Appendix A Traffic Analysis Procedures Manual

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: January 31, 2014 Project #: 13049

To: ODOT, Region 3

From: Matt Hughart, AICP, Anais Malinge, Hermanus Steyn, P.E.

Project: I-5 Exits 124 & 125 Interchange Access Management Plan

Subject: Project Methodology & Key Assumptions

The purpose of this memorandum is to document the methodology and key assumptions to be used in preparation of the existing and future conditions analyses for the Interstate 5 (I-5) Exits 124 (W Harvard Avenue) & 125 (NW Garden Valley Boulevard) Interchange Access Management Plan (IAMP). The methodologies included in this memorandum are based on guidance provided in the Oregon Department of Transportation (ODOT) *Analysis Procedures Manual* (APM, Reference 1) under the guidance of ODOT's Transportation Planning Analysis Unit (TPAU).

STUDY INTERSECTIONS

Traffic counts were conducted by ODOT at the study intersections in January 2011, June 2013, September and October 2012 and consist of 48-hour, 24-hour, 16-hour, and 3-hour counts. All counts are shown in 15-minute intervals in the 6-9 a.m. and 3-6 p.m. periods and include vehicular turning movements, pedestrian movements (with or without marked crosswalks), and bicycles. Table 1 summarizes the traffic count information obtained.

Table 1 Traffic Counts Summary

Intersection	Count Date	Count Type	Intersection	Count Date	Count Type
ODOT Intersections					
I-5 SB Ramp Terminal/ NW Garden Valley Blvd	10/1/2012	16-Hour	SE Washington St/ SE Spruce St	10/3/2012	3-Hour
I-5 NB Ramp Terminal/ NW Garden Valley Blvd	10/1/2012	16-Hour	SE Oak St/SE Pine St	1/19/2011	3-Hour
I-5 SB Ramp Terminal/ Harvard Ave/Bellows St	10/1/2012	16-Hour	SE Washington St/SE Pine St	1/26/2011	3-Hour
I-5 NB Ramp Terminal/ Harvard Ave	10/1/2012	16-Hour	SE Oak St/Stephens St	1/19/2011	3-Hour
Harvard Ave/Madrone St	10/2/2012	16-Hour	SE Washington St/ SE Stephens St	1/19/2011	3-Hour
Harvard Ave/Corey Ct	10/3/2012	3-Hour	SE Oak St/SE Spruce St	10/4/2012	3-Hour
Exit 125 WB to SB Loop	10/1/2012	48-Hour	Exit 125 EB to NB loop	10/1/2012	48-Hour

On-Ramp			On-Ramp		
Exit 125 WB to NB On-Ramp	10/1/2012	48-Hour	Exit 125 EB to SB On-Ramp	10/1/2012	48-Hour
Exit 124 WB to NB On-Ramp	10/1/2012	48-Hour	Exit 124 EB to NB Loop On-Ramp	6/17/2013	48-Hour
Exit 124 EB to SB On-Ramp	6/17/2013	48-Hour			
City Intersections					
NW Garden Valley Blvd/ NW Stewart Pwy	9/27/2012	16-Hour	W Harvard Ave/ Umpqua St	10/2/2012	16-Hour
NW Garden Valley Blvd/ NE Airport Road/Cedar St	9/27/2012	16-Hour	W Harvard Ave/ Maple St	10/10/2012	3-Hour
NW Garden Valley Blvd/ NE Stephens St	9/27/2012	16-Hour	W Harvard Ave/ Harrison St	10/3/2012	3-Hour
W Harvard Ave/ NW Stewart Pwy	10/2/2012	16-Hour			

NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound

Additional 24-hour traffic volumes for the I-5 mainline, northbound and southbound, one-half mile south of Exit 125 were collected on 10/16/2012.

Figure 1 shows the Interchange Management Study area.

Figure 1 – Interchange Management Study Area

PM Peak Hour Development

Traffic volumes were reviewed for both interchange areas, Exit 124 and Exit 125, to determine one-hour peak periods for the operation analysis. System peak periods were identified for both the weekday a.m. and p.m. peak periods, as follows:

- Exit 124
  - a.m. Peak: 7:45 – 8:45
  - p.m. Peak: 4:30 – 5:30
- Exit 125
  - a.m. Peak: 7:15 – 8:15
  - p.m. Peak: 4:30 – 5:30

Intersection Operational Standards

ODOT Facilities

ODOT uses volume-to-capacity (V/C) ratio standards to assess intersection operations. Table 6 of the *Oregon Highway Plan* (OHP, Reference 2) and table 10-2 of the *Oregon Highway Design Manual* (HDM, Reference 3) provide maximum volume-to-capacity ratios for all signalized and unsignalized intersections outside the Metro area. The OHP ratios are used to assist in the planning phase identifying future system deficiencies, while the HDM ratios are used to establish a 20-year design life solution that correct previously identified deficiencies. The ODOT controlled intersections within the study area are located along Oregon State Highway 138 (OR 138) and I-5, which are designated as a Regional Highway and an Interstate Highway, respectively, outside of a Metropolitan Planning Organization (MPO).

Table 2 summarizes the intersection performance standards for OR 138 and I-5 per the OHP and HDM.

Table 2 Summary of ODOT Intersection Performance Standards

Intersection	Traffic Control[1]	OHP Standard	HDM Standard
I-5 SB Ramp Terminal/ NW Garden Valley Blvd	Signalized	0.85	0.70
I-5 NB Ramp Terminal/ NW Garden Valley Blvd	Signalized	0.85	0.70
I-5 SB Ramp Terminal/ Harvard Ave/Bellows St	Signalized	0.85	0.70
I-5 NB Ramp Terminal/ Harvard Ave	Signalized	0.85	0.70
Harvard Ave/Corey Ct (OR 138)	TWSC	0.90	0.75
Harvard Ave/Madrone St (OR 138)	Signalized	0.90	0.75
SE Oak St/SE Spruce St (OR 138)	TWSC	0.90	0.75
SE Washington St/ SE Spruce St (OR 138)	TWSC	0.90	0.75

SE Oak St/SE Pine St (OR 138)	Signalized	0.90	0.75
SE Washington St/SE Pine St (OR 138)	Signalized	0.90	0.75
SE Oak St/Stephens St (OR 138)	Signalized	0.90	0.75
SE Washington St/ SE Stephens St (OR 138)	Signalized	0.90	0.75

[1]TWSC: Two-way stop-controlled (unsignalized)

City of Roseburg Facilities

The City of Roseburg requires that unsignalized and signalized intersections meet the following operational thresholds:

- LOS "D" at signalized intersections and LOS "E" at unsignalized intersections.
- V/C ratios of 0.85 for arterials, 0.90 for collectors, and 0.95 for local streets.

A summary of the operational thresholds that will be used for the study intersections under city jurisdiction is included in Table 3.

Table 3 Operational Thresholds for City Intersections

Intersection	Traffic Control[1]	Operational Performance Standard
NW Garden Valley Blvd/ NW Stewart Pwy	Signalized	0.85/LOS D
NW Garden Valley Blvd/ NE Airport Road/Cedar St	Signalized	0.85/LOS D
NW Garden Valley Blvd/ NE Stephens St	Signalized	0.85/LOS D
W Harvard Ave/ NW Stewart Pwy	Signalized	0.85/LOS D
W Harvard Ave/ Maple St	TWSC	LOS E
W Harvard Ave/ Harrison St	TWSC	LOS E
W Harvard Ave/ Umpqua St	Signalized	0.85/LOS D

[1]TWSC: Two-way stop-controlled (unsignalized)

Seasonal Adjustment Factor

30th Highest Hour Volumes (30 HV) for the study intersections were calculated based on the traffic counts collected in January 2011, June 2013, September and October of 2012 and the application of a seasonal adjustment factor. The APM identifies three methods for identifying seasonal adjustment factors. All three methods are informed by information provided by Automatic Traffic Recorders (ATR) located in select locations throughout the State Highway System that collect traffic data 24-hours a day/365 days a year. Each method was evaluated to determine the most appropriate for the study area. Considering that the I-5 ramps are a hybrid of the freeway and side streets, the average of the factors determined based on the ATR Characteristics Table Method and the Seasonal Trend Table Method was used to develop 30 HV

volumes for the I-5 ramps. The Seasonal Trend Table method was used to develop 30 HV for all other study intersections. The results of the evaluations are summarized below.

On-Site ATR Method

The On-Site ATR Method requires that the ATR be located within or near the project area. If the ATR is located outside the project area, there should be no major intersections between the ATR and the project area and the Average Annual Daily Traffic (AADT) collected by the ATR must be within 10 percent of the AADT near the project area. *Information on AADT for highway segments throughout Oregon can be found in ODOT's Transportation Volume Tables.*

There are currently no ATRs located within the project area that meet all of the requirements for the On-Site ATR Method. The closest ATR (ATR #10-005) is located along I-5 approximately five miles north of the study area. Therefore, the On-Site ATR Method was not applied in this study.

ATR Characteristic Table Method

The Characteristic Table Method requires that the ATR be located on a facility that shares similar characteristics with the facility to be adjusted, such as seasonal traffic trends, area type, and number of lanes. The Characteristic Table Method also requires that the AADT collected by the ATR must be within 10 percent of the AADT near the project area.

Two ATRs were selected for this analysis (ATR #10-005 and ATR #09-020). ATR #10-005 is located along I-5, 0.53 miles north of the Winchester interchange and north of Roseburg. I-5 is classified as an Interstate Highway in a Small Urban Fringe. ATR #09-020 is located along US97, 1.40 miles south of Yew Avenue in Redmond. US97 is classified as a State Highway in a Small Urban Fringe. ATR #10-005 reflects conditions of I-5 mainline and ramp traffic in the study area, while ATR #09-020 provides a more similar commuter traffic trend. As such, considering that the AADT for both ATRs are within 10% of the study area AADT, an average of the two ATRs offers an appropriate seasonal adjustment factor.

The ATR was installed in January 2001 and has traffic count data for the last eight years. Based on historical traffic data provided by the ATR, the Peak Month generally occurs in August. Table 4 summarizes the average weekday traffic percent of average daily traffic (ADT) for the past five years.

Table 4 Seasonal Adjustment Factor

Year	2007	2008	2009	2010	2011
ATR #10-005					
Peak Month (August)	118%	118%	117%	118%	117%
Count Month (January)	83%	99%	87%	87%	90%
Count Month (June)	110%	108%	111%	111%	111%
Count Month (September)	108%	104%	105%	105%	106%
Count Month (October)	100%	91%	99%	100%	100%
ATR #09-020					
Peak Month (August)	116%	113%	115%	117%	117%
Count Month (January)	95%	97%	98%	97%	99%
Count Month (June)	115%	115%	115%	115%	113%
Count Month (September)	110%	108%	111%	111%	109%
Count Month (October)	107%	108%	109%	110%	108%

Note: Shaded values dropped from average calculation per ODOT methodology.

Based on the data in Table 4, average monthly factors were determined as follows:

ATR #10-005

- Peak month average (August): (118% + 118% + 117%) / 3 = 117.67%
- Count month (January): (87% + 87% + 90%)/3 = 88%
- Count month (June): (110% + 111% + 111%)/3 = 110.67%
- Count month (September): (105% + 105% + 106%)/3 = 105.33%
- Count month (October): (99% + 100% + 100%)/3 = 99.67%

ATR #09-020

- Peak month average (August): (116% + 115% + 117%) / 3 = 116%
- Count month (January): (97% + 98% + 97%)/3 = 97.33%
- Count month (June): (115% + 115% + 115%)/3 = 115%
- Count month (September): (110% + 111% + 109%)/3 = 110%
- Count month (October): (108% + 109% + 108%)/3 = 108.33%

Therefore, the adjustment factors based on the Seasonal Adjustment Factors are as follows, by count month:

- January: [(117.67/88) + (116/97.33)]/2 = 1.26
- June: [(117.67/110.67) + (116/115)]/2 = 1.04
- September: [(117.67/105.33) + (116/110)]/2 = 1.09
- October: [(117.67/99.67) + (116/108.33)]/2 = 1.13

Seasonal Trend Method

The Seasonal Trend Method uses average values from the ODOT ATR Characteristic Table for each seasonal traffic trend. For Roseburg, Commuter seasonal traffic trend values were used to derive 30 HV volumes. Table 5 summarizes the average values for seasonal traffic trends during the count months (January, June, September, and October) and the peak period as provided in the ODOT Seasonal Trend Table.

Table 5 Seasonal Trend Table

Trend	1-Jan	15-Jan	1-Jun	15-Jun	1-Sep	15-Sep	1-Oct	15-Oct	ODOT Peak Period Seasonal Factor
Commuter	0.9994	1.0053	0.9234	0.9075	0.915	0.9296	0.9312	0.9329	0.9004
Average	1.0024		0.91545		0.9223		0.9321		

Based on the data in Table 5, the traffic counts at all other study intersections were adjusted by the following factors, by count month:

- January: (1.0/0.90) = 1.11
- June: (0.92/0.90) = 1.02
- September: (0.92/.090) = 1.02
- October: (0.93/0.90) = 1.04

Based on both the Seasonal Adjustment Factors and the Seasonal Trend Method, the traffic counts at the I-5 ramps were adjusted using the average of the factors from both methodologies, as follows:

- January: (1.11+1.26)/2 = 1.19
- June (1.02+1.04)/2 = 1.03
- September: (1.02+1.09)/2 = 1.06
- October: (1.04+1.13)/2 = 1.09

ANALYSIS MODEL PARAMETERS

The bullets below identify the specific sources of data and methodologies we propose to utilize. Analyses of all state facilities will be conducted according to the APM, unless otherwise agreed upon by both ODOT's Transportation Planning and Analysis Unit (TPAU) and the consultant team.

1. *Intersection/Roadway Geometry* (lane numbers and arrangements, cross-section elements, signal phasing, etc.) will be verified for consistency with previous work efforts, reviewed through aerial photography, and confirmed through a site visit. Available as-built data may also be used to verify existing roadway geometry. The analysis models will be built on scaled roadway line work from GIS or aerial photography.

2. *Operational Data* (such as posted speeds, intersection control, parking, transit stops, rail crossings, right-turn on red, etc.) will be verified. Data will be reviewed during a site visit and supplemented by available GIS data, traffic count DVDs, aerials, photos, and the ODOT Video Log.

3. *Peak Hour Factors* (PHF) will be calculated for each intersection and applied to the existing conditions analyses. Future conditions peak hour factors will be developed as per APM methodology.

4. *Traffic Volume* development is described above and resulted in the adjustment of the January and October counts.

5. *Signal Timing Data* will be requested from the City of Roseburg and ODOT for use in the existing conditions analysis.

6. Traffic Operations

   a. The 2000 Highway Capacity Manual (HCM) methodology shall be used for intersection analyses of the design hour conditions. The existing and future no-build analysis will utilize Synchro software using HCM reports for signalized and stop-controlled intersections. Roundabouts will be analyzed using ODOT's methodology for roundabout operations and will be compared to the results yielded from the findings from the National Cooperative Highway Research Program (NCHRP) 3-65 report. Level-of-service, delay, and volume-to-capacity ratios will be reported at each of the study intersections regardless of roadway jurisdiction.

   b. Queuing analysis methodology will be based on Synchro 95th percentile queue lengths. Microsimulation is not proposed as part of the long-range planning effort.

Traffic Analysis Software and Input Assumptions

Synchro software, Version 7 will be used for the intersection analysis. The reported results will be the level of service, intersection delay, and v/c ratios generated by the HCM report. Analysis assumptions are listed in Table 6.

Table 6 Synchro Operations Parameters/Assumptions

Arterial Intersection Parameters	Existing Conditions
Peak Hour Factor	From traffic counts
Conflicting Bikes and Pedestrian per Hour	From traffic counts, as available
Area Type	Other
Ideal Saturation Flow Rate (for all movements)	1,750 passenger cars per hour green per lane
Lane Width	12 feet unless field observations suggest otherwise
Percent Heavy Vehicles	From traffic counts by movement, as available
Percent Grade	Estimated based on field observations
Parking Maneuvers per Hour	Estimated based on field observations
Bus Blockages	None
Intersection signal phasing and coordination	From ODOT/City
Intersection signal timing optimization limits	Maximum cycle length = 120 seconds
Minimum Green time	From timing plans
Yellow and all-red time	From timing plans
95th percentile vehicle queues	Synchro HCM summary output

Crash Analyses

The most recent five years of crash data will be reviewed at the study intersections, as available and where reflective of the current configuration. The data will be analyzed for type, severity and location to identify potential crash patterns. ODOT's top 10% Safety Priority Index System sites will be reviewed, as appropriate. In addition, HSM critical crash rate for intersections/segments, along with the Statewide 90th percentile rates will be analyzed.

FORECAST YEAR VOLUME DEVELOPMENT

Forecast year volume will be informed by the travel demand model (model) for the Roseburg area, which is maintained by TPAU. The model is based on long-range land use assumptions rooted in current and anticipated socioeconomic characteristics, including household and employment projections. The model has a 2035 horizon year and 2009 base year. The TPAU traffic model data will be post-processed using the NCHRP 255 analysis methodology and year 2012 intersection traffic counts to develop the future year 2035 weekday p.m. peak hour traffic volumes at the study intersections. In order to account for the redevelopment of the existing vacant hospital site at Exit 124, consultant will coordinate with ongoing effort to determine the worst-case scenario of the potential rezone. Rather than providing TAZ information, consultant will incrementally add trip generation to 2035 background traffic volumes.

NEXT STEPS

We would like to request concurrence from TPAU, ODOT Region 3, and City staff on the methodology and key assumptions outlined in this memorandum prior to the preparation of the existing and future conditions analyses.

We trust this memorandum provides adequate documentation of the existing and future conditions methodology. If you have any questions or suggestions, please call us at (503) 228-5230.

REFERENCES

1. Oregon Department of Transportation. *Analysis Procedures Manual, 2006.*
2. Oregon Department of Transportation. *Oregon Highway Plan, 1999.*
3. Oregon Department of Transportation. *Highway Design Manual, 2003*.

Appendix B TPAU Model Assumptions

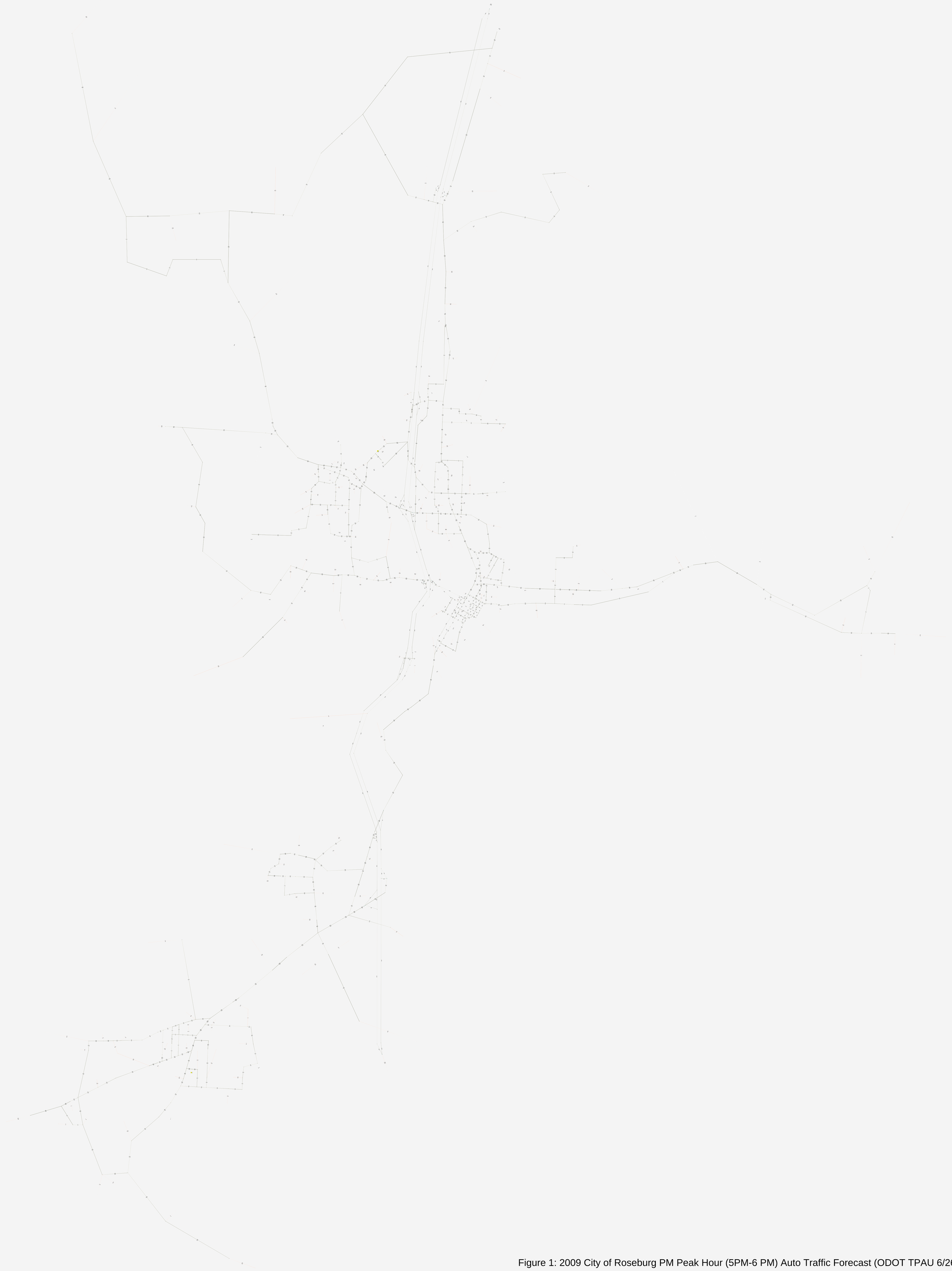
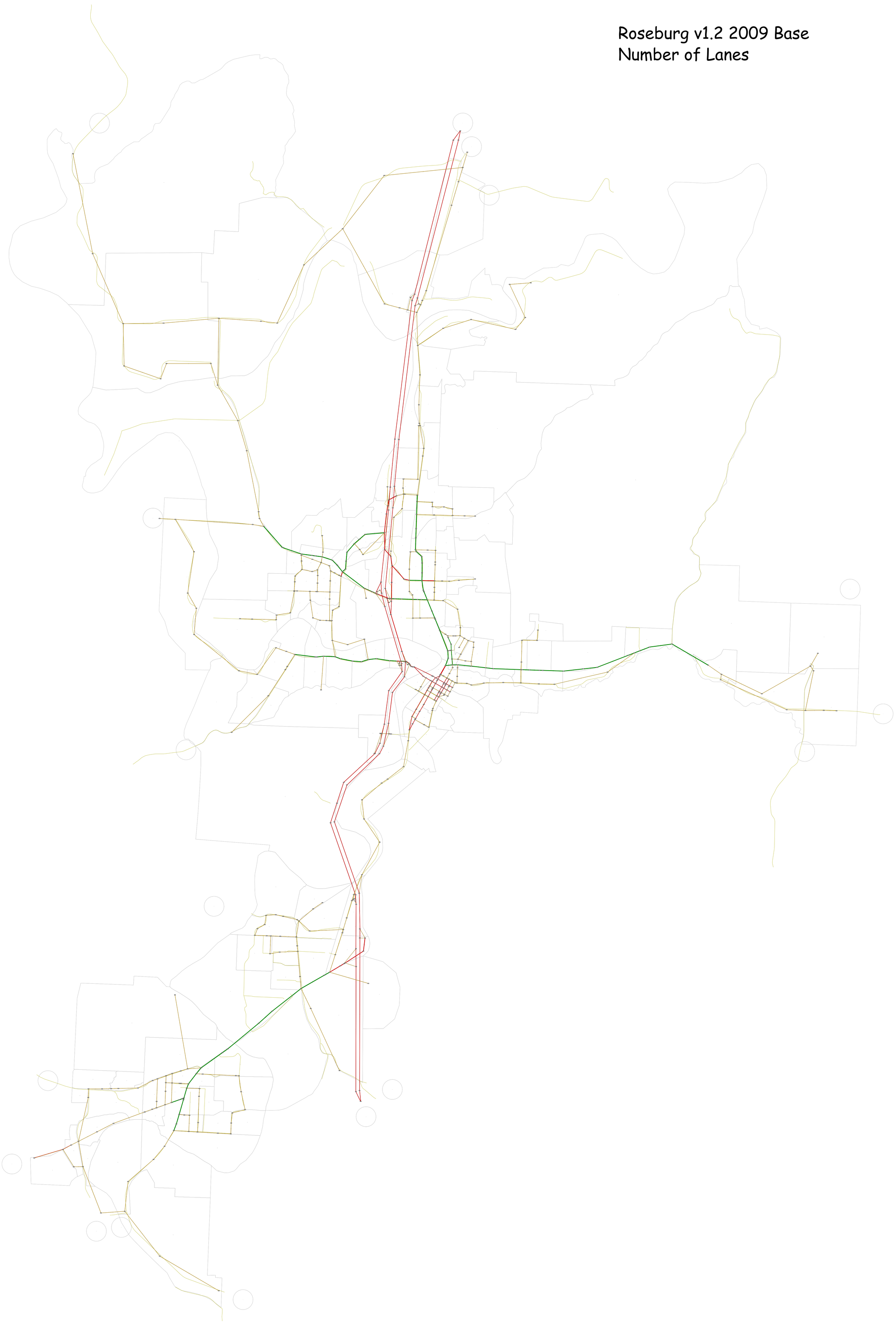


