55.4	56.5	74.1	84.7	158.3	135.8	35.6	31.7
LnGrp LOS	F	F	D	F	E	E	E	F	F	F	D	C
Approach Vol, veh/h		1301			711			3018			1036	
Approach Delay, s/veh		106.5			87.9			105.9			46.1	
Approach LOS		F			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	75.0	18.0	33.0	30.8	58.2	15.0	36.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	10.0	69.5	14.0	28.0	37.0	42.5	11.0	31.0
Max Q Clear Time (g_c+I1), s	11.6	71.5	16.0	19.6	26.5	26.3	13.0	33.0
Green Ext Time (p_c), s	0.0	0.0	0.0	3.8	0.3	15.9	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	93.7
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	502	131	412	1280	713	289	1794	236	449	982	414
Future Volume (veh/h)	395	502	131	412	1280	713	289	1794	236	449	982	414
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1765	1765	1765	1765	1765	1765	1765	1800	1765	1765	1800
Adj Flow Rate, veh/h	429	546	142	448	1391	775	314	1950	257	488	1067	450
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	303	739	317	493	934	403	264	1429	186	276	1125	474
Arrive On Green	0.09	0.22	0.22	0.15	0.28	0.28	0.16	0.33	0.33	0.16	0.34	0.34
Sat Flow, veh/h	3261	3353	1439	3261	3353	1446	1681	4303	560	1681	3316	1398
Grp Volume(v), veh/h	429	546	142	448	1391	775	314	1449	758	488	1034	483
Grp Sat Flow(s),veh/h/ln	1630	1676	1439	1630	1676	1446	1681	1606	1651	1681	1606	1502
Q Serve(g_s), s	13.0	21.2	12.0	18.9	39.0	39.0	22.0	46.5	46.5	23.0	43.9	43.9
Cycle Q Clear(g_c), s	13.0	21.2	12.0	18.9	39.0	39.0	22.0	46.5	46.5	23.0	43.9	43.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.34	1.00		0.93
Lane Grp Cap(c), veh/h	303	739	317	493	934	403	264	1067	548	276	1090	510
V/C Ratio(X)	1.42	0.74	0.45	0.91	1.49	1.92	1.19	1.36	1.38	1.77	0.95	0.95
Avail Cap(c_a), veh/h	303	739	317	536	934	403	264	1067	548	276	1090	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.5	50.8	47.2	58.5	50.5	50.5	59.0	46.8	46.8	58.5	45.1	45.1
Incr Delay (d2), s/veh	206.0	3.5	0.4	17.8	225.9	425.1	116.4	167.5	183.0	359.7	17.4	29.0
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	14.5	10.2	4.8	9.7	47.3	63.1	18.7	45.4	49.0	38.3	22.0	22.2
LnGrp Delay(d),s/veh	269.5	54.3	47.6	76.2	276.4	475.6	175.4	214.3	229.8	418.2	62.4	74.0
LnGrp LOS	F	D	D	E	F	F	F	F	F	F	E	E
Approach Vol, veh/h		1117			2614			2521			2005	
Approach Delay, s/veh		136.1			301.1			214.1			151.8	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	53.0	25.2	35.8	27.0	52.0	17.0	44.0
Change Period (Y+Rc), s	4.0	5.5	4.0	5.0	4.0	5.5	4.0	5.0
Max Green Setting (Gmax), s	22.0	47.5	23.0	29.0	23.0	46.5	13.0	39.0
Max Q Clear Time (g_c+I1), s	24.0	45.9	20.9	23.2	25.0	48.5	15.0	41.0
Green Ext Time (p_c), s	0.0	1.6	0.2	4.7	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	216.0
HCM 2010 LOS	F