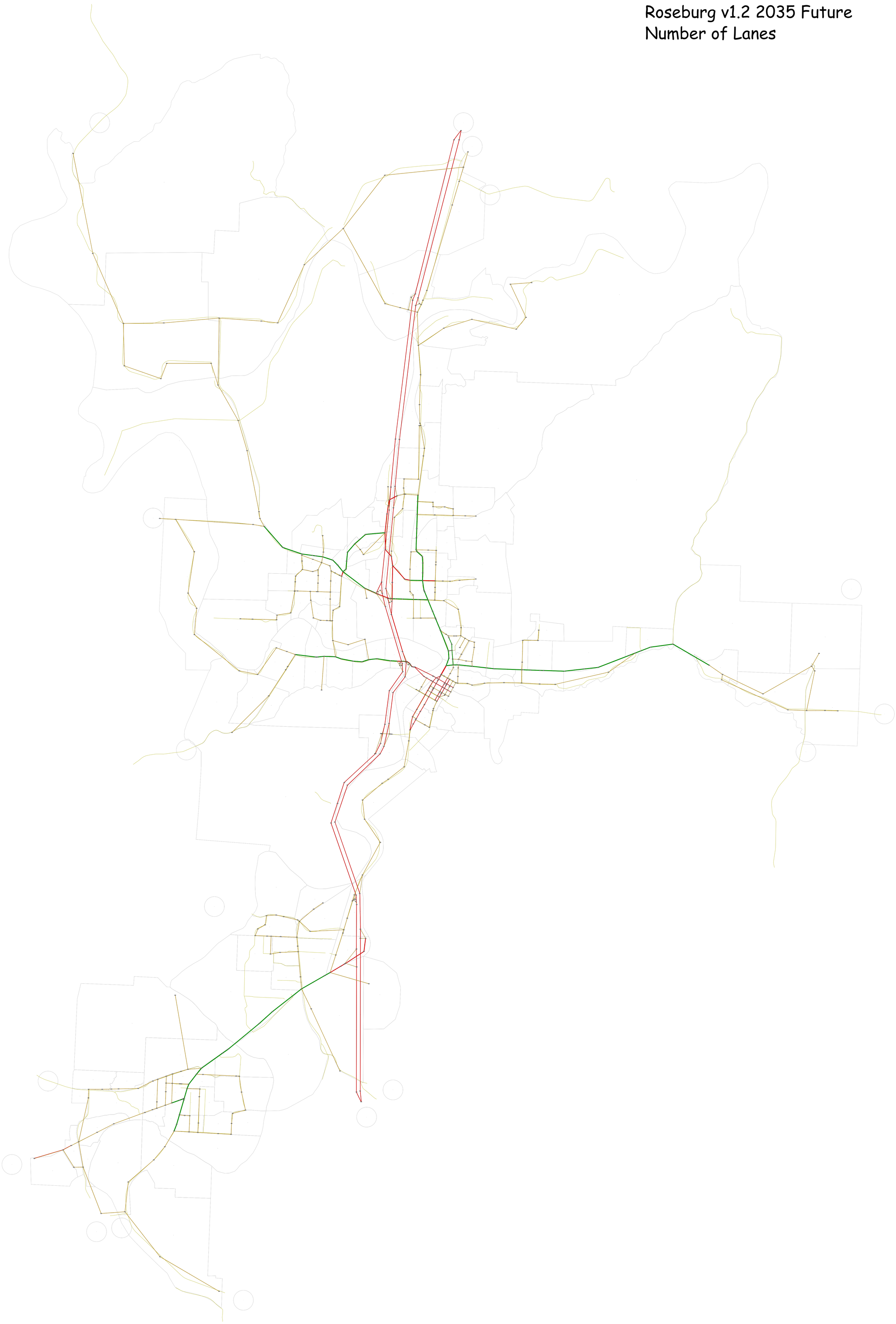
Figure 1: 2009 City of Roseburg PM Peak Hour (5PM-6 PM) Auto Traffic Forecast (ODOT TPAU 6/26/2016)

Figure 2: 2035 City of Roseburg PM Peak Hour (5PM-6 PM) Auto Traffic Forecast (ODOT TPAU 6/26/2016)

Roseburg v1.2 2009 Base
Number of Lanes



Roseburg v1.2 2035 Future
Number of Lanes



The ODOT Transportation Planning Analysis Unit (TPAU) maintains the travel demand model for the Roseburg area. TPAU provided the base (year 2009) and future (year 2035) travel demand models for Roseburg, from which NCHRP 255 was applied to post-process the link volumes. Table B-1 shows the employment and household changes between the base and future year models by documenting the percent change in households and employment by transportation analysis zone (TAZ). As shown, there are a total of 178 TAZs in Roseburg, of which four experience either household or employment growth greater than 45% for the 26 year period between 2009 and 2035. On average, the Roseburg area is projected to experience approximately 28.8% growth (1.1% annual growth) in households and 21.8% growth (0.8% annual growth) in employment.

Table B-1: Household and Employment Growth by TAZ

TAZ	Household	Employment
19	25.0%	0.0%
20	35.2%	36.5%
21	36.5%	50.0%
22	36.5%	35.1%
23	33.3%	37.0%
24	36.3%	0.0%
25	36.2%	37.5%
26	37.1%	35.5%
27	29.4%	20.0%
28	29.1%	30.8%
29	0.0%	33.3%
30	34.9%	2.9%
31	36.4%	23.4%
32	0.0%	11.2%
33	0.0%	11.7%
34	36.5%	31.3%
35	29.7%	0.0%
36	35.7%	0.0%
37	28.6%	36.6%
38	36.3%	37.5%
39	37.9%	36.3%
40	36.7%	7.4%
41	36.4%	11.3%
42	0.0%	0.0%
43	35.9%	11.4%
44	36.2%	20.6%
45	36.4%	0.0%
46	36.1%	33.3%

TAZ	Household	Employment
47	36.5%	33.3%
48	36.4%	36.4%
49	35.9%	42.9%
50	31.3%	33.3%
51	30.1%	30.6%
52	29.4%	29.0%
53	31.3%	50.0%
54	38.7%	35.7%
55	36.4%	37.0%
56	36.6%	36.6%
57	36.4%	0.0%
58	36.0%	33.3%
59	35.9%	17.9%
60	36.5%	0.0%
61	34.6%	36.4%
62	0.0%	36.7%
63	0.0%	36.4%
64	36.1%	26.6%
65	36.3%	8.1%
66	36.2%	30.8%
67	36.0%	36.4%
68	37.1%	0.0%
69	0.0%	36.5%
70	35.3%	11.9%
71	36.6%	7.6%
72	36.8%	37.2%
73	36.4%	36.6%
74	36.7%	36.7%
75	36.3%	0.0%
76	36.2%	36.3%
77	36.3%	15.7%
78	20.0%	30.3%
79	28.6%	36.4%
80	36.4%	34.6%
81	36.2%	35.9%
82	33.3%	9.8%
83	36.0%	18.2%
84	30.0%	34.6%

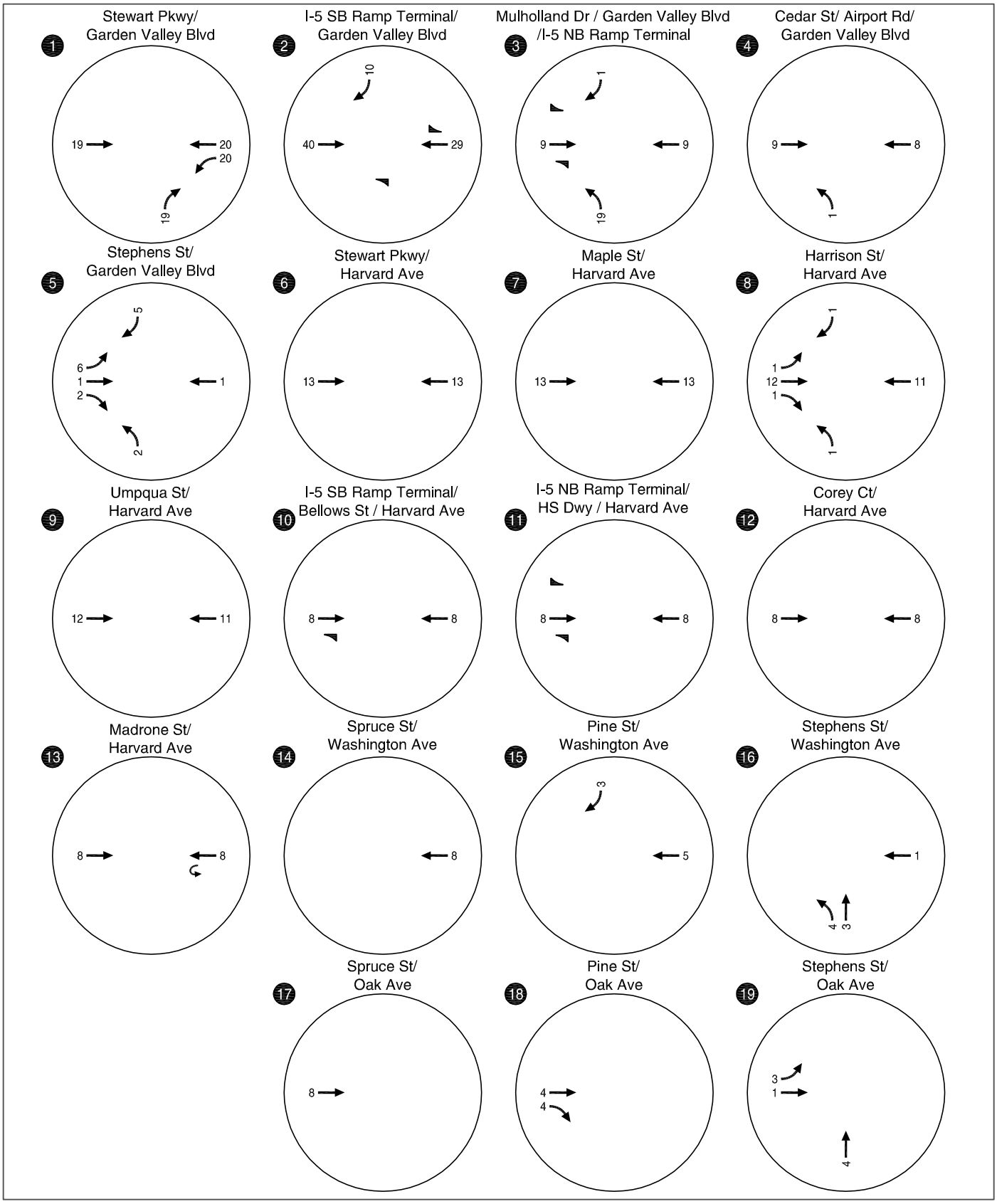
TAZ	Household	Employment
85	33.3%	3.2%
86	38.5%	36.8%
87	0.0%	36.6%
88	0.0%	6.8%
89	20.0%	1.6%
90	37.0%	36.7%
91	36.4%	36.4%
92	36.5%	7.1%
93	40.0%	12.1%
94	36.7%	6.9%
95	0.0%	5.1%
96	35.9%	33.3%
97	35.7%	15.0%
98	36.3%	36.8%
99	37.4%	33.3%
100	36.1%	17.6%
101	36.5%	37.9%
102	0.0%	33.3%
103	34.9%	0.0%
104	35.9%	40.0%
105	28.9%	28.6%
106	29.9%	29.4%
107	29.7%	30.0%
108	28.6%	30.0%
109	29.6%	31.3%
110	29.5%	27.3%
111	29.6%	28.1%
112	0.0%	29.7%
113	29.4%	29.2%
114	29.6%	28.8%
115	29.4%	1.6%
116	33.3%	29.4%
117	30.0%	28.9%
118	29.1%	0.0%
119	29.4%	0.0%
120	29.8%	30.8%
121	29.8%	29.6%
122	29.5%	30.1%

TAZ	Household	Employment
123	29.4%	33.3%
124	29.6%	29.3%
125	29.7%	29.5%
126	29.8%	29.4%
127	29.6%	0.0%
128	28.6%	29.1%
129	31.4%	0.0%
130	29.3%	0.0%
131	0.0%	0.0%
140	29.6%	27.3%
141	29.5%	20.5%
142	29.6%	14.3%
143	29.5%	0.0%
144	29.1%	29.2%
145	36.0%	1.1%
146	29.9%	0.0%
147	30.0%	28.6%
148	26.9%	0.0%
149	30.0%	31.0%
150	28.0%	29.7%
151	32.3%	28.6%
152	29.3%	30.0%
153	31.4%	29.5%
154	0.0%	0.0%
155	36.3%	36.1%
156	36.6%	35.4%
157	36.6%	10.0%
158	36.4%	33.3%
159	39.4%	0.0%
160	0.0%	1.8%
161	0.0%	4.3%
162	0.0%	17.0%
163	36.4%	21.9%
164	36.3%	50.0%
165	36.1%	36.8%
166	36.8%	0.0%
167	50.0%	36.0%
168	36.6%	5.1%

TAZ	Household	Employment
169	36.3%	0.0%
170	36.2%	36.3%
171	0.0%	1.2%
172	36.1%	36.4%
173	36.2%	25.0%
174	30.0%	35.9%
175	37.1%	4.6%
176	36.0%	36.8%
177	36.4%	11.9%
178	35.5%	0.0%
179	29.5%	25.0%
180	28.6%	8.2%
181	29.4%	15.8%
182	29.4%	9.1%
183	29.7%	30.0%
184	29.3%	0.0%
185	29.4%	0.0%
186	29.6%	27.8%
187	30.2%	27.3%
188	31.6%	0.0%
189	27.3%	28.8%
190	0.0%	25.0%
191	0.0%	0.0%
192	29.7%	28.6%
193	0.0%	29.7%
194	0.0%	0.4%
195	0.0%	0.0%
197	31.8%	33.3%
Average	**28.8%**	**21.8%**

The Roseburg travel demand model is an EMME model which accounts for roadway improvements at the link-level only (i.e., not at the intersection, turning movement level). TPAU provided the base and future year models showing the number of lanes by link to determine whether the respective models assume any capacity changes. As shown in the attached plots, there have been no roadway capacity changes (green = 3 lanes, red = 2 lanes, yellow = 1 lane).

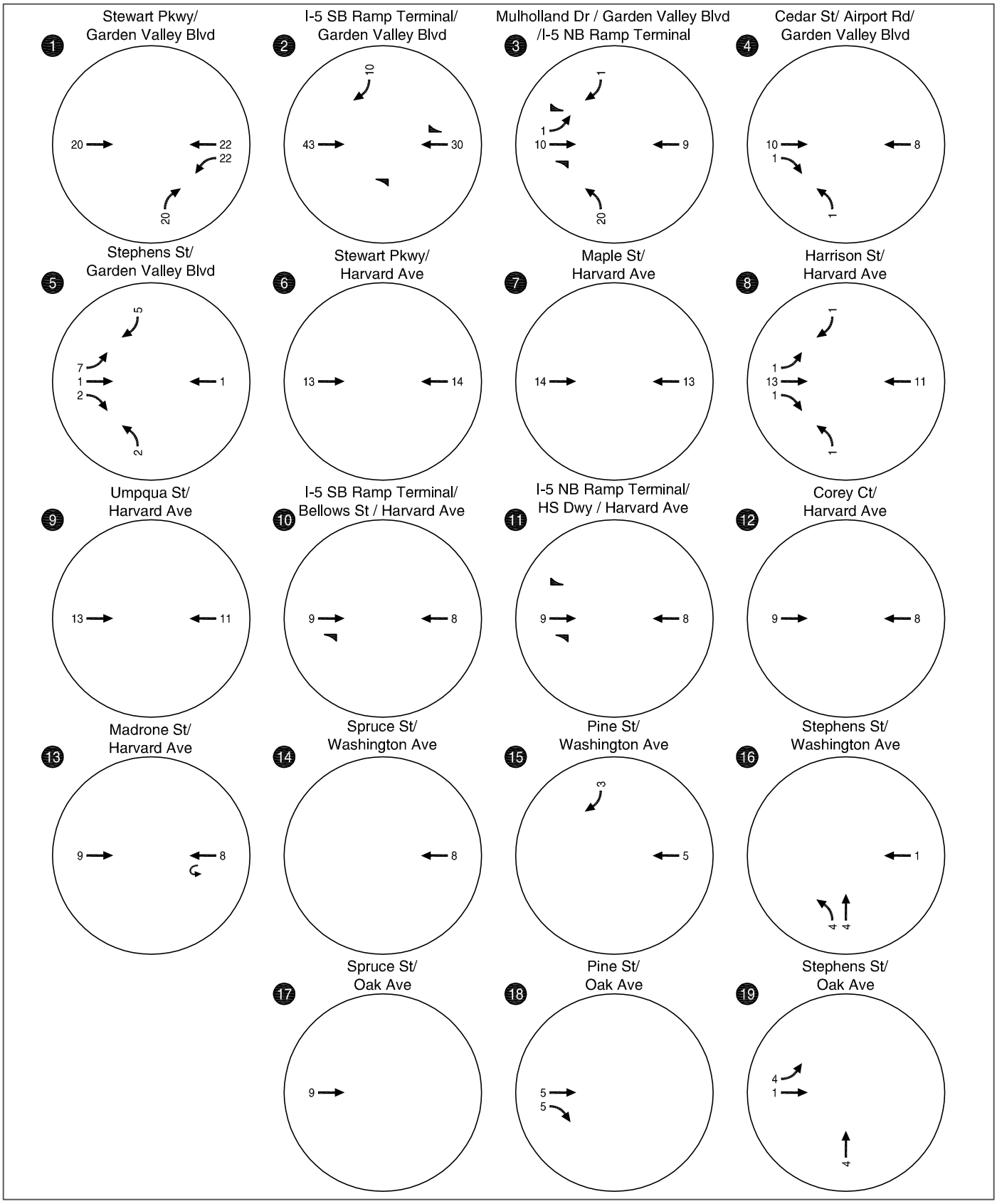
Appendix C VA Estimated Trip Generation



VA Expansion Trip Generation
Weekday AM Peak Hour
Roseburg, OR

Figure **1**

H:\projfile\13049 - IAMP 124 & 125\dwgs\figs\13049_Fig01.dwg Aug 25, 2014 - 7:03pm - amalinge Layout Tab: VA_added_am

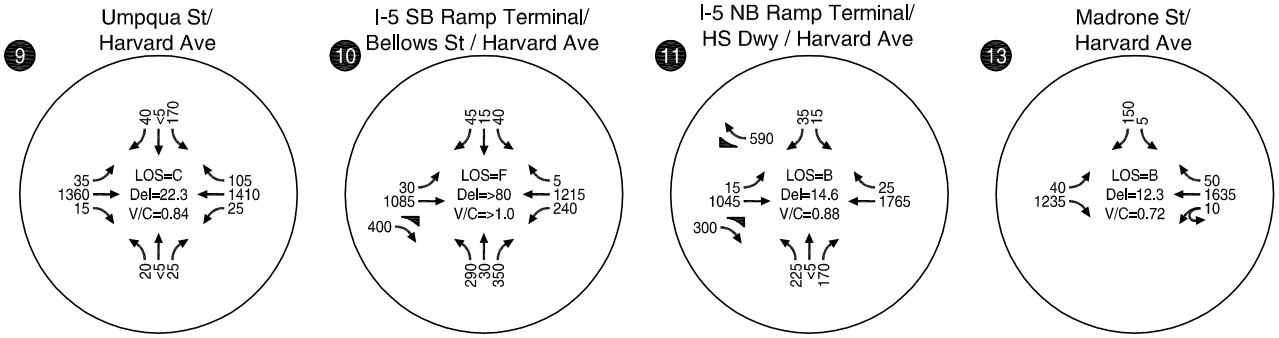


VA Expansion Trip Generation
Weekday PM Peak Hour
Roseburg, OR

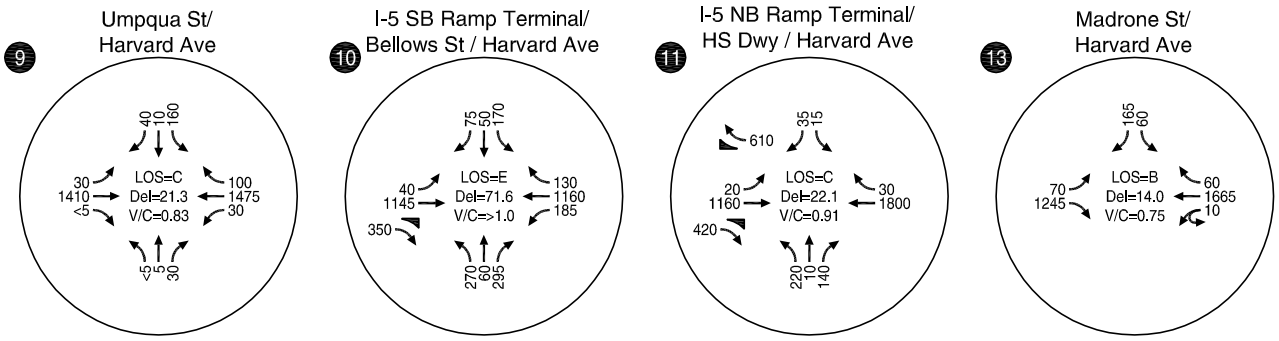
Figure **2**

Appendix D Hospital Site Rezone Analysis

WITHOUT HOSPITAL REZONE



WITH HOSPITAL REZONE



CM = CRITICAL MOVEMENT (TWSC)
LOS = INTERSECTION LEVEL OF SERVICE (AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
Del = INTERSECTION AVERAGE CONTROL DELAY (AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
TWC = TWO-WAY STOP CONTROL

2035 Traffic Condition Comparison w/ & w/out Hospital Site Rezone
Weekday PM Peak Hour
Roseburg, OR

Figure
C-1

H:\projfile\13049 - IAMP 124 & 125\dwgs\figs\13049_Fig01.dwg Aug 29, 2014 - 2:54pm - amallinge Layout Tab: rezone

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	32	1486	32	1656	37	219
v/c Ratio	0.27	0.75	0.27	0.84	0.11	0.84
Control Delay	44.9	17.4	44.9	21.2	12.5	58.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	17.4	44.9	21.2	12.5	58.9
Queue Length 50th (ft)	18	347	18	431	2	110
Queue Length 95th (ft)	46	470	46	#639	27	#219
Internal Link Dist (ft)		411		442	147	253
Turn Bay Length (ft)	150		175			
Base Capacity (vph)	139	1991	139	1975	365	298
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.75	0.23	0.84	0.10	0.73

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	1410	2	30	1473	100	2	3	30	160	9	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	1.00		1.00	0.99			0.88			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.96	
Satd. Flow (prot)	1662	3196		1662	3165			1513			1624	
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.75	
Satd. Flow (perm)	1662	3196		1662	3165			1496			1267	
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)	32	1484	2	32	1551	105	2	3	32	168	9	42
RTOR Reduction (vph)	0	0	0	0	5	0	0	26	0	0	10	0
Lane Group Flow (vph)	32	1486	0	32	1651	0	0	11	0	0	209	0
Confl. Peds. (#/hr)	2		5	5		2	9		7	7		9
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	0%	4%	0%	0%	4%	2%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.3	54.3		4.3	54.3			17.9			17.9	
Effective Green, g (s)	4.3	54.3		4.3	54.3			17.9			17.9	
Actuated g/C Ratio	0.05	0.60		0.05	0.60			0.20			0.20	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			2.5	
Lane Grp Cap (vph)	79	1928		79	1910			298			252	
v/s Ratio Prot	c0.02	0.46		0.02	c0.52							
v/s Ratio Perm								0.01			c0.17	
v/c Ratio	0.41	0.77		0.41	0.86			0.04			0.83	
Uniform Delay, d1	41.6	13.2		41.6	14.8			29.1			34.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.5	3.0		2.5	5.5			0.0			19.9	
Delay (s)	44.1	16.3		44.1	20.3			29.1			54.5	
Level of Service	D	B		D	C			C			D	
Approach Delay (s)		16.9			20.8			29.1			54.5	
Approach LOS		B			C			C			D	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	42	1205	195	1358	347	311	312
v/c Ratio	0.17	1.02	0.85	1.07	0.92	0.44	1.06
Control Delay	31.7	62.6	70.1	75.3	60.3	4.6	99.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	62.6	70.1	75.3	60.3	4.6	99.8
Queue Length 50th (ft)	19	~393	109	~560	186	0	~190
Queue Length 95th (ft)	47	#521	#224	#694	#357	53	#354
Internal Link Dist (ft)		177		207	278		89
Turn Bay Length (ft)	150		150				
Base Capacity (vph)	351	1176	238	1275	376	710	293
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	1.02	0.82	1.07	0.92	0.44	1.06

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1145	0	185	1160	130	269	61	295	171	52	73
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	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		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	
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			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1662	3260		1646	3239			1662	1399		1632	
Flt Permitted	0.95	1.00		0.95	1.00			0.59	1.00		0.45	
Satd. Flow (perm)	1662	3260		1646	3239			1026	1399		762	
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)	42	1205	0	195	1221	137	283	64	311	180	55	77
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	197	0	13	0
Lane Group Flow (vph)	42	1205	0	195	1350	0	0	347	114	0	299	0
Confl. Peds. (#/hr)							7		8	8		7
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	2%	2%	1%	1%	0%	1%	0%	4%	0%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	11.4	32.5		12.5	33.6			33.0	33.0		33.0	
Effective Green, g (s)	11.4	32.5		12.5	33.6			33.0	33.0		33.0	
Actuated g/C Ratio	0.13	0.36		0.14	0.37			0.37	0.37		0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	2.5	5.5		2.5	5.5			2.5	2.5		2.5	
Lane Grp Cap (vph)	211	1177		229	1209			376	513		279	
v/s Ratio Prot	0.03	c0.37		0.12	c0.42							
v/s Ratio Perm								0.34	0.08		c0.39	
v/c Ratio	0.20	1.02		0.85	1.12			0.92	0.22		1.07	
Uniform Delay, d1	35.2	28.8		37.8	28.2			27.3	19.7		28.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	32.4		24.7	64.1			27.8	0.2		73.9	
Delay (s)	35.5	61.2		62.5	92.3			55.0	19.8		102.4	
Level of Service	D	E		E	F			E	B		F	
Approach Delay (s)		60.3			88.6			38.4			102.4	
Approach LOS		E			F			D			F	

Intersection Summary			
HCM Average Control Delay	71.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	21	1220	1925	234	158	16	37
v/c Ratio	0.18	0.55	0.91	0.72	0.49	0.08	0.11
Control Delay	42.5	8.6	25.4	45.9	24.1	27.7	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	8.6	25.4	45.9	24.1	27.7	9.6
Queue Length 50th (ft)	12	153	364	126	49	8	0
Queue Length 95th (ft)	34	262	#853	186	99	23	23
Internal Link Dist (ft)		40	104		647		
Turn Bay Length (ft)	125					100	
Base Capacity (vph)	471	2231	2106	551	505	328	521
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.55	0.91	0.42	0.31	0.05	0.07

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1159	0	0	1798	30	222	10	140	15	0	35
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.98		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		0.99	1.00		0.99		1.00
Frt	1.00	1.00			1.00		1.00	0.86		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1662	3197			3251		1654	1397		1650		1488
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.57		1.00
Satd. Flow (perm)	1662	3197			3251		1654	1397		982		1488
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)	21	1220	0	0	1893	32	234	11	147	16	0	37
RTOR Reduction (vph)	0	0	0	0	1	0	0	47	0	0	0	30
Lane Group Flow (vph)	21	1220	0	0	1924	0	234	111	0	16	0	7
Confl. Peds. (#/hr)	4		1	1		4	4		8	8		4
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	6%	0%	0%	0%
Turn Type	Prot						Perm			custom		custom
Protected Phases	5	2			6			8				4
Permitted Phases							8			4		
Actuated Green, G (s)	3.0	62.8			55.8		17.7	17.7		17.7		17.7
Effective Green, g (s)	3.0	62.8			55.8		17.7	17.7		17.7		17.7
Actuated g/C Ratio	0.03	0.70			0.62		0.20	0.20		0.20		0.20
Clearance Time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Vehicle Extension (s)	2.5	5.9			5.9		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	55	2231			2016		325	275		193		293
v/s Ratio Prot	0.01	c0.38			c0.59			0.08				0.00
v/s Ratio Perm							c0.14			0.02		
v/c Ratio	0.38	0.55			0.95		0.72	0.40		0.08		0.02
Uniform Delay, d1	42.6	6.6			15.9		33.8	31.5		29.5		29.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.2	1.0			11.9		7.0	0.7		0.1		0.0
Delay (s)	45.8	7.6			27.8		40.8	32.2		29.7		29.2
Level of Service	D	A			C		D	C		C		C
Approach Delay (s)		8.3			27.8			37.3			29.3	
Approach LOS		A			C			D			C	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Volume (vph)	69	0	1245	10	1665	60	60	163	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0		4.5	4.0	4.5		4.5	4.5		
Lane Util. Factor	1.00		0.88	1.00	0.95		1.00	1.00		
Frpb, ped/bikes	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		
Frt	1.00		0.85	1.00	0.99		1.00	0.85		
Flt Protected	0.95		1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1662		2618	1662	3238		1662	1418		
Flt Permitted	0.95		1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1662		2618	1662	3238		1662	1418		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92
Adj. Flow (vph)	73	0	1311	11	1753	63	63	172	0	0
RTOR Reduction (vph)	0	0	293	6	2	0	0	155	0	0
Lane Group Flow (vph)	73	0	1018	5	1814	0	63	17	0	0
Confl. Peds. (#/hr)	8		4	4		8	10	20		
Confl. Bikes (#/hr)						1				
Heavy Vehicles (%)	0%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Prot		custom	Prot				Perm		
Protected Phases	5		2	1	6		4			
Permitted Phases								4		
Actuated Green, G (s)	7.8		66.7	1.2	60.1		9.1	9.1		
Effective Green, g (s)	7.8		66.7	1.2	60.1		9.1	9.1		
Actuated g/C Ratio	0.09		0.74	0.01	0.67		0.10	0.10		
Clearance Time (s)	4.0		4.5	4.0	4.5		4.5	4.5		
Vehicle Extension (s)	2.5		5.0	1.5	5.0		2.5	2.5		
Lane Grp Cap (vph)	144		1940	22	2162		168	143		
v/s Ratio Prot	c0.04		0.39	0.00	c0.56		c0.04			
v/s Ratio Perm								0.01		
v/c Ratio	0.51		0.52	0.23	0.84		0.38	0.12		
Uniform Delay, d1	39.3		4.9	43.9	11.3		37.8	36.8		
Progression Factor	1.00		1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	2.0		1.0	2.0	4.1		1.0	0.3		
Delay (s)	41.3		6.0	45.9	15.4		38.8	37.1		
Level of Service	D		A	D	B		D	D		
Approach Delay (s)		7.8			15.6		37.6		0.0	
Approach LOS		A			B		D		A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix E Year 2035 Traffic Operations Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	451	778	73	147	524	223	69	264	174	125	142	152
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.0	5.0		4.5	5.0	5.0	4.5	5.0		4.5	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		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	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		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)	1614	3185		1599	3023	1369	1511	3060		3101	3137	1335
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)	1614	3185		1599	3023	1369	1511	3060		3101	3137	1335
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)	475	819	77	155	552	235	73	278	183	132	149	160
RTOR Reduction (vph)	0	4	0	0	0	134	0	72	0	0	0	127
Lane Group Flow (vph)	475	892	0	155	552	101	73	389	0	132	149	33
Confl. Peds. (#/hr)	1		2	2		1	1					1
Confl. Bikes (#/hr)						3			2			
Heavy Vehicles (%)	3%	3%	2%	4%	10%	7%	10%	2%	1%	4%	6%	10%
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						4
Actuated Green, G (s)	30.3	41.7		15.9	26.8	26.8	8.9	21.1		9.9	22.1	22.1
Effective Green, g (s)	30.3	41.7		15.9	26.8	26.8	8.9	21.1		9.9	22.1	22.1
Actuated g/C Ratio	0.28	0.39		0.15	0.25	0.25	0.08	0.20		0.09	0.21	0.21
Clearance Time (s)	5.0	5.0		4.5	5.0	5.0	4.5	5.0		4.5	5.0	5.0
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	455	1234		236	753	341	125	600		285	644	274
v/s Ratio Prot	c0.29	c0.28		0.10	0.18		c0.05	c0.13		0.04	0.05	
v/s Ratio Perm						0.07						0.02
v/c Ratio	1.04	0.72		0.66	0.73	0.29	0.58	0.65		0.46	0.23	0.12
Uniform Delay, d1	38.6	28.0		43.3	37.1	32.7	47.6	39.8		46.3	35.7	34.8
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	54.1	2.0		5.8	3.5	0.4	5.7	2.1		0.9	0.1	0.1
Delay (s)	92.8	30.0		49.0	40.6	33.1	53.2	42.0		47.2	35.8	35.0
Level of Service	F	C		D	D	C	D	D		D	D	C
Approach Delay (s)		51.8			40.1			43.5			38.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	107.6	Sum of lost time (s)	14.5
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												
Volume (vph)	17	740	259	338	664	7	32	0	40	16	0	26
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	1.00
Frt	1.00	0.96		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1662	3138		1662	3286			1648	1458		1650	1457
Flt Permitted	0.95	1.00		0.95	1.00			0.75	1.00		0.73	1.00
Satd. Flow (perm)	1662	3138		1662	3286			1292	1458		1272	1457
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	18	779	273	356	699	7	38	0	47	19	0	31
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	42	0	0	28
Lane Group Flow (vph)	18	1027	0	356	706	0	0	38	5	0	19	3
Confl. Peds. (#/hr)	9		8	8		9	8		7	7		8
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	2.9	60.2		16.2	73.5			10.1	10.1		10.1	10.1
Effective Green, g (s)	2.9	60.2		16.2	73.5			10.1	10.1		10.1	10.1
Actuated g/C Ratio	0.03	0.60		0.16	0.74			0.10	0.10		0.10	0.10
Clearance Time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.5	4.5		2.5	4.5			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	48	1889		269	2415			130	147		128	147
v/s Ratio Prot	0.01	c0.33		c0.21	0.21							
v/s Ratio Perm								c0.03	0.00		0.01	0.00
v/c Ratio	0.38	0.54		1.32	0.29			0.29	0.03		0.15	0.02
Uniform Delay, d1	47.7	11.8		41.9	4.5			41.6	40.5		41.0	40.5
Progression Factor	1.00	1.00		0.77	0.15			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.6	1.1		166.0	0.3			0.9	0.1		0.4	0.0
Delay (s)	51.2	12.9		198.1	0.9			42.6	40.6		41.4	40.5
Level of Service	D	B		F	A			D	D		D	D
Approach Delay (s)		13.5			67.0			41.5			40.9	
Approach LOS		B			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
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												
Volume (vph)	71	755	26	23	925	5	5	1	13	90	1	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3272		1662	3289		1658	1478		1652	1468	
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00		0.75	1.00	
Satd. Flow (perm)	1662	3272		1662	3289		1211	1478		1299	1468	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	75	795	27	24	974	5	6	1	15	106	1	94
RTOR Reduction (vph)	0	2	0	0	1	0	0	11	0	0	69	0
Lane Group Flow (vph)	75	820	0	24	978	0	6	5	0	106	26	0
Confl. Peds. (#/hr)	2		12	12		2	2		4	4		2
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	11.0	56.8		3.2	49.0		27.0	27.0		27.0	27.0	
Effective Green, g (s)	11.0	56.8		3.2	49.0		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.11	0.57		0.03	0.49		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		2.0	2.0		2.5	2.5	
Lane Grp Cap (vph)	182	1858		53	1611		326	399		350	396	
v/s Ratio Prot	0.05	c0.25		0.01	c0.30			0.00			0.02	
v/s Ratio Perm							0.00			c0.08		
v/c Ratio	0.41	0.44		0.45	0.61		0.02	0.01		0.30	0.07	
Uniform Delay, d1	41.5	12.5		47.5	18.5		26.8	26.7		29.0	27.1	
Progression Factor	0.75	0.33		1.30	0.81		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.7		4.0	1.6		0.0	0.0		2.2	0.3	
Delay (s)	32.0	4.8		65.9	16.6		26.8	26.7		31.2	27.5	
Level of Service	C	A		E	B		C	C		C	C	
Approach Delay (s)		7.1			17.8			26.8			29.5	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	940	1035	0	180	168
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3260	3228		1554	1430
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3260	3228		1554	1430
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1000	1101	0	191	179
RTOR Reduction (vph)	0	0	0	0	0	96
Lane Group Flow (vph)	0	1000	1101	0	191	83
Confl. Peds. (#/hr)	3			3	4	4
Heavy Vehicles (%)	0%	2%	3%	0%	7%	4%
Turn Type						custom
Protected Phases		2	6		7	4
Permitted Phases						
Actuated Green, G (s)		77.8	77.8		18.2	18.2
Effective Green, g (s)		77.8	77.8		18.2	18.2
Actuated g/C Ratio		0.74	0.74		0.17	0.17
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		4.6	4.6		2.5	2.5
Lane Grp Cap (vph)		2416	2392		269	248
v/s Ratio Prot		0.31	c0.34		c0.12	0.06
v/s Ratio Perm						
v/c Ratio		0.41	0.46		0.71	0.34
Uniform Delay, d1		5.1	5.3		40.9	38.1
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.6		8.0	0.6
Delay (s)		5.6	6.0		48.9	38.7
Level of Service		A	A		D	D
Approach Delay (s)		5.6	6.0		43.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.4%	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												
Volume (vph)	50	640	0	0	714	36	525	335	365	25	0	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5			4.5		4.5	4.5		4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	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
Frt	1.00	1.00			0.99		1.00	0.92		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1363	3197			3046		1610	1539		1374		1403
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.10		1.00
Satd. Flow (perm)	1363	3197			3046		1610	1539		146		1403
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	674	0	0	752	38	553	353	384	26	0	129
RTOR Reduction (vph)	0	0	0	0	3	0	0	39	0	0	0	78
Lane Group Flow (vph)	53	674	0	0	787	0	553	698	0	26	0	51
Confl. Peds. (#/hr)	3		2	2		3	2		3	3		2
Heavy Vehicles (%)	22%	4%	0%	0%	8%	13%	3%	4%	4%	21%	0%	6%
Turn Type	Prot						Perm			custom		custom
Protected Phases	5	2			6			8				4
Permitted Phases							8			4		
Actuated Green, G (s)	7.8	51.5			39.2		39.5	39.5		39.5		39.5
Effective Green, g (s)	7.8	51.5			39.2		39.5	39.5		39.5		39.5
Actuated g/C Ratio	0.08	0.52			0.39		0.40	0.40		0.40		0.40
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5		4.5
Vehicle Extension (s)	2.5	6.1			6.1		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	106	1646			1194		636	608		58		554
v/s Ratio Prot	0.04	c0.21			c0.26			c0.45				0.04
v/s Ratio Perm							0.34			0.18		
v/c Ratio	0.50	0.41			0.66		0.87	1.15		0.45		0.09
Uniform Delay, d1	44.2	14.9			24.9		27.9	30.2		22.2		19.0
Progression Factor	1.00	1.00			0.75		1.00	1.00		1.00		1.00
Incremental Delay, d2	2.7	0.8			2.7		12.0	84.5		4.0		0.1
Delay (s)	46.9	15.7			21.3		39.9	114.7		26.2		19.0
Level of Service	D	B			C		D	F		C		B
Approach Delay (s)		17.9			21.3			82.6			20.2	
Approach LOS		B			C			F			C	

Intersection Summary			
HCM Average Control Delay	47.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	80.8%	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												
Volume (vph)	98	698	95	20	593	18	63	11	10	26	10	52
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	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	
Frt	1.00	0.98		1.00	1.00		1.00	0.93		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3139		1662	3009		1554	1612		1662	1428	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1662	3139		1662	3009		1554	1612		1662	1428	
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)	103	735	100	21	624	19	66	12	11	27	11	55
RTOR Reduction (vph)	0	7	0	0	1	0	0	10	0	0	49	0
Lane Group Flow (vph)	103	828	0	21	642	0	66	13	0	27	17	0
Confl. Peds. (#/hr)	1		2	2		1	3		4	4		3
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	3%	9%	0%	10%	8%	7%	0%	0%	0%	14%	4%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	10.3	61.4		4.0	55.1		7.3	10.5		7.1	10.3	
Effective Green, g (s)	10.3	61.4		4.0	55.1		7.3	10.5		7.1	10.3	
Actuated g/C Ratio	0.10	0.61		0.04	0.55		0.07	0.10		0.07	0.10	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.5	4.6		2.5	4.6		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	171	1927		66	1658		113	169		118	147	
v/s Ratio Prot	c0.06	c0.26		0.01	c0.21		c0.04	0.01		0.02	c0.01	
v/s Ratio Perm												
v/c Ratio	0.60	0.43		0.32	0.39		0.58	0.08		0.23	0.11	
Uniform Delay, d1	42.9	10.1		46.7	12.8		44.9	40.4		43.9	40.7	
Progression Factor	0.81	1.08		0.73	0.60		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.5		1.8	0.6		6.2	0.1		0.7	0.3	
Delay (s)	38.2	11.5		36.0	8.3		51.1	40.5		44.6	41.0	
Level of Service	D	B		D	A		D	D		D	D	
Approach Delay (s)		14.4			9.2			48.4			42.0	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	50.3%	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												
Volume (vph)	133	139	229	93	130	21	307	444	41	30	448	112
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	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	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1568	1606	1430	1599	1541		3101	3099		1511	3045	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1568	1606	1430	1599	1541		3101	3099		1511	3045	
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)	140	146	241	98	137	22	323	467	43	32	472	118
RTOR Reduction (vph)	0	0	130	0	6	0	0	6	0	0	20	0
Lane Group Flow (vph)	140	146	111	98	153	0	323	504	0	32	570	0
Confl. Peds. (#/hr)							2		1	1		2
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	6%	9%	4%	4%	13%	0%	4%	6%	3%	10%	5%	8%
Turn Type	Prot		pt+ov	Prot			Prot			Prot		
Protected Phases	3	8	1 8	7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	13.1	16.8	37.9	10.4	14.1		16.6	50.1		4.7	38.2	
Effective Green, g (s)	13.1	16.8	37.9	10.4	14.1		16.6	50.1		4.7	38.2	
Actuated g/C Ratio	0.13	0.17	0.38	0.10	0.14		0.17	0.50		0.05	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	2.5		2.5	4.6		2.5	4.6	
Lane Grp Cap (vph)	205	270	542	166	217		515	1553		71	1163	
v/s Ratio Prot	c0.09	0.09	0.08	0.06	c0.10		c0.10	0.16		0.02	c0.19	
v/s Ratio Perm												
v/c Ratio	0.68	0.54	0.20	0.59	0.71		0.63	0.32		0.45	0.49	
Uniform Delay, d1	41.5	38.1	20.9	42.8	41.0		38.8	14.9		46.4	23.5	
Progression Factor	0.79	0.74	0.83	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.8	2.1	0.2	4.6	9.3		5.7	0.6		3.3	1.5	
Delay (s)	40.7	30.3	17.5	47.4	50.2		44.5	15.4		49.7	25.0	
Level of Service	D	C	B	D	D		D	B		D	C	
Approach Delay (s)		27.2			49.2			26.7			26.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.0%	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												
Volume (vph)	283	782	8	0	295	273	0	0	0	344	11	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.5			5.5	5.5				4.5	4.5	
Lane Util. Factor	1.00	0.95			0.95	1.00				1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	0.98				1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00				0.99	1.00	
Frt	1.00	1.00			1.00	0.85				1.00	0.86	
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	
Satd. Flow (prot)	1646	3133			3050	1395				1602	1350	
Flt Permitted	0.95	1.00			1.00	1.00				0.76	1.00	
Satd. Flow (perm)	1646	3133			3050	1395				1277	1350	
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)	298	823	8	0	311	287	0	0	0	362	12	129
RTOR Reduction (vph)	0	0	0	0	0	219	0	0	0	0	81	0
Lane Group Flow (vph)	298	831	0	0	311	68	0	0	0	362	60	0
Confl. Peds. (#/hr)	3		1	1		3	5		7	7		5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	6%	0%	0%	9%	4%	0%	0%	0%	3%	0%	11%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases						2	4			4		
Actuated Green, G (s)	23.9	50.9			23.0	23.0				36.3	36.3	
Effective Green, g (s)	23.9	50.9			23.0	23.0				36.3	36.3	
Actuated g/C Ratio	0.25	0.52			0.24	0.24				0.37	0.37	
Clearance Time (s)	4.0	5.5			5.5	5.5				4.5	4.5	
Vehicle Extension (s)	3.0	4.5			4.5	4.5				3.5	3.5	
Lane Grp Cap (vph)	405	1641			722	330				477	504	
v/s Ratio Prot	c0.18	c0.27			0.10						0.04	
v/s Ratio Perm						0.05				c0.28		
v/c Ratio	0.74	0.51			0.43	0.21				0.76	0.12	
Uniform Delay, d1	33.7	15.0			31.5	29.8				26.6	20.0	
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	
Incremental Delay, d2	6.8	0.4			0.7	0.5				7.0	0.1	
Delay (s)	40.6	15.4			32.3	30.3				33.7	20.1	
Level of Service	D	B			C	C				C	C	
Approach Delay (s)		22.1			31.3			0.0			29.9	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	97.2	Sum of lost time (s)	8.5
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	7	1149	1060	9	51	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	7	1209	1116	9	60	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)			760			
pX, platoon unblocked	0.85				0.85	0.85
vC, conflicting volume	1125				1740	563
vC1, stage 1 conf vol					1121	
vC2, stage 2 conf vol					619	
vCu, unblocked vol	807				1526	149
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				79	95
cM capacity (veh/h)	707				291	750

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	7	605	605	744	381	101
Volume Left	7	0	0	0	0	60
Volume Right	0	0	0	0	9	41
cSH	707	1700	1700	1700	1700	388
Volume to Capacity	0.01	0.36	0.36	0.44	0.22	0.26
Queue Length 95th (ft)	1	0	0	0	0	26
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	17.5
Lane LOS	B					C
Approach Delay (s)	0.1			0.0		17.5
Approach LOS						C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	1175	16	12	1059	20	11	2	21	14	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	1237	17	13	1115	21	13	2	25	16	0	11
Pedestrians		6			12							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					491							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	1136			1254			1853	2415	639	1815	2413	574
vC1, stage 1 conf vol							1254	1254		1151	1151	
vC2, stage 2 conf vol							599	1161		665	1262	
vCu, unblocked vol	767			1254			1626	2299	639	1581	2296	94
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			93	99	94	93	100	99
cM capacity (veh/h)	714			562			176	190	419	229	184	790

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	4	825	429	13	743	393	40	27
Volume Left	4	0	0	13	0	0	13	16
Volume Right	0	0	17	0	0	21	25	11
cSH	714	1700	1700	562	1700	1700	276	317
Volume to Capacity	0.01	0.49	0.25	0.02	0.44	0.23	0.15	0.09
Queue Length 95th (ft)	0	0	0	2	0	0	13	7
Control Delay (s)	10.1	0.0	0.0	11.6	0.0	0.0	20.3	17.4
Lane LOS	B			B			C	C
Approach Delay (s)	0.0			0.1			20.3	17.4
Approach LOS							C	C

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	1175	6	19	1086	75	2	1	2	36	1	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.95			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1662	3135		1662	3170			1608			1543	
Flt Permitted	0.95	1.00		0.95	1.00			0.90			0.82	
Satd. Flow (perm)	1662	3135		1662	3170			1470			1307	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	31	1237	6	20	1143	79	2	1	2	42	1	32
RTOR Reduction (vph)	0	0	0	0	4	0	0	2	0	0	29	0
Lane Group Flow (vph)	31	1243	0	20	1218	0	0	3	0	0	46	0
Confl. Peds. (#/hr)			1	1			3		6	6		3
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	6%	0%	0%	4%	0%	0%	0%	0%	5%	0%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.3	64.8		2.9	63.4			8.8			8.8	
Effective Green, g (s)	4.3	64.8		2.9	63.4			8.8			8.8	
Actuated g/C Ratio	0.05	0.72		0.03	0.70			0.10			0.10	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			2.5	
Lane Grp Cap (vph)	79	2257		54	2233			144			128	
v/s Ratio Prot	c0.02	c0.40		0.01	0.38							
v/s Ratio Perm								0.00			c0.04	
v/c Ratio	0.39	0.55		0.37	0.55			0.02			0.36	
Uniform Delay, d1	41.6	5.8		42.7	6.4			36.7			38.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.3	1.0		3.1	1.0			0.0			1.3	
Delay (s)	43.9	6.8		45.8	7.3			36.8			39.2	
Level of Service	D	A		D	A			D			D	
Approach Delay (s)		7.7			8.0			36.8			39.2	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	875	0	148	867	22	268	142	416	43	21	41
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	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		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.98	
Satd. Flow (prot)	1458	3228		1554	3216			1661	1412		1455	
Flt Permitted	0.95	1.00		0.95	1.00			0.75	1.00		0.65	
Satd. Flow (perm)	1458	3228		1554	3216			1282	1412		960	
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)	86	921	0	156	913	23	282	149	438	45	22	43
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	238	0	26	0
Lane Group Flow (vph)	86	921	0	156	934	0	0	431	200	0	84	0
Confl. Peds. (#/hr)	1					1	10		8	8		10
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	14%	3%	19%	7%	3%	0%	2%	0%	3%	0%	0%	27%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	15.2	34.2		11.9	30.9			31.9	31.9		31.9	
Effective Green, g (s)	15.2	34.2		11.9	30.9			31.9	31.9		31.9	
Actuated g/C Ratio	0.17	0.38		0.13	0.34			0.35	0.35		0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	2.5	5.5		2.5	5.5			2.5	2.5		2.5	
Lane Grp Cap (vph)	246	1227		205	1104			454	500		340	
v/s Ratio Prot	0.06	c0.29		0.10	c0.29							
v/s Ratio Perm								c0.34	0.14		0.09	
v/c Ratio	0.35	0.75		0.76	0.85			0.95	0.40		0.25	
Uniform Delay, d1	33.0	24.2		37.7	27.3			28.3	21.9		20.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.6	4.3		14.7	8.0			29.4	0.4		0.3	
Delay (s)	33.7	28.5		52.3	35.4			57.6	22.2		20.8	
Level of Service	C	C		D	D			E	C		C	
Approach Delay (s)		28.9			37.8			39.8			20.8	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	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												
Volume (vph)	123	852	0	0	877	89	354	56	227	51	0	166
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.98		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		0.99		1.00
Frt	1.00	1.00			0.99		1.00	0.88		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1662	3228			3128		1660	1512		1653		1430
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.38		1.00
Satd. Flow (perm)	1662	3228			3128		1660	1512		657		1430
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	129	897	0	0	923	94	373	59	239	60	0	195
RTOR Reduction (vph)	0	0	0	0	6	0	0	96	0	0	0	142
Lane Group Flow (vph)	129	897	0	0	1011	0	373	202	0	60	0	53
Confl. Peds. (#/hr)	3					3	1		8	8		1
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	4%
Turn Type	Prot						Perm			custom		custom
Protected Phases	5	2			6			8				4
Permitted Phases							8			4		
Actuated Green, G (s)	11.8	56.0			40.2		24.5	24.5		24.5		24.5
Effective Green, g (s)	11.8	56.0			40.2		24.5	24.5		24.5		24.5
Actuated g/C Ratio	0.13	0.62			0.45		0.27	0.27		0.27		0.27
Clearance Time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Vehicle Extension (s)	2.5	5.9			5.9		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	218	2009			1397		452	412		179		389
v/s Ratio Prot	c0.08	0.28			c0.32			0.13				0.04
v/s Ratio Perm							c0.22			0.09		
v/c Ratio	0.59	0.45			0.72		0.83	0.49		0.34		0.14
Uniform Delay, d1	36.8	8.9			20.4		30.7	27.5		26.2		24.8
Progression Factor	1.00	1.00			0.62		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.6	0.7			2.9		11.4	0.7		0.8		0.1
Delay (s)	40.4	9.6			15.6		42.2	28.2		27.0		24.9
Level of Service	D	A			B		D	C		C		C
Approach Delay (s)		13.5			15.6			36.0			25.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1105	17	19	958	19	118
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	1163	18	20	1008	22	139
Pedestrians	3			8		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	184			342		
pX, platoon unblocked			0.86		0.91	0.86
vC, conflicting volume			1181		1719	599
vC1, stage 1 conf vol					1172	
vC2, stage 2 conf vol					547	
vCu, unblocked vol			883		900	205
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		93	80
cM capacity (veh/h)			666		313	690

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	775	406	20	504	504	22	139
Volume Left	0	0	20	0	0	22	0
Volume Right	0	18	0	0	0	0	139
cSH	1700	1700	666	1700	1700	313	690
Volume to Capacity	0.46	0.24	0.03	0.30	0.30	0.07	0.20
Queue Length 95th (ft)	0	0	2	0	0	6	19
Control Delay (s)	0.0	0.0	10.6	0.0	0.0	17.4	11.5
Lane LOS			B			C	B
Approach Delay (s)	0.0		0.2			12.3	
Approach LOS						B	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Volume (vph)	133	0	977	0	909	83	3	73	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0		4.5		4.5		4.5	4.5		
Lane Util. Factor	1.00		0.88		0.95		1.00	1.00		
Frpb, ped/bikes	1.00		1.00		1.00		1.00	0.98		
Flpb, ped/bikes	1.00		1.00		1.00		1.00	1.00		
Frt	1.00		0.85		0.99		1.00	0.85		
Flt Protected	0.95		1.00		1.00		0.95	1.00		
Satd. Flow (prot)	1646		2470		3052		1662	1420		
Flt Permitted	0.95		1.00		1.00		0.95	1.00		
Satd. Flow (perm)	1646		2470		3052		1662	1420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.92	0.92
Adj. Flow (vph)	140	0	1028	0	957	87	4	86	0	0
RTOR Reduction (vph)	0	0	177	0	5	0	0	80	0	0
Lane Group Flow (vph)	140	0	851	0	1039	0	4	6	0	0
Confl. Peds. (#/hr)	4		3	3		4	5	4		
Heavy Vehicles (%)	1%	0%	6%	0%	8%	0%	0%	3%	2%	2%
Turn Type	Prot		custom	Prot				Perm		
Protected Phases	5		2	1	6		4			
Permitted Phases								4		
Actuated Green, G (s)	12.0		74.5		58.5		6.5	6.5		
Effective Green, g (s)	12.0		74.5		58.5		6.5	6.5		
Actuated g/C Ratio	0.13		0.83		0.65		0.07	0.07		
Clearance Time (s)	4.0		4.5		4.5		4.5	4.5		
Vehicle Extension (s)	2.5		5.0		5.0		2.5	2.5		
Lane Grp Cap (vph)	219		2045		1984		120	103		
v/s Ratio Prot	c0.09		0.34		c0.34		0.00			
v/s Ratio Perm								c0.00		
v/c Ratio	0.64		0.42		0.52		0.03	0.06		
Uniform Delay, d1	36.9		2.0		8.4		38.8	38.9		
Progression Factor	1.08		1.22		1.00		1.00	1.00		
Incremental Delay, d2	4.9		0.6		1.0		0.1	0.2		
Delay (s)	45.0		3.1		9.3		38.9	39.1		
Level of Service	D		A		A		D	D		
Approach Delay (s)		8.1			9.3		39.1		0.0	
Approach LOS		A			A		D		A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
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												
Volume (veh/h)	0	0	0	1	914	6	48	141	0	0	2	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	1	962	6	56	166	0	0	2	68
Pedestrians		1			4			1				
Lane Width (ft)		0.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					567							
pX, platoon unblocked												
vC, conflicting volume	968			1			555	972	5	1054	968	485
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	968			1			555	972	5	1054	968	485
tC, single (s)	4.1			4.4			7.7	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			84	34	100	100	99	87
cM capacity (veh/h)	720			1536			344	253	1078	86	255	533

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	482	487	222	71
Volume Left	1	0	56	0
Volume Right	0	6	0	68
cSH	1536	1700	271	515
Volume to Capacity	0.00	0.29	0.82	0.14
Queue Length 95th (ft)	0	0	165	12
Control Delay (s)	0.0	0.0	58.9	13.1
Lane LOS	A		F	B
Approach Delay (s)	0.0		58.9	13.1
Approach LOS			F	B

Intersection Summary			
Average Delay	11.1		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	31	124	22	351	872	0	0	454	479
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		0.97	0.95			0.95	0.88
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					0.98		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3111		3101	3079			3325	2618
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3111		3101	3079			3325	2618
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)	0	0	0	33	131	23	369	918	0	0	478	504
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	0	182
Lane Group Flow (vph)	0	0	0	0	176	0	369	918	0	0	478	322
Confl. Peds. (#/hr)	1		1	1		1	5		6	6		479
Heavy Vehicles (%)	0%	0%	0%	0%	4%	8%	4%	8%	0%	0%	0%	0%
Turn Type				Perm			Prot					Prot
Protected Phases					4		1	6			2	2
Permitted Phases				4								
Actuated Green, G (s)					12.9		16.6	94.1			73.5	73.5
Effective Green, g (s)					12.9		16.6	94.1			73.5	73.5
Actuated g/C Ratio					0.11		0.14	0.82			0.64	0.64
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)					0.2		0.2	0.2			0.2	0.2
Lane Grp Cap (vph)					349		448	2519			2125	1673
v/s Ratio Prot							c0.12	c0.30			0.14	0.12
v/s Ratio Perm					0.06							
v/c Ratio					0.51		0.82	0.36			0.22	0.19
Uniform Delay, d1					48.0		47.8	2.7			8.7	8.5
Progression Factor					1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2					0.4		11.1	0.4			0.2	0.3
Delay (s)					48.5		58.9	3.1			9.0	8.8
Level of Service					D		E	A			A	A
Approach Delay (s)		0.0			48.5			19.1			8.9	
Approach LOS		A			D			B			A	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.7%	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												
Volume (veh/h)	180	751	0	0	0	0	0	0	0	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.85	0.92	0.85
Hourly flow rate (vph)	189	791	0	0	0	0	0	0	0	2	0	0
Pedestrians		2			3						1	
Lane Width (ft)		12.0			0.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					370							
pX, platoon unblocked												
vC, conflicting volume	1			791			1171	1170	267	646	1170	3
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1			791			1171	1170	267	646	1170	3
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			100	100	100	99	100	100
cM capacity (veh/h)	1626			825			134	169	732	328	169	1083

Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1
Volume Total	387	395	198	0	2
Volume Left	189	0	0	0	2
Volume Right	0	0	0	0	0
cSH	1626	1700	1700	1700	328
Volume to Capacity	0.12	0.23	0.12	0.00	0.01
Queue Length 95th (ft)	10	0	0	0	1
Control Delay (s)	4.2	0.0	0.0	0.0	16.1
Lane LOS	A			A	C
Approach Delay (s)	1.7			0.0	16.1
Approach LOS				A	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	540	212	0	0	0	0	0	0	124	371	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5							4.0	4.0	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frpb, ped/bikes		1.00	0.98							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3167	1392							1630	3260	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3167	1392							1630	3260	
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	0	568	223	0	0	0	0	0	0	135	403	0
RTOR Reduction (vph)	0	0	162	0	0	0	0	0	0	53	0	0
Lane Group Flow (vph)	0	568	61	0	0	0	0	0	0	82	403	0
Confl. Peds. (#/hr)			5	5			1		6			
Heavy Vehicles (%)	2%	5%	5%	0%	0%	2%	0%	2%	0%	2%	2%	2%
Turn Type			Perm							Perm		
Protected Phases		8									6	
Permitted Phases			8							6		
Actuated Green, G (s)		19.2	19.2							42.3	42.3	
Effective Green, g (s)		19.2	19.2							42.3	42.3	
Actuated g/C Ratio		0.27	0.27							0.60	0.60	
Clearance Time (s)		4.5	4.5							4.0	4.0	
Vehicle Extension (s)		0.2	0.2							3.0	3.0	
Lane Grp Cap (vph)		869	382							985	1970	
v/s Ratio Prot		c0.18									c0.12	
v/s Ratio Perm			0.04							0.05		
v/c Ratio		0.65	0.16							0.08	0.20	
Uniform Delay, d1		22.5	19.3							5.8	6.3	
Progression Factor		1.00	1.00							1.00	1.00	
Incremental Delay, d2		3.8	0.9							0.0	0.1	
Delay (s)		26.3	20.2							5.8	6.3	
Level of Service		C	C							A	A	
Approach Delay (s)		24.6			0.0			0.0			6.2	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	34.4%	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												
Volume (vph)	359	306	0	0	0	0	0	876	38	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0						4.0	4.0			
Lane Util. Factor	0.91	0.91						0.91	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	0.85			
Flt Protected	0.95	0.98						1.00	1.00			
Satd. Flow (prot)	1398	3055						4507	1423			
Flt Permitted	0.95	0.98						1.00	1.00			
Satd. Flow (perm)	1398	3055						4507	1423			
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)	378	322	0	0	0	0	0	922	40	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	18	0	0	0
Lane Group Flow (vph)	227	473	0	0	0	0	0	922	22	0	0	0
Confl. Peds. (#/hr)	2		3	3		2	3		3	3		3
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	6%	3%	0%	0%	0%
Turn Type	Perm								Perm			
Protected Phases		8						6				
Permitted Phases	8								6			
Actuated Green, G (s)	24.0	24.0						38.0	38.0			
Effective Green, g (s)	24.0	24.0						38.0	38.0			
Actuated g/C Ratio	0.34	0.34						0.54	0.54			
Clearance Time (s)	4.0	4.0						4.0	4.0			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	479	1047						2447	772			
v/s Ratio Prot								c0.20				
v/s Ratio Perm	c0.16	0.15							0.02			
v/c Ratio	0.47	0.45						0.38	0.03			
Uniform Delay, d1	18.0	17.9						9.2	7.4			
Progression Factor	0.72	0.68						1.00	1.00			
Incremental Delay, d2	3.0	1.3						0.4	0.1			
Delay (s)	15.9	13.4						9.6	7.5			
Level of Service	B	B						A	A			
Approach Delay (s)		14.2			0.0			9.5			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.7%	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												
Volume (vph)	449	723	94	390	1038	334	148	398	238	420	402	433
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.0	5.0		4.5	5.0	5.0	4.5	5.0		4.5	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	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		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		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)	1646	3148		1662	3292	1473	1646	3120		3193	3292	1473
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)	1646	3148		1662	3292	1473	1646	3120		3193	3292	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)	473	761	99	411	1093	352	156	419	251	442	423	456
RTOR Reduction (vph)	0	6	0	0	0	95	0	56	0	0	0	287
Lane Group Flow (vph)	473	854	0	411	1093	257	156	614	0	442	423	169
Confl. Peds. (#/hr)			6	6					2	2		
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	1%	4%	0%	0%	1%	1%	1%	0%	0%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						4
Actuated Green, G (s)	29.6	45.1		30.1	45.1	45.1	17.7	32.5		25.2	40.0	40.0
Effective Green, g (s)	29.6	45.1		30.1	45.1	45.1	17.7	32.5		25.2	40.0	40.0
Actuated g/C Ratio	0.19	0.30		0.20	0.30	0.30	0.12	0.21		0.17	0.26	0.26
Clearance Time (s)	5.0	5.0		4.5	5.0	5.0	4.5	5.0		4.5	5.0	5.0
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	321	935		329	977	437	192	668		530	867	388
v/s Ratio Prot	c0.29	0.27		0.25	c0.33		0.09	c0.20		c0.14	0.13	
v/s Ratio Perm						0.17						0.12
v/c Ratio	1.47	0.91		1.25	1.12	0.59	0.81	0.92		0.83	0.49	0.44
Uniform Delay, d1	61.1	51.5		60.9	53.4	45.5	65.5	58.4		61.3	47.3	46.6
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	229.3	13.0		134.9	67.2	1.7	21.9	17.7		10.7	0.3	0.6
Delay (s)	290.4	64.5		195.8	120.6	47.2	87.4	76.1		72.0	47.6	47.1
Level of Service	F	E		F	F	D	F	E		E	D	D
Approach Delay (s)		144.7			123.4			78.2			55.6	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	104.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	151.9	Sum of lost time (s)	19.5
Intersection Capacity Utilization	108.1%	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												
Volume (vph)	32	1213	98	71	1280	23	161	6	235	37	3	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	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
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1662	3274		1662	3190			1670	1488		1673	1488
Flt Permitted	0.95	1.00		0.95	1.00			0.70	1.00		0.61	1.00
Satd. Flow (perm)	1662	3274		1662	3190			1222	1488		1062	1488
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	34	1277	103	75	1347	24	189	7	276	44	4	76
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	210	0	0	61
Lane Group Flow (vph)	34	1375	0	75	1370	0	0	196	66	0	48	15
Confl. Peds. (#/hr)	1		12	12		1						
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	4.9	58.7		11.7	65.5			21.1	21.1		21.1	21.1
Effective Green, g (s)	4.9	58.7		11.7	65.5			21.1	21.1		21.1	21.1
Actuated g/C Ratio	0.05	0.56		0.11	0.62			0.20	0.20		0.20	0.20
Clearance Time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.5	4.5		2.5	4.5			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	77	1830		185	1989			245	299		213	299
v/s Ratio Prot	0.02	c0.42		0.05	c0.43							
v/s Ratio Perm								c0.16	0.04		0.05	0.01
v/c Ratio	0.44	0.75		0.41	0.69			0.80	0.22		0.23	0.05
Uniform Delay, d1	48.7	17.6		43.4	13.0			39.9	35.1		35.1	33.9
Progression Factor	1.00	1.00		0.69	0.32			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.9	2.9		0.5	1.0			16.4	0.3		0.4	0.1
Delay (s)	51.6	20.5		30.4	5.2			56.3	35.3		35.5	33.9
Level of Service	D	C		C	A			E	D		D	C
Approach Delay (s)		21.3			6.5			44.1			34.5	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	13.5
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												
Volume (vph)	233	1272	6	6	1275	53	25	5	25	314	0	305
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	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	
Frt	1.00	1.00		1.00	0.99		1.00	0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3226		1662	3239		1662	1515		1643	1488	
Flt Permitted	0.95	1.00		0.95	1.00		0.23	1.00		0.73	1.00	
Satd. Flow (perm)	1662	3226		1662	3239		410	1515		1270	1488	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	245	1339	6	6	1342	56	29	6	29	369	0	359
RTOR Reduction (vph)	0	0	0	0	3	0	0	22	0	0	232	0
Lane Group Flow (vph)	245	1345	0	6	1395	0	29	13	0	369	127	0
Confl. Peds. (#/hr)	3		15	15		3			1	1		
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	20.1	63.7		1.3	44.9		27.0	27.0		27.0	27.0	
Effective Green, g (s)	20.1	63.7		1.3	44.9		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.19	0.61		0.01	0.43		0.26	0.26		0.26	0.26	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		2.0	2.0		2.5	2.5	
Lane Grp Cap (vph)	318	1957		20	1385		105	389		326	382	
v/s Ratio Prot	0.15	c0.42		0.00	c0.43			0.01			0.09	
v/s Ratio Perm							0.07			c0.29		
v/c Ratio	0.77	0.69		0.30	1.01		0.28	0.03		1.13	0.33	
Uniform Delay, d1	40.3	13.9		51.4	30.1		31.2	29.2		39.0	31.7	
Progression Factor	0.73	0.24		1.31	0.80		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.9	1.5		4.6	22.8		0.5	0.0		90.4	0.4	
Delay (s)	37.3	4.8		72.1	46.9		31.7	29.2		129.4	32.1	
Level of Service	D	A		E	D		C	C		F	C	
Approach Delay (s)		9.8			47.0			30.4			81.4	
Approach LOS		A			D			C			F	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Volume (vph)	0	1877	1570	0	146	191
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3292	3292		1568	1458
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3292	3292		1568	1458
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1976	1653	0	154	201
RTOR Reduction (vph)	0	0	0	0	0	30
Lane Group Flow (vph)	0	1976	1653	0	154	171
Confl. Peds. (#/hr)	3			3	4	13
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	0%	1%	1%	0%	6%	2%
Turn Type						custom
Protected Phases		2	6		7	4
Permitted Phases						
Actuated Green, G (s)		78.6	78.6		17.4	17.4
Effective Green, g (s)		78.6	78.6		17.4	17.4
Actuated g/C Ratio		0.75	0.75		0.17	0.17
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		4.6	4.6		2.5	2.5
Lane Grp Cap (vph)		2464	2464		260	242
v/s Ratio Prot		c0.60	0.50		0.10	c0.12
v/s Ratio Perm						
v/c Ratio		0.80	0.67		0.59	0.71
Uniform Delay, d1		8.3	6.7		40.5	41.4
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.9	1.5		3.0	8.4
Delay (s)		11.2	8.1		43.5	49.8
Level of Service		B	A		D	D
Approach Delay (s)		11.2	8.1		47.1	
Approach LOS		B	A		D	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.6%	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												
Volume (vph)	64	956	0	0	1353	38	561	226	316	44	0	267
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5			4.5		4.5	4.5		4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.99		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		0.99	1.00		1.00		1.00
Frt	1.00	1.00			1.00		1.00	0.91		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1630	3260			3279		1627	1541		1662		1488
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.15		1.00
Satd. Flow (perm)	1630	3260			3279		1627	1541		264		1488
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)	67	1006	0	0	1424	40	591	238	333	46	0	281
RTOR Reduction (vph)	0	0	0	0	2	0	0	48	0	0	0	176
Lane Group Flow (vph)	67	1006	0	0	1462	0	591	523	0	46	0	105
Confl. Peds. (#/hr)			1	1			9		4	4		9
Heavy Vehicles (%)	2%	2%	0%	0%	1%	0%	1%	2%	3%	0%	0%	0%
Turn Type	Prot						Perm			custom		custom
Protected Phases	5	2			6			8				4
Permitted Phases							8			4		
Actuated Green, G (s)	8.1	56.8			44.2		39.2	39.2		39.2		39.2
Effective Green, g (s)	8.1	56.8			44.2		39.2	39.2		39.2		39.2
Actuated g/C Ratio	0.08	0.54			0.42		0.37	0.37		0.37		0.37
Clearance Time (s)	4.5	4.5			4.5		4.5	4.5		4.5		4.5
Vehicle Extension (s)	2.5	6.1			6.1		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	126	1764			1380		607	575		99		556
v/s Ratio Prot	0.04	c0.31			c0.45			0.34				0.07
v/s Ratio Perm							c0.36			0.17		
v/c Ratio	0.53	0.57			1.06		0.97	0.91		0.46		0.19
Uniform Delay, d1	46.6	16.0			30.4		32.4	31.2		24.9		22.2
Progression Factor	1.00	1.00			0.61		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.3	1.3			38.7		29.7	18.2		2.5		0.1
Delay (s)	49.9	17.3			57.2		62.1	49.4		27.4		22.3
Level of Service	D	B			E		E	D		C		C
Approach Delay (s)		19.4			57.2			55.9			23.0	
Approach LOS		B			E			E			C	

Intersection Summary			
HCM Average Control Delay	43.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	105.8%	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												
Volume (vph)	131	970	105	49	1057	32	132	47	51	60	74	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1614	3182		1662	3245		1630	1587		1662	1594	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1614	3182		1662	3245		1630	1587		1662	1594	
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)	138	1021	111	52	1113	34	139	49	54	63	78	93
RTOR Reduction (vph)	0	6	0	0	2	0	0	42	0	0	47	0
Lane Group Flow (vph)	138	1126	0	52	1145	0	139	61	0	63	124	0
Confl. Peds. (#/hr)	2		2	2		2	3					3
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	3%	0%	0%	2%	0%	2%	0%	3%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	13.4	54.6		8.0	49.2		10.7	17.9		7.5	14.7	
Effective Green, g (s)	13.4	54.6		8.0	49.2		10.7	17.9		7.5	14.7	
Actuated g/C Ratio	0.13	0.52		0.08	0.47		0.10	0.17		0.07	0.14	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.5	4.6		2.5	4.6		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	206	1655		127	1521		166	271		119	223	
v/s Ratio Prot	0.09	c0.35		0.03	c0.35		c0.09	c0.04		0.04	c0.08	
v/s Ratio Perm												
v/c Ratio	0.67	0.68		0.41	0.75		0.84	0.22		0.53	0.55	
Uniform Delay, d1	43.7	18.7		46.2	22.9		46.3	37.6		47.0	42.1	
Progression Factor	0.75	0.95		0.71	0.54		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	1.7		0.1	0.3		28.6	0.3		3.2	2.4	
Delay (s)	38.1	19.5		33.2	12.6		74.9	37.9		50.3	44.5	
Level of Service	D	B		C	B		E	D		D	D	
Approach Delay (s)		21.5			13.5			59.2			46.0	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.1%	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												
Volume (vph)	278	287	338	323	300	52	597	1076	62	46	867	242
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	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	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1646	1750	1444	1646	1693		3193	3257		1662	3173	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1646	1750	1444	1646	1693		3193	3257		1662	3173	
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)	293	302	356	340	316	55	628	1133	65	48	913	255
RTOR Reduction (vph)	0	0	21	0	6	0	0	4	0	0	24	0
Lane Group Flow (vph)	293	302	335	340	365	0	628	1194	0	48	1144	0
Confl. Peds. (#/hr)							5		6	6		5
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	1%	0%	3%	1%	1%	0%	1%	1%	2%	0%	1%	1%
Turn Type	Prot		pt+ov	Prot			Prot			Prot		
Protected Phases	3	8	1 8	7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	20.7	20.6	41.6	17.4	17.3		16.5	42.2		6.8	32.5	
Effective Green, g (s)	20.7	20.6	41.6	17.4	17.3		16.5	42.2		6.8	32.5	
Actuated g/C Ratio	0.20	0.20	0.40	0.17	0.16		0.16	0.40		0.06	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	3.0		2.5	2.5		2.5	4.6		2.5	4.6	
Lane Grp Cap (vph)	324	343	572	273	279		502	1309		108	982	
v/s Ratio Prot	c0.18	0.17	0.23	0.21	c0.22		c0.20	0.37		0.03	c0.36	
v/s Ratio Perm												
v/c Ratio	0.90	0.88	0.59	1.25	1.31		1.25	0.91		0.44	1.16	
Uniform Delay, d1	41.2	41.0	24.9	43.8	43.9		44.2	29.7		47.3	36.2	
Progression Factor	0.69	0.69	0.63	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.6	18.2	1.2	137.3	162.4		128.6	11.2		2.1	85.4	
Delay (s)	50.8	46.3	16.9	181.1	206.2		172.9	40.8		49.4	121.7	
Level of Service	D	D	B	F	F		F	D		D	F	
Approach Delay (s)		36.7			194.2			86.2			118.8	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM Average Control Delay	101.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	105.3%	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												
Volume (vph)	270	516	2	2	716	653	9	18	8	463	5	337
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.5		4.0	5.5	5.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1630	3258		1662	3260	1446		1667		1632	1432	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.91		0.73	1.00	
Satd. Flow (perm)	1630	3258		1662	3260	1446		1534		1260	1432	
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)	284	543	2	2	754	687	9	19	8	487	5	355
RTOR Reduction (vph)	0	0	0	0	0	209	0	5	0	0	238	0
Lane Group Flow (vph)	284	545	0	2	754	478	0	31	0	487	122	0
Confl. Peds. (#/hr)	3					3	6		6	6		6
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases						2	4			4		
Actuated Green, G (s)	27.7	77.4		1.2	50.9	50.9		45.3		45.3	45.3	
Effective Green, g (s)	27.7	77.4		1.2	50.9	50.9		45.3		45.3	45.3	
Actuated g/C Ratio	0.20	0.56		0.01	0.37	0.37		0.33		0.33	0.33	
Clearance Time (s)	4.0	5.5		4.0	5.5	5.5		4.5		4.5	4.5	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5		3.5		3.5	3.5	
Lane Grp Cap (vph)	327	1829		14	1203	534		504		414	470	
v/s Ratio Prot	c0.17	0.17		0.00	0.23						0.08	
v/s Ratio Perm						c0.33		0.02		c0.39		
v/c Ratio	0.87	0.30		0.14	0.63	0.90		0.06		1.18	0.26	
Uniform Delay, d1	53.3	15.9		67.8	35.7	41.0		31.7		46.3	34.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	20.9	0.2		4.7	1.3	18.1		0.1		101.9	0.3	
Delay (s)	74.2	16.1		72.5	37.0	59.1		31.8		148.2	34.3	
Level of Service	E	B		E	D	E		C		F	C	
Approach Delay (s)		36.0			47.6			31.8			99.8	
Approach LOS		D			D			C			F	

Intersection Summary			
HCM Average Control Delay	58.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	137.9	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	1392	1520	31	40	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	5	1465	1600	33	47	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)			760			
pX, platoon unblocked	0.59				0.59	0.59
vC, conflicting volume	1633				2359	816
vC1, stage 1 conf vol					1616	
vC2, stage 2 conf vol					743	
vCu, unblocked vol	689				1918	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				80	96
cM capacity (veh/h)	541				230	646

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	5	733	733	1067	566	72
Volume Left	5	0	0	0	0	47
Volume Right	0	0	0	0	33	25
cSH	541	1700	1700	1700	1700	296
Volume to Capacity	0.01	0.43	0.43	0.63	0.33	0.24
Queue Length 95th (ft)	1	0	0	0	0	23
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	21.0
Lane LOS	B					C
Approach Delay (s)	0.0			0.0		21.0
Approach LOS						C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	1409	17	11	1505	22	22	1	31	22	1	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	8	1483	18	12	1584	23	26	1	36	26	1	29
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					491							
pX, platoon unblocked	0.58						0.58	0.58		0.58	0.58	0.58
vC, conflicting volume	1607			1501			2363	3139	764	2427	3137	813
vC1, stage 1 conf vol							1509	1509		1619	1619	
vC2, stage 2 conf vol							854	1631		808	1518	
vCu, unblocked vol	612			1501			1908	3239	764	2018	3235	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			79	99	89	86	99	95
cM capacity (veh/h)	570			452			120	139	347	179	135	631

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	8	989	512	12	1056	551	64	56
Volume Left	8	0	0	12	0	0	26	26
Volume Right	0	0	18	0	0	23	36	29
cSH	570	1700	1700	452	1700	1700	193	283
Volume to Capacity	0.01	0.58	0.30	0.03	0.62	0.32	0.33	0.20
Queue Length 95th (ft)	1	0	0	2	0	0	34	18
Control Delay (s)	11.4	0.0	0.0	13.2	0.0	0.0	32.5	20.9
Lane LOS	B			B			D	C
Approach Delay (s)	0.1			0.1			32.5	20.9
Approach LOS							D	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	1358	16	25	1409	107	19	1	25	172	2	42
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	1.00		1.00	0.99			0.92			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.96	
Satd. Flow (prot)	1662	3192		1662	3162			1562			1621	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.76	
Satd. Flow (perm)	1662	3192		1662	3162			1389			1277	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	36	1429	17	26	1483	113	22	1	29	202	2	49
RTOR Reduction (vph)	0	1	0	0	5	0	0	23	0	0	9	0
Lane Group Flow (vph)	36	1445	0	26	1591	0	0	29	0	0	244	0
Confl. Peds. (#/hr)	2		5	5		2	9		7	7		9
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	0%	4%	0%	0%	4%	2%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.4	54.2		2.9	52.7			19.4			19.4	
Effective Green, g (s)	4.4	54.2		2.9	52.7			19.4			19.4	
Actuated g/C Ratio	0.05	0.60		0.03	0.59			0.22			0.22	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			2.5	
Lane Grp Cap (vph)	81	1922		54	1852			299			275	
v/s Ratio Prot	c0.02	0.45		0.02	c0.50							
v/s Ratio Perm								0.02			c0.19	
v/c Ratio	0.44	0.75		0.48	0.86			0.10			0.89	
Uniform Delay, d1	41.6	13.0		42.8	15.5			28.3			34.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	2.8		4.9	5.4			0.1			26.8	
Delay (s)	44.4	15.8		47.7	21.0			28.4			61.0	
Level of Service	D	B		D	C			C			E	
Approach Delay (s)		16.5			21.4			28.4			61.0	
Approach LOS		B			C			C			E	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	1084	399	238	1214	7	288	29	349	40	14	46
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	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		1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.96		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1662	3110		1646	3289			1648	1399		1593	
Flt Permitted	0.95	1.00		0.95	1.00			0.68	1.00		0.75	
Satd. Flow (perm)	1662	3110		1646	3289			1178	1399		1212	
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)	32	1141	420	251	1278	7	303	31	367	42	15	48
RTOR Reduction (vph)	0	41	0	0	1	0	0	0	242	0	33	0
Lane Group Flow (vph)	32	1520	0	251	1284	0	0	334	125	0	72	0
Confl. Peds. (#/hr)							7		8	8		7
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	2%	2%	1%	1%	0%	1%	0%	4%	0%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	11.4	32.9		16.4	37.9			28.7	28.7		28.7	
Effective Green, g (s)	11.4	32.9		16.4	37.9			28.7	28.7		28.7	
Actuated g/C Ratio	0.13	0.37		0.18	0.42			0.32	0.32		0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	2.5	5.5		2.5	5.5			2.5	2.5		2.5	
Lane Grp Cap (vph)	211	1137		300	1385			376	446		386	
v/s Ratio Prot	0.02	c0.49		0.15	c0.39							
v/s Ratio Perm								c0.28	0.09		0.06	
v/c Ratio	0.15	1.34		0.84	0.93			0.89	0.28		0.19	
Uniform Delay, d1	35.0	28.6		35.5	24.7			29.1	22.9		22.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	157.5		17.7	12.1			21.5	0.3		0.2	
Delay (s)	35.2	186.1		53.2	36.9			50.6	23.2		22.4	
Level of Service	D	F		D	D			D	C		C	
Approach Delay (s)		183.1			39.5			36.2			22.4	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM Average Control Delay	96.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
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												
Volume (vph)	15	1046	0	0	1767	23	223	0	171	15	0	34
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.98		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		0.99	1.00		0.99		1.00
Frt	1.00	1.00			1.00		1.00	0.85		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1662	3197			3253		1654	1372		1650		1488
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.52		1.00
Satd. Flow (perm)	1662	3197			3253		1654	1372		895		1488
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	16	1101	0	0	1860	24	235	0	180	18	0	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	64	0	0	0	32
Lane Group Flow (vph)	16	1101	0	0	1884	0	235	116	0	18	0	8
Confl. Peds. (#/hr)	4		1	1		4	4		8	8		4
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	6%	0%	0%	0%
Turn Type	Prot						Perm			custom		custom
Protected Phases	5	2			6			8				4
Permitted Phases							8			4		
Actuated Green, G (s)	1.5	62.8			57.3		17.7	17.7		17.7		17.7
Effective Green, g (s)	1.5	62.8			57.3		17.7	17.7		17.7		17.7
Actuated g/C Ratio	0.02	0.70			0.64		0.20	0.20		0.20		0.20
Clearance Time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Vehicle Extension (s)	2.5	5.9			5.9		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	28	2231			2071		325	270		176		293
v/s Ratio Prot	0.01	c0.34			c0.58			0.08				0.01
v/s Ratio Perm							c0.14			0.02		
v/c Ratio	0.57	0.49			0.91		0.72	0.43		0.10		0.03
Uniform Delay, d1	43.9	6.3			14.1		33.9	31.7		29.6		29.2
Progression Factor	1.00	1.00			0.55		1.00	1.00		1.00		1.00
Incremental Delay, d2	21.0	0.8			5.3		7.3	0.8		0.2		0.0
Delay (s)	65.0	7.1			13.1		41.1	32.5		29.8		29.2
Level of Service	E	A			B		D	C		C		C
Approach Delay (s)		7.9			13.1			37.4			29.4	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1199	32	6	1779	11	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	1262	34	6	1873	13	106
Pedestrians	11			12		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	1			1		
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	184			342		
pX, platoon unblocked			0.84		0.72	0.84
vC, conflicting volume			1296		2239	660
vC1, stage 1 conf vol					1279	
vC2, stage 2 conf vol					960	
vCu, unblocked vol			980		956	226
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	84
cM capacity (veh/h)			601		274	654

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	841	454	6	936	936	13	106
Volume Left	0	0	6	0	0	13	0
Volume Right	0	34	0	0	0	0	106
cSH	1700	1700	601	1700	1700	274	654
Volume to Capacity	0.49	0.27	0.01	0.55	0.55	0.05	0.16
Queue Length 95th (ft)	0	0	1	0	0	4	14
Control Delay (s)	0.0	0.0	11.1	0.0	0.0	18.8	11.6
Lane LOS			B			C	B
Approach Delay (s)	0.0		0.0			12.4	
Approach LOS						B	

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Volume (vph)	41	0	1237	12	1635	49	7	148	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0		4.5	4.0	4.5		4.5	4.5		
Lane Util. Factor	1.00		0.88	1.00	0.95		1.00	1.00		
Frpb, ped/bikes	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		
Frt	1.00		0.85	1.00	1.00		1.00	0.85		
Flt Protected	0.95		1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1662		2618	1662	3241		1662	1418		
Flt Permitted	0.95		1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1662		2618	1662	3241		1662	1418		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.92	0.92
Adj. Flow (vph)	43	0	1302	13	1721	52	8	174	0	0
RTOR Reduction (vph)	0	0	318	7	1	0	0	159	0	0
Lane Group Flow (vph)	43	0	984	6	1772	0	8	15	0	0
Confl. Peds. (#/hr)	8		4	4		8	10	20		
Confl. Bikes (#/hr)						1				
Heavy Vehicles (%)	0%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Prot		custom	Prot				Perm		
Protected Phases	5		2	1	6		4			
Permitted Phases								4		
Actuated Green, G (s)	5.1		68.0	1.2	64.1		7.8	7.8		
Effective Green, g (s)	5.1		68.0	1.2	64.1		7.8	7.8		
Actuated g/C Ratio	0.06		0.76	0.01	0.71		0.09	0.09		
Clearance Time (s)	4.0		4.5	4.0	4.5		4.5	4.5		
Vehicle Extension (s)	2.5		5.0	1.5	5.0		2.5	2.5		
Lane Grp Cap (vph)	94		1978	22	2308		144	123		
v/s Ratio Prot	c0.03		c0.38	0.00	c0.55		0.00			
v/s Ratio Perm								c0.01		
v/c Ratio	0.46		0.50	0.28	0.77		0.06	0.12		
Uniform Delay, d1	41.1		4.3	44.0	8.2		37.7	37.9		
Progression Factor	1.12		1.97	1.00	1.00		1.00	1.00		
Incremental Delay, d2	2.3		0.8	2.5	2.5		0.1	0.3		
Delay (s)	48.3		9.3	46.5	10.7		37.8	38.3		
Level of Service	D		A	D	B		D	D		
Approach Delay (s)		10.6			11.0		38.2		0.0	
Approach LOS		B			B		D		A	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	72.9%	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												
Volume (veh/h)	0	10	1	14	1467	10	86	121	0	0	10	143
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	11	1	15	1544	11	101	142	0	0	12	168
Pedestrians		5			5			1			7	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					567							
pX, platoon unblocked												
vC, conflicting volume	1562			13			993	1603	17	1673	1599	789
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1562			13			993	1603	17	1673	1599	789
tC, single (s)	4.1			4.1			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			0	0	100	0	89	50
cM capacity (veh/h)	426			1618			89	104	1059	0	106	333

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	787	783	244	180
Volume Left	15	0	101	0
Volume Right	0	11	0	168
cSH	1618	1700	97	292
Volume to Capacity	0.01	0.46	2.51	0.62
Queue Length 95th (ft)	1	0	560	95
Control Delay (s)	0.3	0.0	778.1	35.2
Lane LOS	A		F	E
Approach Delay (s)	0.1		778.1	35.2
Approach LOS			F	E

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	112	392	120	558	1241	0	0	954	652
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		0.97	0.95			0.95	0.88
Frpb, ped/bikes					0.99		1.00	1.00			1.00	1.00
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.97		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3123		3162	3260			3325	2618
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3123		3162	3260			3325	2618
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)	0	0	0	118	413	126	587	1306	0	0	1004	686
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	0	78
Lane Group Flow (vph)	0	0	0	0	638	0	587	1306	0	0	1004	608
Confl. Peds. (#/hr)	12		7	7		12	10		13	13		10
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%	2%	2%	0%	0%	0%	0%
Turn Type				Perm			Prot					custom
Protected Phases					4		1	6			2	2
Permitted Phases				4								2
Actuated Green, G (s)					25.8		23.7	81.2			53.5	53.5
Effective Green, g (s)					25.8		23.7	81.2			53.5	53.5
Actuated g/C Ratio					0.22		0.21	0.71			0.47	0.47
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)					0.2		0.2	0.2			0.2	0.2
Lane Grp Cap (vph)					701		652	2302			1547	1218
v/s Ratio Prot							c0.19	0.40			c0.30	0.23
v/s Ratio Perm					0.20							
v/c Ratio					0.91		0.90	0.57			0.65	0.50
Uniform Delay, d1					43.5		44.5	8.3			23.6	21.4
Progression Factor					1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2					15.8		15.3	1.0			2.1	1.5
Delay (s)					59.2		59.8	9.3			25.7	22.9
Level of Service					E		E	A			C	C
Approach Delay (s)		0.0			59.2			24.9			24.5	
Approach LOS		A			E			C			C	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	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												
Volume (veh/h)	192	1016	0	0	0	0	0	0	0	18	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.85	0.92	0.85
Hourly flow rate (vph)	202	1069	0	0	0	0	0	0	0	21	0	0
Pedestrians		8			7						1	
Lane Width (ft)		12.0			0.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					370							
pX, platoon unblocked												
vC, conflicting volume	1			1069			1482	1475	363	769	1475	9
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1			1069			1482	1475	363	769	1475	9
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			100	100	100	92	100	100
cM capacity (veh/h)	1626			647			78	110	633	266	110	1069

Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1
Volume Total	469	535	267	0	21
Volume Left	202	0	0	0	21
Volume Right	0	0	0	0	0
cSH	1626	1700	1700	1700	266
Volume to Capacity	0.12	0.31	0.16	0.00	0.08
Queue Length 95th (ft)	11	0	0	0	6
Control Delay (s)	3.9	0.0	0.0	0.0	19.7
Lane LOS	A			A	C
Approach Delay (s)	1.4			0.0	19.7
Approach LOS				A	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	700	345	0	0	0	0	0	0	209	858	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5								4.5	4.5	
Lane Util. Factor		0.91								1.00	0.95	
Frpb, ped/bikes		0.99								1.00	1.00	
Flpb, ped/bikes		1.00								1.00	1.00	
Frt		0.95								1.00	1.00	
Flt Protected		1.00								0.95	1.00	
Satd. Flow (prot)		4423								1657	3197	
Flt Permitted		1.00								0.95	1.00	
Satd. Flow (perm)		4423								1657	3197	
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)	0	737	363	0	0	0	0	0	0	220	903	0
RTOR Reduction (vph)	0	84	0	0	0	0	0	0	0	21	0	0
Lane Group Flow (vph)	0	1016	0	0	0	0	0	0	0	199	903	0
Confl. Peds. (#/hr)	11		7	7		11	1		3	3		1
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Turn Type										Perm		
Protected Phases		8									2	
Permitted Phases										2		
Actuated Green, G (s)		22.5								38.5	38.5	
Effective Green, g (s)		22.5								38.5	38.5	
Actuated g/C Ratio		0.32								0.55	0.55	
Clearance Time (s)		4.5								4.5	4.5	
Vehicle Extension (s)		0.2								0.2	0.2	
Lane Grp Cap (vph)		1422								911	1758	
v/s Ratio Prot		c0.23									c0.28	
v/s Ratio Perm										0.12		
v/c Ratio		0.71								0.22	0.51	
Uniform Delay, d1		20.9								8.1	9.9	
Progression Factor		1.00								1.00	1.00	
Incremental Delay, d2		3.1								0.6	1.1	
Delay (s)		24.0								8.6	11.0	
Level of Service		C								A	B	
Approach Delay (s)		24.0			0.0			0.0			10.5	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.6%	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												
Volume (vph)	520	390	0	0	0	0	0	1278	52	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0						4.0	4.0			
Lane Util. Factor	0.91	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.99			
Flpb, ped/bikes	0.99	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	0.98						1.00	1.00			
Satd. Flow (prot)	1487	3109						4684	1465			
Flt Permitted	0.95	0.98						1.00	1.00			
Satd. Flow (perm)	1487	3109						4684	1465			
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)	547	411	0	0	0	0	0	1345	55	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	25	0	0	0
Lane Group Flow (vph)	312	646	0	0	0	0	0	1345	30	0	0	0
Confl. Peds. (#/hr)	7		6	6		7	1		3	3		1
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Turn Type	Perm								Perm			
Protected Phases		8						6			6	
Permitted Phases	8								6			
Actuated Green, G (s)	24.0	24.0						38.0	38.0			
Effective Green, g (s)	24.0	24.0						38.0	38.0			
Actuated g/C Ratio	0.34	0.34						0.54	0.54			
Clearance Time (s)	4.0	4.0						4.0	4.0			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	510	1066						2543	795			
v/s Ratio Prot								c0.29				
v/s Ratio Perm	c0.21	0.21							0.02			
v/c Ratio	0.61	0.61						0.53	0.04			
Uniform Delay, d1	19.1	19.1						10.3	7.5			
Progression Factor	0.72	0.72						1.00	1.00			
Incremental Delay, d2	4.3	2.0						0.8	0.1			
Delay (s)	18.0	15.7						11.1	7.6			
Level of Service	B	B						B	A			
Approach Delay (s)		16.4			0.0			10.9			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.6%	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												
Volume (vph)	451	778	73	147	524	223	69	264	174	125	142	152
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.0	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	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	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)	3131	3228	1439	1599	3023	1369	1511	3260	1451	3101	3137	1335
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)	3131	3228	1439	1599	3023	1369	1511	3260	1451	3101	3137	1335
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)	475	819	77	155	552	235	73	278	183	132	149	160
RTOR Reduction (vph)	0	0	48	0	0	171	0	0	153	0	0	136
Lane Group Flow (vph)	475	819	29	155	552	64	73	278	30	132	149	24
Confl. Peds. (#/hr)	1		2	2		1	1					1
Confl. Bikes (#/hr)						3			2			
Heavy Vehicles (%)	3%	3%	2%	4%	10%	7%	10%	2%	1%	4%	6%	10%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	16.5	24.4	24.4	12.0	19.4	19.4	5.6	11.6	11.6	4.6	10.6	10.6
Effective Green, g (s)	16.5	24.4	24.4	12.0	19.4	19.4	5.6	11.6	11.6	4.6	10.6	10.6
Actuated g/C Ratio	0.23	0.34	0.34	0.17	0.27	0.27	0.08	0.16	0.16	0.06	0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	722	1100	490	268	819	371	118	528	235	199	464	198
v/s Ratio Prot	0.15	c0.25		0.10	c0.18		c0.05	c0.09		0.04	0.05	
v/s Ratio Perm			0.02			0.05			0.02			0.02
v/c Ratio	0.66	0.74	0.06	0.58	0.67	0.17	0.62	0.53	0.13	0.66	0.32	0.12
Uniform Delay, d1	25.0	20.8	15.9	27.5	23.3	20.0	32.0	27.5	25.7	32.7	27.3	26.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	2.6	0.0	2.5	2.0	0.2	8.0	0.7	0.2	7.3	0.3	0.2
Delay (s)	26.9	23.5	15.9	29.9	25.3	20.1	40.0	28.2	25.8	40.0	27.6	26.7
Level of Service	C	C	B	C	C	C	D	C	C	D	C	C
Approach Delay (s)		24.2			24.8			29.0			31.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	71.6	Sum of lost time (s)	14.5
Intersection Capacity Utilization	59.9%	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												
Volume (vph)	17	740	259	338	664	7	32	0	40	16	0	26
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	1.00
Frt	1.00	0.96		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1662	3138		1662	3286			1648	1458		1650	1457
Flt Permitted	0.95	1.00		0.95	1.00			0.75	1.00		0.73	1.00
Satd. Flow (perm)	1662	3138		1662	3286			1292	1458		1272	1457
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	18	779	273	356	699	7	38	0	47	19	0	31
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	42	0	0	28
Lane Group Flow (vph)	18	1027	0	356	706	0	0	38	5	0	19	3
Confl. Peds. (#/hr)	9		8	8		9	8		7	7		8
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	2.9	60.2		16.2	73.5			10.1	10.1		10.1	10.1
Effective Green, g (s)	2.9	60.2		16.2	73.5			10.1	10.1		10.1	10.1
Actuated g/C Ratio	0.03	0.60		0.16	0.74			0.10	0.10		0.10	0.10
Clearance Time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.5	4.5		2.5	4.5			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	48	1889		269	2415			130	147		128	147
v/s Ratio Prot	0.01	c0.33		c0.21	0.21							
v/s Ratio Perm								c0.03	0.00		0.01	0.00
v/c Ratio	0.38	0.54		1.32	0.29			0.29	0.03		0.15	0.02
Uniform Delay, d1	47.7	11.8		41.9	4.5			41.6	40.5		41.0	40.5
Progression Factor	1.00	1.00		0.77	0.15			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.6	1.1		166.0	0.3			0.9	0.1		0.4	0.0
Delay (s)	51.2	12.9		198.1	0.9			42.6	40.6		41.4	40.5
Level of Service	D	B		F	A			D	D		D	D
Approach Delay (s)		13.5			67.0			41.5			40.9	
Approach LOS		B			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
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												
Volume (vph)	71	755	26	23	925	5	5	1	13	90	1	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3272		1662	3289		1658	1478		1652	1468	
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00		0.75	1.00	
Satd. Flow (perm)	1662	3272		1662	3289		1211	1478		1299	1468	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	75	795	27	24	974	5	6	1	15	106	1	94
RTOR Reduction (vph)	0	2	0	0	1	0	0	11	0	0	69	0
Lane Group Flow (vph)	75	820	0	24	978	0	6	5	0	106	26	0
Confl. Peds. (#/hr)	2		12	12		2	2		4	4		2
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	11.0	56.8		3.2	49.0		27.0	27.0		27.0	27.0	
Effective Green, g (s)	11.0	56.8		3.2	49.0		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.11	0.57		0.03	0.49		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		2.0	2.0		2.5	2.5	
Lane Grp Cap (vph)	182	1858		53	1611		326	399		350	396	
v/s Ratio Prot	0.05	c0.25		0.01	c0.30			0.00			0.02	
v/s Ratio Perm							0.00			c0.08		
v/c Ratio	0.41	0.44		0.45	0.61		0.02	0.01		0.30	0.07	
Uniform Delay, d1	41.5	12.5		47.5	18.5		26.8	26.7		29.0	27.1	
Progression Factor	0.75	0.33		1.30	0.81		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.7		4.0	1.6		0.0	0.0		2.2	0.3	
Delay (s)	32.0	4.8		65.9	16.6		26.8	26.7		31.2	27.5	
Level of Service	C	A		E	B		C	C		C	C	
Approach Delay (s)		7.1			17.8			26.8			29.5	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	940	1035	0	180	168
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3260	3228		1554	1430
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3260	3228		1554	1430
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1000	1101	0	191	179
RTOR Reduction (vph)	0	0	0	0	0	96
Lane Group Flow (vph)	0	1000	1101	0	191	83
Confl. Peds. (#/hr)	3			3	4	4
Heavy Vehicles (%)	0%	2%	3%	0%	7%	4%
Turn Type						custom
Protected Phases		2	6		7	4
Permitted Phases						
Actuated Green, G (s)		77.8	77.8		18.2	18.2
Effective Green, g (s)		77.8	77.8		18.2	18.2
Actuated g/C Ratio		0.74	0.74		0.17	0.17
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		4.6	4.6		2.5	2.5
Lane Grp Cap (vph)		2416	2392		269	248
v/s Ratio Prot		0.31	c0.34		c0.12	0.06
v/s Ratio Perm						
v/c Ratio		0.41	0.46		0.71	0.34
Uniform Delay, d1		5.1	5.3		40.9	38.1
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.6		8.0	0.6
Delay (s)		5.6	6.0		48.9	38.7
Level of Service		A	A		D	D
Approach Delay (s)		5.6	6.0		43.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.4%	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												
Volume (vph)	50	640	0	0	714	36	525	335	365	25	0	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5			4.5	4.5	4.0	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95	1.00	0.97	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00	0.97	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
Frt	1.00	1.00			1.00	0.85	1.00	0.92		1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95		1.00
Satd. Flow (prot)	1363	3197			3079	1281	3131	1538		1374		1386
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00		0.95		1.00
Satd. Flow (perm)	1363	3197			3079	1281	3131	1538		1374		1386
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.90
Adj. Flow (vph)	53	674	0	0	752	38	553	353	384	28	0	137
RTOR Reduction (vph)	0	0	0	0	0	20	0	37	0	0	0	0
Lane Group Flow (vph)	53	674	0	0	752	18	553	700	0	28	0	137
Confl. Peds. (#/hr)	3		2	2		3	2		3	3		2
Heavy Vehicles (%)	22%	4%	0%	0%	8%	13%	3%	4%	4%	21%	0%	6%
Turn Type	Prot					Perm	Prot			Prot		Free
Protected Phases	5!	2			6!		3	8		1!		
Permitted Phases						6						Free
Actuated Green, G (s)	6.3	40.5			38.0	38.0	55.7	55.2		4.3		113.0
Effective Green, g (s)	6.3	40.5			38.0	38.0	55.7	55.2		4.3		113.0
Actuated g/C Ratio	0.06	0.36			0.34	0.34	0.49	0.49		0.04		1.00
Clearance Time (s)	4.5	4.5			4.5	4.5	4.0	4.5		4.0		
Vehicle Extension (s)	2.5	6.1			6.1	6.1	3.0	2.5		3.0		
Lane Grp Cap (vph)	76	1146			1035	431	1543	751		52		1386
v/s Ratio Prot	c0.04	0.21			c0.24		0.18	c0.46		0.02		
v/s Ratio Perm						0.01						c0.10
v/c Ratio	0.70	0.59			0.73	0.04	0.36	0.93		0.54		0.10
Uniform Delay, d1	52.4	29.5			32.9	25.2	17.6	27.1		53.4		0.0
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00		1.00
Incremental Delay, d2	22.6	2.2			4.5	0.2	0.1	18.3		10.3		0.1
Delay (s)	75.0	31.7			37.4	25.4	17.8	45.5		63.7		0.1
Level of Service	E	C			D	C	B	D		E		A
Approach Delay (s)		34.8			36.8			33.6			10.9	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	698	95	20	593	18	63	11	10	26	10	52
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		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	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	0.93		1.00	1.00	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)	1662	3139		1662	3009		3014	1611		1662	1535	1405
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1662	3139		1662	3009		3014	1611		1662	1535	1405
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	103	735	100	21	624	19	70	12	11	29	11	58
RTOR Reduction (vph)	0	6	0	0	1	0	0	10	0	0	0	52
Lane Group Flow (vph)	103	829	0	21	642	0	70	13	0	29	11	6
Confl. Peds. (#/hr)	1		2	2		1	3		4	4		3
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	3%	9%	0%	10%	8%	7%	0%	0%	0%	14%	4%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	11.3	67.5		4.0	60.2		6.3	9.6		6.9	10.2	10.2
Effective Green, g (s)	11.3	67.5		4.0	60.2		6.3	9.6		6.9	10.2	10.2
Actuated g/C Ratio	0.11	0.64		0.04	0.57		0.06	0.09		0.07	0.10	0.10
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	4.5
Vehicle Extension (s)	2.5	4.6		2.5	4.6		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	179	2018		63	1725		181	147		109	149	136
v/s Ratio Prot	c0.06	c0.26		0.01	c0.21		c0.02	c0.01		0.02	0.01	
v/s Ratio Perm												0.00
v/c Ratio	0.58	0.41		0.33	0.37		0.39	0.09		0.27	0.07	0.04
Uniform Delay, d1	44.6	9.1		49.2	12.1		47.5	43.7		46.6	43.1	43.0
Progression Factor	1.00	1.00		0.76	0.70		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.6	0.6		2.0	0.5		1.0	0.2		1.0	0.2	0.1
Delay (s)	48.2	9.7		39.6	9.1		48.5	43.9		47.6	43.3	43.1
Level of Service	D	A		D	A		D	D		D	D	D
Approach Delay (s)		13.9			10.1			47.4			44.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	48.7%	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												
Volume (vph)	133	139	229	93	130	21	307	444	41	30	448	112
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1568	1606	1430	1599	1541		3101	3099		1511	3167	1357
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1568	1606	1430	1599	1541		3101	3099		1511	3167	1357
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)	140	146	241	98	137	22	323	467	43	32	472	118
RTOR Reduction (vph)	0	0	155	0	6	0	0	5	0	0	0	71
Lane Group Flow (vph)	140	146	86	98	153	0	323	505	0	32	472	47
Confl. Peds. (#/hr)							2		1	1		2
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	6%	9%	4%	4%	13%	0%	4%	6%	3%	10%	5%	8%
Turn Type	Prot		pt+ov	Prot			Prot			Prot		Perm
Protected Phases	3	8	1 8	7	4		1	6		5	2	
Permitted Phases												2
Actuated Green, G (s)	14.2	17.3	37.5	12.2	15.3		15.7	52.4		5.1	41.8	41.8
Effective Green, g (s)	14.2	17.3	37.5	12.2	15.3		15.7	52.4		5.1	41.8	41.8
Actuated g/C Ratio	0.14	0.16	0.36	0.12	0.15		0.15	0.50		0.05	0.40	0.40
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	3.0		2.5	2.5		2.5	4.6		2.5	4.6	4.6
Lane Grp Cap (vph)	212	265	511	186	225		464	1547		73	1261	540
v/s Ratio Prot	c0.09	0.09	0.06	0.06	c0.10		c0.10	0.16		0.02	c0.15	
v/s Ratio Perm												0.03
v/c Ratio	0.66	0.55	0.17	0.53	0.68		0.70	0.33		0.44	0.37	0.09
Uniform Delay, d1	43.1	40.3	23.1	43.7	42.5		42.4	15.7		48.6	22.4	19.7
Progression Factor	0.85	0.84	0.80	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.4	2.3	0.1	2.0	7.5		8.4	0.6		3.0	0.9	0.3
Delay (s)	42.9	36.0	18.6	45.7	50.0		50.8	16.3		51.6	23.2	20.0
Level of Service	D	D	B	D	D		D	B		D	C	C
Approach Delay (s)		29.9			48.4			29.7			24.1	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.0%	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												
Volume (vph)	283	782	8	0	295	273	0	0	0	344	11	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.5			5.5	5.5				4.0	4.5	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.97	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	0.98				1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00	1.00				1.00	1.00	
Frt	1.00	1.00			1.00	0.85				1.00	0.86	
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	
Satd. Flow (prot)	1646	3133			3050	1396				3131	1351	
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	
Satd. Flow (perm)	1646	3133			3050	1396				3131	1351	
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)	298	823	8	0	311	287	0	0	0	362	12	129
RTOR Reduction (vph)	0	0	0	0	0	201	0	0	0	0	96	0
Lane Group Flow (vph)	298	831	0	0	311	86	0	0	0	362	45	0
Confl. Peds. (#/hr)	3		1	1		3	5		7	7		5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	6%	0%	0%	9%	4%	0%	0%	0%	3%	0%	11%
Turn Type	Prot			Prot		Perm	Perm			Prot		
Protected Phases	1	6		5	2			8		7	4	
Permitted Phases						2	8					
Actuated Green, G (s)	18.8	45.2			22.4	22.4				11.5	19.3	
Effective Green, g (s)	18.8	45.2			22.4	22.4				11.5	19.3	
Actuated g/C Ratio	0.25	0.61			0.30	0.30				0.15	0.26	
Clearance Time (s)	4.0	5.5			5.5	5.5				4.0	4.5	
Vehicle Extension (s)	3.0	4.5			4.5	4.5				3.0	3.5	
Lane Grp Cap (vph)	415	1901			917	420				483	350	
v/s Ratio Prot	c0.18	c0.27			0.10					c0.12	c0.03	
v/s Ratio Perm						0.06						
v/c Ratio	0.72	0.44			0.34	0.21				0.75	0.13	
Uniform Delay, d1	25.4	7.8			20.3	19.4				30.1	21.2	
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	
Incremental Delay, d2	5.9	0.3			0.4	0.4				6.3	0.2	
Delay (s)	31.3	8.1			20.7	19.8				36.4	21.4	
Level of Service	C	A			C	B				D	C	
Approach Delay (s)		14.2			20.3			0.0			32.2	
Approach LOS		B			C			A			C	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	7	1149	1060	9	51	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	7	1209	1116	9	60	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)			760			
pX, platoon unblocked	0.85				0.85	0.85
vC, conflicting volume	1125				1740	563
vC1, stage 1 conf vol					1121	
vC2, stage 2 conf vol					619	
vCu, unblocked vol	807				1526	149
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				79	95
cM capacity (veh/h)	707				291	750

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	7	605	605	744	381	101
Volume Left	7	0	0	0	0	60
Volume Right	0	0	0	0	9	41
cSH	707	1700	1700	1700	1700	388
Volume to Capacity	0.01	0.36	0.36	0.44	0.22	0.26
Queue Length 95th (ft)	1	0	0	0	0	26
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	17.5
Lane LOS	B					C
Approach Delay (s)	0.1			0.0		17.5
Approach LOS						C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	1175	16	12	1059	20	11	2	21	14	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	1237	17	13	1115	21	13	2	25	16	0	11
Pedestrians		6			12							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					491							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	1136			1254			1853	2415	639	1815	2413	574
vC1, stage 1 conf vol							1254	1254		1151	1151	
vC2, stage 2 conf vol							599	1161		665	1262	
vCu, unblocked vol	767			1254			1626	2299	639	1581	2296	94
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			93	99	94	93	100	99
cM capacity (veh/h)	714			562			176	190	419	229	184	790

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	4	825	429	13	743	393	40	27
Volume Left	4	0	0	13	0	0	13	16
Volume Right	0	0	17	0	0	21	25	11
cSH	714	1700	1700	562	1700	1700	276	317
Volume to Capacity	0.01	0.49	0.25	0.02	0.44	0.23	0.15	0.09
Queue Length 95th (ft)	0	0	0	2	0	0	13	7
Control Delay (s)	10.1	0.0	0.0	11.6	0.0	0.0	20.3	17.4
Lane LOS	B			B			C	C
Approach Delay (s)	0.0			0.1			20.3	17.4
Approach LOS							C	C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	1175	6	19	1086	75	2	1	2	36	1	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.95			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1662	3135		1662	3170			1608			1543	
Flt Permitted	0.95	1.00		0.95	1.00			0.90			0.82	
Satd. Flow (perm)	1662	3135		1662	3170			1470			1307	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	31	1237	6	20	1143	79	2	1	2	42	1	32
RTOR Reduction (vph)	0	0	0	0	4	0	0	2	0	0	29	0
Lane Group Flow (vph)	31	1243	0	20	1218	0	0	3	0	0	46	0
Confl. Peds. (#/hr)			1	1			3		6	6		3
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	6%	0%	0%	4%	0%	0%	0%	0%	5%	0%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.3	64.8		2.9	63.4			8.8			8.8	
Effective Green, g (s)	4.3	64.8		2.9	63.4			8.8			8.8	
Actuated g/C Ratio	0.05	0.72		0.03	0.70			0.10			0.10	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			2.5	
Lane Grp Cap (vph)	79	2257		54	2233			144			128	
v/s Ratio Prot	c0.02	c0.40		0.01	0.38							
v/s Ratio Perm								0.00			c0.04	
v/c Ratio	0.39	0.55		0.37	0.55			0.02			0.36	
Uniform Delay, d1	41.6	5.8		42.7	6.4			36.7			38.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.3	1.0		3.1	1.0			0.0			1.3	
Delay (s)	43.9	6.8		45.8	7.3			36.8			39.2	
Level of Service	D	A		D	A			D			D	
Approach Delay (s)		7.7			8.0			36.8			39.2	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	875	0	148	867	22	268	142	416	43	21	41
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	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		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.98	
Satd. Flow (prot)	1458	3228		1554	3216			1661	1412		1455	
Flt Permitted	0.95	1.00		0.95	1.00			0.75	1.00		0.65	
Satd. Flow (perm)	1458	3228		1554	3216			1282	1412		960	
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)	86	921	0	156	913	23	282	149	438	45	22	43
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	238	0	26	0
Lane Group Flow (vph)	86	921	0	156	934	0	0	431	200	0	84	0
Confl. Peds. (#/hr)	1					1	10		8	8		10
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	14%	3%	19%	7%	3%	0%	2%	0%	3%	0%	0%	27%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	15.2	34.2		11.9	30.9			31.9	31.9		31.9	
Effective Green, g (s)	15.2	34.2		11.9	30.9			31.9	31.9		31.9	
Actuated g/C Ratio	0.17	0.38		0.13	0.34			0.35	0.35		0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	2.5	5.5		2.5	5.5			2.5	2.5		2.5	
Lane Grp Cap (vph)	246	1227		205	1104			454	500		340	
v/s Ratio Prot	0.06	c0.29		0.10	c0.29							
v/s Ratio Perm								c0.34	0.14		0.09	
v/c Ratio	0.35	0.75		0.76	0.85			0.95	0.40		0.25	
Uniform Delay, d1	33.0	24.2		37.7	27.3			28.3	21.9		20.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.6	4.3		14.7	8.0			29.4	0.4		0.3	
Delay (s)	33.7	28.5		52.3	35.4			57.6	22.2		20.8	
Level of Service	C	C		D	D			E	C		C	
Approach Delay (s)		28.9			37.8			39.8			20.8	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	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												
Volume (vph)	123	852	0	0	877	89	354	56	227	51	0	166
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.98		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		0.99		1.00
Frt	1.00	1.00			0.99		1.00	0.88		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1662	3228			3128		1660	1512		1653		1430
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.38		1.00
Satd. Flow (perm)	1662	3228			3128		1660	1512		657		1430
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	129	897	0	0	923	94	373	59	239	60	0	195
RTOR Reduction (vph)	0	0	0	0	6	0	0	96	0	0	0	142
Lane Group Flow (vph)	129	897	0	0	1011	0	373	202	0	60	0	53
Confl. Peds. (#/hr)	3					3	1		8	8		1
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	4%
Turn Type	Prot						Perm			custom		custom
Protected Phases	5	2			6			8				4
Permitted Phases							8			4		
Actuated Green, G (s)	11.8	56.0			40.2		24.5	24.5		24.5		24.5
Effective Green, g (s)	11.8	56.0			40.2		24.5	24.5		24.5		24.5
Actuated g/C Ratio	0.13	0.62			0.45		0.27	0.27		0.27		0.27
Clearance Time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Vehicle Extension (s)	2.5	5.9			5.9		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	218	2009			1397		452	412		179		389
v/s Ratio Prot	c0.08	0.28			c0.32			0.13				0.04
v/s Ratio Perm							c0.22			0.09		
v/c Ratio	0.59	0.45			0.72		0.83	0.49		0.34		0.14
Uniform Delay, d1	36.8	8.9			20.4		30.7	27.5		26.2		24.8
Progression Factor	1.00	1.00			0.62		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.6	0.7			2.9		11.4	0.7		0.8		0.1
Delay (s)	40.4	9.6			15.6		42.2	28.2		27.0		24.9
Level of Service	D	A			B		D	C		C		C
Approach Delay (s)		13.5			15.6			36.0			25.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1105	17	19	958	19	118
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	1163	18	20	1008	22	139
Pedestrians	3			8		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	184			342		
pX, platoon unblocked			0.86		0.91	0.86
vC, conflicting volume			1181		1719	599
vC1, stage 1 conf vol					1172	
vC2, stage 2 conf vol					547	
vCu, unblocked vol			883		900	205
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		93	80
cM capacity (veh/h)			666		313	690

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	775	406	20	504	504	22	139
Volume Left	0	0	20	0	0	22	0
Volume Right	0	18	0	0	0	0	139
cSH	1700	1700	666	1700	1700	313	690
Volume to Capacity	0.46	0.24	0.03	0.30	0.30	0.07	0.20
Queue Length 95th (ft)	0	0	2	0	0	6	19
Control Delay (s)	0.0	0.0	10.6	0.0	0.0	17.4	11.5
Lane LOS			B			C	B
Approach Delay (s)	0.0		0.2			12.3	
Approach LOS						B	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Volume (vph)	133	0	977	0	909	83	3	73	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0		4.5		4.5		4.5	4.5		
Lane Util. Factor	1.00		0.88		0.95		1.00	1.00		
Frpb, ped/bikes	1.00		1.00		1.00		1.00	0.98		
Flpb, ped/bikes	1.00		1.00		1.00		1.00	1.00		
Frt	1.00		0.85		0.99		1.00	0.85		
Flt Protected	0.95		1.00		1.00		0.95	1.00		
Satd. Flow (prot)	1646		2470		3052		1662	1420		
Flt Permitted	0.95		1.00		1.00		0.95	1.00		
Satd. Flow (perm)	1646		2470		3052		1662	1420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.92	0.92
Adj. Flow (vph)	140	0	1028	0	957	87	4	86	0	0
RTOR Reduction (vph)	0	0	177	0	5	0	0	80	0	0
Lane Group Flow (vph)	140	0	851	0	1039	0	4	6	0	0
Confl. Peds. (#/hr)	4		3	3		4	5	4		
Heavy Vehicles (%)	1%	0%	6%	0%	8%	0%	0%	3%	2%	2%
Turn Type	Prot		custom	Prot				Perm		
Protected Phases	5		2	1	6		4			
Permitted Phases								4		
Actuated Green, G (s)	12.0		74.5		58.5		6.5	6.5		
Effective Green, g (s)	12.0		74.5		58.5		6.5	6.5		
Actuated g/C Ratio	0.13		0.83		0.65		0.07	0.07		
Clearance Time (s)	4.0		4.5		4.5		4.5	4.5		
Vehicle Extension (s)	2.5		5.0		5.0		2.5	2.5		
Lane Grp Cap (vph)	219		2045		1984		120	103		
v/s Ratio Prot	c0.09		0.34		c0.34		0.00			
v/s Ratio Perm								c0.00		
v/c Ratio	0.64		0.42		0.52		0.03	0.06		
Uniform Delay, d1	36.9		2.0		8.4		38.8	38.9		
Progression Factor	1.08		1.22		1.00		1.00	1.00		
Incremental Delay, d2	4.9		0.6		1.0		0.1	0.2		
Delay (s)	45.0		3.1		9.3		38.9	39.1		
Level of Service	D		A		A		D	D		
Approach Delay (s)		8.1			9.3		39.1		0.0	
Approach LOS		A			A		D		A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
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												
Volume (veh/h)	0	0	0	1	914	6	48	141	0	0	2	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	1	962	6	56	166	0	0	2	68
Pedestrians		1			4			1				
Lane Width (ft)		0.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					567							
pX, platoon unblocked												
vC, conflicting volume	968			1			555	972	5	1054	968	485
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	968			1			555	972	5	1054	968	485
tC, single (s)	4.1			4.4			7.7	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			84	34	100	100	99	87
cM capacity (veh/h)	720			1536			344	253	1078	86	255	533

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	482	487	222	71
Volume Left	1	0	56	0
Volume Right	0	6	0	68
cSH	1536	1700	271	515
Volume to Capacity	0.00	0.29	0.82	0.14
Queue Length 95th (ft)	0	0	165	12
Control Delay (s)	0.0	0.0	58.9	13.1
Lane LOS	A		F	B
Approach Delay (s)	0.0		58.9	13.1
Approach LOS			F	B

Intersection Summary			
Average Delay	11.1		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	31	124	22	351	872	0	0	454	479
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		0.97	0.95			0.95	0.88
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					0.98		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3111		3101	3079			3325	2618
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3111		3101	3079			3325	2618
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)	0	0	0	33	131	23	369	918	0	0	478	504
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	0	182
Lane Group Flow (vph)	0	0	0	0	176	0	369	918	0	0	478	322
Confl. Peds. (#/hr)	1		1	1		1	5		6	6		479
Heavy Vehicles (%)	0%	0%	0%	0%	4%	8%	4%	8%	0%	0%	0%	0%
Turn Type				Perm			Prot					Prot
Protected Phases					4		1	6			2	2
Permitted Phases				4								
Actuated Green, G (s)					12.9		16.6	94.1			73.5	73.5
Effective Green, g (s)					12.9		16.6	94.1			73.5	73.5
Actuated g/C Ratio					0.11		0.14	0.82			0.64	0.64
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)					0.2		0.2	0.2			0.2	0.2
Lane Grp Cap (vph)					349		448	2519			2125	1673
v/s Ratio Prot							c0.12	c0.30			0.14	0.12
v/s Ratio Perm					0.06							
v/c Ratio					0.51		0.82	0.36			0.22	0.19
Uniform Delay, d1					48.0		47.8	2.7			8.7	8.5
Progression Factor					1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2					0.4		11.1	0.4			0.2	0.3
Delay (s)					48.5		58.9	3.1			9.0	8.8
Level of Service					D		E	A			A	A
Approach Delay (s)		0.0			48.5			19.1			8.9	
Approach LOS		A			D			B			A	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.7%	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												
Volume (veh/h)	180	751	0	0	0	0	0	0	0	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.85	0.92	0.85
Hourly flow rate (vph)	189	791	0	0	0	0	0	0	0	2	0	0
Pedestrians		2			3						1	
Lane Width (ft)		12.0			0.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					370							
pX, platoon unblocked												
vC, conflicting volume	1			791			1171	1170	267	646	1170	3
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1			791			1171	1170	267	646	1170	3
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			100	100	100	99	100	100
cM capacity (veh/h)	1626			825			134	169	732	328	169	1083

Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1
Volume Total	387	395	198	0	2
Volume Left	189	0	0	0	2
Volume Right	0	0	0	0	0
cSH	1626	1700	1700	1700	328
Volume to Capacity	0.12	0.23	0.12	0.00	0.01
Queue Length 95th (ft)	10	0	0	0	1
Control Delay (s)	4.2	0.0	0.0	0.0	16.1
Lane LOS	A			A	C
Approach Delay (s)	1.7			0.0	16.1
Approach LOS				A	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	540	212	0	0	0	0	0	0	124	371	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5							4.0	4.0	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frpb, ped/bikes		1.00	0.98							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3167	1392							1630	3260	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3167	1392							1630	3260	
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	0	568	223	0	0	0	0	0	0	135	403	0
RTOR Reduction (vph)	0	0	162	0	0	0	0	0	0	53	0	0
Lane Group Flow (vph)	0	568	61	0	0	0	0	0	0	82	403	0
Confl. Peds. (#/hr)			5	5			1		6			
Heavy Vehicles (%)	2%	5%	5%	0%	0%	2%	0%	2%	0%	2%	2%	2%
Turn Type			Perm							Perm		
Protected Phases		8									6	
Permitted Phases			8							6		
Actuated Green, G (s)		19.2	19.2							42.3	42.3	
Effective Green, g (s)		19.2	19.2							42.3	42.3	
Actuated g/C Ratio		0.27	0.27							0.60	0.60	
Clearance Time (s)		4.5	4.5							4.0	4.0	
Vehicle Extension (s)		0.2	0.2							3.0	3.0	
Lane Grp Cap (vph)		869	382							985	1970	
v/s Ratio Prot		c0.18									c0.12	
v/s Ratio Perm			0.04							0.05		
v/c Ratio		0.65	0.16							0.08	0.20	
Uniform Delay, d1		22.5	19.3							5.8	6.3	
Progression Factor		1.00	1.00							1.00	1.00	
Incremental Delay, d2		3.8	0.9							0.0	0.1	
Delay (s)		26.3	20.2							5.8	6.3	
Level of Service		C	C							A	A	
Approach Delay (s)		24.6			0.0			0.0			6.2	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	34.4%	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												
Volume (vph)	359	306	0	0	0	0	0	876	38	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0						4.0	4.0			
Lane Util. Factor	0.91	0.91						0.91	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	0.85			
Flt Protected	0.95	0.98						1.00	1.00			
Satd. Flow (prot)	1398	3055						4507	1423			
Flt Permitted	0.95	0.98						1.00	1.00			
Satd. Flow (perm)	1398	3055						4507	1423			
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)	378	322	0	0	0	0	0	922	40	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	18	0	0	0
Lane Group Flow (vph)	227	473	0	0	0	0	0	922	22	0	0	0
Confl. Peds. (#/hr)	2		3	3		2	3		3	3		3
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	6%	3%	0%	0%	0%
Turn Type	Perm								Perm			
Protected Phases		8						6				
Permitted Phases	8								6			
Actuated Green, G (s)	24.0	24.0						38.0	38.0			
Effective Green, g (s)	24.0	24.0						38.0	38.0			
Actuated g/C Ratio	0.34	0.34						0.54	0.54			
Clearance Time (s)	4.0	4.0						4.0	4.0			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	479	1047						2447	772			
v/s Ratio Prot								c0.20				
v/s Ratio Perm	c0.16	0.15							0.02			
v/c Ratio	0.47	0.45						0.38	0.03			
Uniform Delay, d1	18.0	17.9						9.2	7.4			
Progression Factor	0.72	0.68						1.00	1.00			
Incremental Delay, d2	3.0	1.3						0.4	0.1			
Delay (s)	15.9	13.4						9.6	7.5			
Level of Service	B	B						A	A			
Approach Delay (s)		14.2			0.0			9.5			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.7%	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												
Volume (vph)	449	723	94	390	1038	334	148	398	238	420	402	433
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.0	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	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	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)	3193	3197	1458	1662	3292	1473	1646	3325	1465	3193	3292	1473
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)	3193	3197	1458	1662	3292	1473	1646	3325	1465	3193	3292	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)	473	761	99	411	1093	352	156	419	251	442	423	456
RTOR Reduction (vph)	0	0	53	0	0	113	0	0	206	0	0	259
Lane Group Flow (vph)	473	761	46	411	1093	239	156	419	45	442	423	197
Confl. Peds. (#/hr)			6	6					2	2		
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	1%	4%	0%	0%	1%	1%	1%	0%	0%	1%	1%	1%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	18.0	31.1	31.1	30.6	43.2	43.2	14.7	21.4	21.4	17.5	24.2	24.2
Effective Green, g (s)	18.0	31.1	31.1	30.6	43.2	43.2	14.7	21.4	21.4	17.5	24.2	24.2
Actuated g/C Ratio	0.15	0.26	0.26	0.26	0.36	0.36	0.12	0.18	0.18	0.15	0.20	0.20
Clearance Time (s)	5.0	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	481	831	379	425	1189	532	202	595	262	467	666	298
v/s Ratio Prot	0.15	0.24		c0.25	c0.33		0.09	0.13		c0.14	0.13	
v/s Ratio Perm			0.03			0.16			0.03			c0.13
v/c Ratio	0.98	0.92	0.12	0.97	0.92	0.45	0.77	0.70	0.17	0.95	0.64	0.66
Uniform Delay, d1	50.7	43.0	33.8	44.0	36.5	29.1	50.8	46.1	41.6	50.6	43.7	43.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.5	14.6	0.1	34.8	11.3	0.4	16.0	3.5	0.2	28.3	1.7	4.9
Delay (s)	87.1	57.5	33.9	78.8	47.8	29.6	66.8	49.6	41.8	78.9	45.4	48.8
Level of Service	F	E	C	E	D	C	E	D	D	E	D	D
Approach Delay (s)		66.3			51.2			50.5			57.8	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM Average Control Delay	56.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	1213	98	71	1280	23	161	6	235	37	3	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	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
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1662	3274		1662	3190			1670	1488		1673	1488
Flt Permitted	0.95	1.00		0.95	1.00			0.70	1.00		0.61	1.00
Satd. Flow (perm)	1662	3274		1662	3190			1222	1488		1062	1488
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	34	1277	103	75	1347	24	189	7	276	44	4	76
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	210	0	0	61
Lane Group Flow (vph)	34	1375	0	75	1370	0	0	196	66	0	48	15
Confl. Peds. (#/hr)	1		12	12		1						
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	4.9	58.7		11.7	65.5			21.1	21.1		21.1	21.1
Effective Green, g (s)	4.9	58.7		11.7	65.5			21.1	21.1		21.1	21.1
Actuated g/C Ratio	0.05	0.56		0.11	0.62			0.20	0.20		0.20	0.20
Clearance Time (s)	4.5	5.0		4.5	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.5	4.5		2.5	4.5			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	77	1830		185	1989			245	299		213	299
v/s Ratio Prot	0.02	c0.42		0.05	c0.43							
v/s Ratio Perm								c0.16	0.04		0.05	0.01
v/c Ratio	0.44	0.75		0.41	0.69			0.80	0.22		0.23	0.05
Uniform Delay, d1	48.7	17.6		43.4	13.0			39.9	35.1		35.1	33.9
Progression Factor	1.00	1.00		0.69	0.32			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.9	2.9		0.5	1.0			16.4	0.3		0.4	0.1
Delay (s)	51.6	20.5		30.4	5.2			56.3	35.3		35.5	33.9
Level of Service	D	C		C	A			E	D		D	C
Approach Delay (s)		21.3			6.5			44.1			34.5	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	13.5
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												
Volume (vph)	233	1272	6	6	1275	53	25	5	25	314	0	305
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	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	
Frt	1.00	1.00		1.00	0.99		1.00	0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3226		1662	3239		1662	1515		1643	1488	
Flt Permitted	0.95	1.00		0.95	1.00		0.23	1.00		0.73	1.00	
Satd. Flow (perm)	1662	3226		1662	3239		410	1515		1270	1488	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	245	1339	6	6	1342	56	29	6	29	369	0	359
RTOR Reduction (vph)	0	0	0	0	3	0	0	22	0	0	232	0
Lane Group Flow (vph)	245	1345	0	6	1395	0	29	13	0	369	127	0
Confl. Peds. (#/hr)	3		15	15		3			1	1		
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	20.1	63.7		1.3	44.9		27.0	27.0		27.0	27.0	
Effective Green, g (s)	20.1	63.7		1.3	44.9		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.19	0.61		0.01	0.43		0.26	0.26		0.26	0.26	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	4.2		2.5	4.2		2.0	2.0		2.5	2.5	
Lane Grp Cap (vph)	318	1957		20	1385		105	389		326	382	
v/s Ratio Prot	0.15	c0.42		0.00	c0.43			0.01			0.09	
v/s Ratio Perm							0.07			c0.29		
v/c Ratio	0.77	0.69		0.30	1.01		0.28	0.03		1.13	0.33	
Uniform Delay, d1	40.3	13.9		51.4	30.1		31.2	29.2		39.0	31.7	
Progression Factor	0.73	0.24		1.31	0.80		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.9	1.5		4.6	22.8		0.5	0.0		90.4	0.4	
Delay (s)	37.3	4.8		72.1	46.9		31.7	29.2		129.4	32.1	
Level of Service	D	A		E	D		C	C		F	C	
Approach Delay (s)		9.8			47.0			30.4			81.4	
Approach LOS		A			D			C			F	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	1877	1570	0	146	191
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3292	3292		1568	1458
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3292	3292		1568	1458
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1976	1653	0	154	201
RTOR Reduction (vph)	0	0	0	0	0	30
Lane Group Flow (vph)	0	1976	1653	0	154	171
Confl. Peds. (#/hr)	3			3	4	13
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	0%	1%	1%	0%	6%	2%
Turn Type						custom
Protected Phases		2	6		7	4
Permitted Phases						
Actuated Green, G (s)		78.6	78.6		17.4	17.4
Effective Green, g (s)		78.6	78.6		17.4	17.4
Actuated g/C Ratio		0.75	0.75		0.17	0.17
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		4.6	4.6		2.5	2.5
Lane Grp Cap (vph)		2464	2464		260	242
v/s Ratio Prot		c0.60	0.50		0.10	c0.12
v/s Ratio Perm						
v/c Ratio		0.80	0.67		0.59	0.71
Uniform Delay, d1		8.3	6.7		40.5	41.4
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.9	1.5		3.0	8.4
Delay (s)		11.2	8.1		43.5	49.8
Level of Service		B	A		D	D
Approach Delay (s)		11.2	8.1		47.1	
Approach LOS		B	A		D	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.6%	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												
Volume (vph)	64	956	0	0	1353	38	561	226	316	44	0	267
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5			4.5	4.5	4.0	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95	1.00	0.97	1.00		1.00		1.00
Frpb, ped/bikes	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
Frt	1.00	1.00			1.00	0.85	1.00	0.91		1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95		1.00
Satd. Flow (prot)	1630	3260			3292	1488	3193	1541		1662		1466
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00		0.95		1.00
Satd. Flow (perm)	1630	3260			3292	1488	3193	1541		1662		1466
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.90	0.90	0.90
Adj. Flow (vph)	67	1006	0	0	1424	40	660	266	372	49	0	297
RTOR Reduction (vph)	0	0	0	0	0	18	0	41	0	0	0	0
Lane Group Flow (vph)	67	1006	0	0	1424	22	660	597	0	49	0	297
Confl. Peds. (#/hr)			1	1			9		4	4		9
Heavy Vehicles (%)	2%	2%	0%	0%	1%	0%	1%	2%	3%	0%	0%	0%
Turn Type	Prot					Perm	Prot			Prot		Free
Protected Phases	5	2			6		3	8		7		
Permitted Phases						6						Free
Actuated Green, G (s)	6.0	59.7			49.2	49.2	51.8	41.0		6.3		120.0
Effective Green, g (s)	6.0	59.7			49.2	49.2	51.8	41.0		6.3		120.0
Actuated g/C Ratio	0.05	0.50			0.41	0.41	0.43	0.34		0.05		1.00
Clearance Time (s)	4.5	4.5			4.5	4.5	4.0	4.5		4.0		
Vehicle Extension (s)	2.5	6.1			6.1	6.1	3.0	2.5		3.0		
Lane Grp Cap (vph)	82	1622			1350	610	1378	527		87		1466
v/s Ratio Prot	0.04	c0.31			c0.43		c0.21	c0.39		0.03		
v/s Ratio Perm						0.01						0.20
v/c Ratio	0.82	0.62			1.05	0.04	0.48	1.13		0.56		0.20
Uniform Delay, d1	56.5	21.9			35.4	21.2	24.4	39.5		55.5		0.0
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00		1.00
Incremental Delay, d2	43.5	1.8			40.4	0.1	0.3	81.3		8.1		0.3
Delay (s)	100.0	23.7			75.8	21.3	24.7	120.8		63.6		0.3
Level of Service	F	C			E	C	C	F		E		A
Approach Delay (s)		28.5			74.3			72.0			9.3	
Approach LOS		C			E			E			A	

Intersection Summary			
HCM Average Control Delay	56.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	95.0%	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												
Volume (vph)	131	970	105	49	1057	32	132	47	51	60	74	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.92		1.00	1.00	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)	1614	3182		1662	3245		3162	1588		1662	1750	1464
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1614	3182		1662	3245		3162	1588		1662	1750	1464
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	138	1021	111	52	1113	34	147	52	57	67	82	98
RTOR Reduction (vph)	0	6	0	0	2	0	0	43	0	0	0	86
Lane Group Flow (vph)	138	1126	0	52	1145	0	147	66	0	67	82	12
Confl. Peds. (#/hr)	2		2	2		2	3					3
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	3%	0%	0%	2%	0%	2%	0%	3%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	12.8	63.4		4.8	55.4		7.0	15.0		4.8	12.8	12.8
Effective Green, g (s)	12.8	63.4		4.8	55.4		7.0	15.0		4.8	12.8	12.8
Actuated g/C Ratio	0.12	0.60		0.05	0.53		0.07	0.14		0.05	0.12	0.12
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	4.5
Vehicle Extension (s)	2.5	4.6		2.5	4.6		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	197	1921		76	1712		211	227		76	213	178
v/s Ratio Prot	c0.09	0.35		0.03	c0.35		c0.05	0.04		0.04	c0.05	
v/s Ratio Perm												0.01
v/c Ratio	0.70	0.59		0.68	0.67		0.70	0.29		0.88	0.38	0.07
Uniform Delay, d1	44.3	12.8		49.4	18.1		48.0	40.2		49.8	42.5	40.8
Progression Factor	1.00	1.00		0.80	0.71		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.0	1.3		2.1	0.2		8.9	0.5		64.3	0.8	0.1
Delay (s)	54.2	14.1		41.8	13.0		56.8	40.8		114.1	43.3	40.9
Level of Service	D	B		D	B		E	D		F	D	D
Approach Delay (s)		18.4			14.3			50.0			61.6	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	62.8%	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												
Volume (vph)	278	287	338	323	300	52	597	1076	62	46	867	242
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1646	1750	1444	1646	1693		3193	3257		1662	3292	1453
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1646	1750	1444	1646	1693		3193	3257		1662	3292	1453
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)	293	302	356	340	316	55	628	1133	65	48	913	255
RTOR Reduction (vph)	0	0	48	0	6	0	0	4	0	0	0	124
Lane Group Flow (vph)	293	302	308	340	365	0	628	1194	0	48	913	131
Confl. Peds. (#/hr)							5		6	6		5
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	1%	0%	3%	1%	1%	0%	1%	1%	2%	0%	1%	1%
Turn Type	Prot		pt+ov	Prot			Prot			Prot		pm+ov
Protected Phases	3	8	1 8	7	4		1	6		5	2	3
Permitted Phases												2
Actuated Green, G (s)	7.5	21.6	34.6	23.3	37.4		8.5	36.3		5.8	33.6	41.1
Effective Green, g (s)	7.5	21.6	34.6	23.3	37.4		8.5	36.3		5.8	33.6	41.1
Actuated g/C Ratio	0.07	0.21	0.33	0.22	0.36		0.08	0.35		0.06	0.32	0.39
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	3.0		2.5	2.5		2.5	4.6		2.5	4.6	2.5
Lane Grp Cap (vph)	118	360	476	365	603		258	1126		92	1053	569
v/s Ratio Prot	c0.18	c0.17	0.21	c0.21	0.22		c0.20	c0.37		0.03	c0.28	0.02
v/s Ratio Perm												0.07
v/c Ratio	2.48	0.84	0.65	0.93	0.61		2.43	1.06		0.52	0.87	0.23
Uniform Delay, d1	48.8	40.0	30.0	40.1	27.7		48.2	34.4		48.3	33.6	21.4
Progression Factor	1.14	0.92	0.95	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	688.0	13.3	2.5	30.1	1.5		657.0	44.4		4.0	9.6	0.2
Delay (s)	743.6	50.1	31.0	70.2	29.2		705.2	78.7		52.3	43.2	21.5
Level of Service	F	D	C	E	C		F	E		D	D	C
Approach Delay (s)		256.6			48.8			294.2			39.0	
Approach LOS		F			D			F			D	

Intersection Summary			
HCM Average Control Delay	183.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	97.4%	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												
Volume (vph)	270	516	2	2	716	653	9	18	8	463	5	337
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.5		4.0	5.5	5.5		4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1630	3258		1662	3260	1450		1669		3165	1437	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.90		0.73	1.00	
Satd. Flow (perm)	1630	3258		1662	3260	1450		1529		2444	1437	
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)	284	543	2	2	754	687	9	19	8	487	5	355
RTOR Reduction (vph)	0	0	0	0	0	326	0	6	0	0	261	0
Lane Group Flow (vph)	284	545	0	2	754	361	0	30	0	487	99	0
Confl. Peds. (#/hr)	3					3	6		6	6		6
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases						2	4			4		
Actuated Green, G (s)	16.7	49.0		0.9	33.2	33.2		23.0		23.0	23.0	
Effective Green, g (s)	16.7	49.0		0.9	33.2	33.2		23.0		23.0	23.0	
Actuated g/C Ratio	0.19	0.56		0.01	0.38	0.38		0.26		0.26	0.26	
Clearance Time (s)	4.0	5.5		4.0	5.5	5.5		4.5		4.5	4.5	
Vehicle Extension (s)	3.0	4.5		3.0	4.5	4.5		3.5		3.5	3.5	
Lane Grp Cap (vph)	313	1837		17	1245	554		405		647	380	
v/s Ratio Prot	c0.17	0.17		0.00	0.23						0.07	
v/s Ratio Perm						c0.25		0.02		c0.20		
v/c Ratio	0.91	0.30		0.12	0.61	0.65		0.07		0.75	0.26	
Uniform Delay, d1	34.3	9.9		42.6	21.6	22.1		24.0		29.3	25.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	28.2	0.2		3.1	1.1	3.3		0.1		5.1	0.4	
Delay (s)	62.6	10.1		45.7	22.7	25.4		24.1		34.4	25.7	
Level of Service	E	B		D	C	C		C		C	C	
Approach Delay (s)		28.1			24.0			24.1			30.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	86.9	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	1392	1520	31	40	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	5	1465	1600	33	47	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)			760			
pX, platoon unblocked	0.59				0.59	0.59
vC, conflicting volume	1633				2359	816
vC1, stage 1 conf vol					1616	
vC2, stage 2 conf vol					743	
vCu, unblocked vol	689				1918	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				80	96
cM capacity (veh/h)	541				230	646

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	5	733	733	1067	566	72
Volume Left	5	0	0	0	0	47
Volume Right	0	0	0	0	33	25
cSH	541	1700	1700	1700	1700	296
Volume to Capacity	0.01	0.43	0.43	0.63	0.33	0.24
Queue Length 95th (ft)	1	0	0	0	0	23
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	21.0
Lane LOS	B					C
Approach Delay (s)	0.0			0.0		21.0
Approach LOS						C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	1409	17	11	1505	22	22	1	31	22	1	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	8	1483	18	12	1584	23	26	1	36	26	1	29
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)					491							
pX, platoon unblocked	0.58						0.58	0.58		0.58	0.58	0.58
vC, conflicting volume	1607			1501			2363	3139	764	2427	3137	813
vC1, stage 1 conf vol							1509	1509		1619	1619	
vC2, stage 2 conf vol							854	1631		808	1518	
vCu, unblocked vol	612			1501			1908	3239	764	2018	3235	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			79	99	89	86	99	95
cM capacity (veh/h)	570			452			120	139	347	179	135	631

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	8	989	512	12	1056	551	64	56
Volume Left	8	0	0	12	0	0	26	26
Volume Right	0	0	18	0	0	23	36	29
cSH	570	1700	1700	452	1700	1700	193	283
Volume to Capacity	0.01	0.58	0.30	0.03	0.62	0.32	0.33	0.20
Queue Length 95th (ft)	1	0	0	2	0	0	34	18
Control Delay (s)	11.4	0.0	0.0	13.2	0.0	0.0	32.5	20.9
Lane LOS	B			B			D	C
Approach Delay (s)	0.1			0.1			32.5	20.9
Approach LOS							D	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	1358	16	25	1409	107	19	1	25	172	2	42
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	1.00		1.00	0.99			0.92			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.96	
Satd. Flow (prot)	1662	3192		1662	3162			1562			1621	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.76	
Satd. Flow (perm)	1662	3192		1662	3162			1389			1277	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	36	1429	17	26	1483	113	22	1	29	202	2	49
RTOR Reduction (vph)	0	1	0	0	5	0	0	23	0	0	9	0
Lane Group Flow (vph)	36	1445	0	26	1591	0	0	29	0	0	244	0
Confl. Peds. (#/hr)	2		5	5		2	9		7	7		9
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	0%	4%	0%	0%	4%	2%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.4	54.2		2.9	52.7			19.4			19.4	
Effective Green, g (s)	4.4	54.2		2.9	52.7			19.4			19.4	
Actuated g/C Ratio	0.05	0.60		0.03	0.59			0.22			0.22	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			2.5	
Lane Grp Cap (vph)	81	1922		54	1852			299			275	
v/s Ratio Prot	c0.02	0.45		0.02	c0.50							
v/s Ratio Perm								0.02			c0.19	
v/c Ratio	0.44	0.75		0.48	0.86			0.10			0.89	
Uniform Delay, d1	41.6	13.0		42.8	15.5			28.3			34.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	2.8		4.9	5.4			0.1			26.8	
Delay (s)	44.4	15.8		47.7	21.0			28.4			61.0	
Level of Service	D	B		D	C			C			E	
Approach Delay (s)		16.5			21.4			28.4			61.0	
Approach LOS		B			C			C			E	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	1084	399	238	1214	7	288	29	349	40	14	46
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	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		1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.96		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1662	3110		1646	3289			1648	1399		1593	
Flt Permitted	0.95	1.00		0.95	1.00			0.68	1.00		0.75	
Satd. Flow (perm)	1662	3110		1646	3289			1178	1399		1212	
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)	32	1141	420	251	1278	7	303	31	367	42	15	48
RTOR Reduction (vph)	0	41	0	0	1	0	0	0	242	0	33	0
Lane Group Flow (vph)	32	1520	0	251	1284	0	0	334	125	0	72	0
Confl. Peds. (#/hr)							7		8	8		7
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	2%	2%	1%	1%	0%	1%	0%	4%	0%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	11.4	32.9		16.4	37.9			28.7	28.7		28.7	
Effective Green, g (s)	11.4	32.9		16.4	37.9			28.7	28.7		28.7	
Actuated g/C Ratio	0.13	0.37		0.18	0.42			0.32	0.32		0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	2.5	5.5		2.5	5.5			2.5	2.5		2.5	
Lane Grp Cap (vph)	211	1137		300	1385			376	446		386	
v/s Ratio Prot	0.02	c0.49		0.15	c0.39							
v/s Ratio Perm								c0.28	0.09		0.06	
v/c Ratio	0.15	1.34		0.84	0.93			0.89	0.28		0.19	
Uniform Delay, d1	35.0	28.6		35.5	24.7			29.1	22.9		22.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	157.5		17.7	12.1			21.5	0.3		0.2	
Delay (s)	35.2	186.1		53.2	36.9			50.6	23.2		22.4	
Level of Service	D	F		D	D			D	C		C	
Approach Delay (s)		183.1			39.5			36.2			22.4	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM Average Control Delay	96.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
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												
Volume (vph)	15	1046	0	0	1767	23	223	0	171	15	0	34
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.98		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		0.99	1.00		0.99		1.00
Frt	1.00	1.00			1.00		1.00	0.85		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1662	3197			3253		1654	1372		1650		1488
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.52		1.00
Satd. Flow (perm)	1662	3197			3253		1654	1372		895		1488
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	16	1101	0	0	1860	24	235	0	180	18	0	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	64	0	0	0	32
Lane Group Flow (vph)	16	1101	0	0	1884	0	235	116	0	18	0	8
Confl. Peds. (#/hr)	4		1	1		4	4		8	8		4
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	6%	0%	0%	0%
Turn Type	Prot						Perm			custom		custom
Protected Phases	5	2			6			8				4
Permitted Phases							8			4		
Actuated Green, G (s)	1.5	62.8			57.3		17.7	17.7		17.7		17.7
Effective Green, g (s)	1.5	62.8			57.3		17.7	17.7		17.7		17.7
Actuated g/C Ratio	0.02	0.70			0.64		0.20	0.20		0.20		0.20
Clearance Time (s)	4.0	5.0			5.0		4.5	4.5		4.5		4.5
Vehicle Extension (s)	2.5	5.9			5.9		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	28	2231			2071		325	270		176		293
v/s Ratio Prot	0.01	c0.34			c0.58			0.08				0.01
v/s Ratio Perm							c0.14			0.02		
v/c Ratio	0.57	0.49			0.91		0.72	0.43		0.10		0.03
Uniform Delay, d1	43.9	6.3			14.1		33.9	31.7		29.6		29.2
Progression Factor	1.00	1.00			0.55		1.00	1.00		1.00		1.00
Incremental Delay, d2	21.0	0.8			5.3		7.3	0.8		0.2		0.0
Delay (s)	65.0	7.1			13.1		41.1	32.5		29.8		29.2
Level of Service	E	A			B		D	C		C		C
Approach Delay (s)		7.9			13.1			37.4			29.4	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1199	32	6	1779	11	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	1262	34	6	1873	13	106
Pedestrians	11			12		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	1			1		
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	184			342		
pX, platoon unblocked			0.84		0.72	0.84
vC, conflicting volume			1296		2239	660
vC1, stage 1 conf vol					1279	
vC2, stage 2 conf vol					960	
vCu, unblocked vol			980		956	226
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	84
cM capacity (veh/h)			601		274	654

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	841	454	6	936	936	13	106
Volume Left	0	0	6	0	0	13	0
Volume Right	0	34	0	0	0	0	106
cSH	1700	1700	601	1700	1700	274	654
Volume to Capacity	0.49	0.27	0.01	0.55	0.55	0.05	0.16
Queue Length 95th (ft)	0	0	1	0	0	4	14
Control Delay (s)	0.0	0.0	11.1	0.0	0.0	18.8	11.6
Lane LOS			B			C	B
Approach Delay (s)	0.0		0.0			12.4	
Approach LOS						B	

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations										
Volume (vph)	41	0	1237	12	1635	49	7	148	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0		4.5	4.0	4.5		4.5	4.5		
Lane Util. Factor	1.00		0.88	1.00	0.95		1.00	1.00		
Frpb, ped/bikes	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		
Frt	1.00		0.85	1.00	1.00		1.00	0.85		
Flt Protected	0.95		1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1662		2618	1662	3241		1662	1418		
Flt Permitted	0.95		1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1662		2618	1662	3241		1662	1418		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.92	0.92
Adj. Flow (vph)	43	0	1302	13	1721	52	8	174	0	0
RTOR Reduction (vph)	0	0	318	7	1	0	0	159	0	0
Lane Group Flow (vph)	43	0	984	6	1772	0	8	15	0	0
Confl. Peds. (#/hr)	8		4	4		8	10	20		
Confl. Bikes (#/hr)						1				
Heavy Vehicles (%)	0%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Prot		custom	Prot				Perm		
Protected Phases	5		2	1	6		4			
Permitted Phases								4		
Actuated Green, G (s)	5.1		68.0	1.2	64.1		7.8	7.8		
Effective Green, g (s)	5.1		68.0	1.2	64.1		7.8	7.8		
Actuated g/C Ratio	0.06		0.76	0.01	0.71		0.09	0.09		
Clearance Time (s)	4.0		4.5	4.0	4.5		4.5	4.5		
Vehicle Extension (s)	2.5		5.0	1.5	5.0		2.5	2.5		
Lane Grp Cap (vph)	94		1978	22	2308		144	123		
v/s Ratio Prot	c0.03		c0.38	0.00	c0.55		0.00			
v/s Ratio Perm								c0.01		
v/c Ratio	0.46		0.50	0.28	0.77		0.06	0.12		
Uniform Delay, d1	41.1		4.3	44.0	8.2		37.7	37.9		
Progression Factor	1.12		1.97	1.00	1.00		1.00	1.00		
Incremental Delay, d2	2.3		0.8	2.5	2.5		0.1	0.3		
Delay (s)	48.3		9.3	46.5	10.7		37.8	38.3		
Level of Service	D		A	D	B		D	D		
Approach Delay (s)		10.6			11.0		38.2		0.0	
Approach LOS		B			B		D		A	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	72.9%	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												
Volume (veh/h)	0	10	1	14	1467	10	86	121	0	0	10	143
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	11	1	15	1544	11	101	142	0	0	12	168
Pedestrians		5			5			1			7	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					567							
pX, platoon unblocked												
vC, conflicting volume	1562			13			993	1603	17	1673	1599	789
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1562			13			993	1603	17	1673	1599	789
tC, single (s)	4.1			4.1			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			0	0	100	0	89	50
cM capacity (veh/h)	426			1618			89	104	1059	0	106	333

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	787	783	244	180
Volume Left	15	0	101	0
Volume Right	0	11	0	168
cSH	1618	1700	97	292
Volume to Capacity	0.01	0.46	2.51	0.62
Queue Length 95th (ft)	1	0	560	95
Control Delay (s)	0.3	0.0	778.1	35.2
Lane LOS	A		F	E
Approach Delay (s)	0.1		778.1	35.2
Approach LOS			F	E

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	112	392	120	558	1241	0	0	954	652
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		0.97	0.95			0.95	0.88
Frpb, ped/bikes					0.99		1.00	1.00			1.00	1.00
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.97		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3123		3162	3260			3325	2618
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3123		3162	3260			3325	2618
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)	0	0	0	118	413	126	587	1306	0	0	1004	686
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	0	78
Lane Group Flow (vph)	0	0	0	0	638	0	587	1306	0	0	1004	608
Confl. Peds. (#/hr)	12		7	7		12	10		13	13		10
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%	2%	2%	0%	0%	0%	0%
Turn Type				Perm			Prot					custom
Protected Phases					4		1	6			2	2
Permitted Phases				4								2
Actuated Green, G (s)					25.8		23.7	81.2			53.5	53.5
Effective Green, g (s)					25.8		23.7	81.2			53.5	53.5
Actuated g/C Ratio					0.22		0.21	0.71			0.47	0.47
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)					0.2		0.2	0.2			0.2	0.2
Lane Grp Cap (vph)					701		652	2302			1547	1218
v/s Ratio Prot							c0.19	0.40			c0.30	0.23
v/s Ratio Perm					0.20							
v/c Ratio					0.91		0.90	0.57			0.65	0.50
Uniform Delay, d1					43.5		44.5	8.3			23.6	21.4
Progression Factor					1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2					15.8		15.3	1.0			2.1	1.5
Delay (s)					59.2		59.8	9.3			25.7	22.9
Level of Service					E		E	A			C	C
Approach Delay (s)		0.0			59.2			24.9			24.5	
Approach LOS		A			E			C			C	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	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												
Volume (veh/h)	192	1016	0	0	0	0	0	0	0	18	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.85	0.92	0.85
Hourly flow rate (vph)	202	1069	0	0	0	0	0	0	0	21	0	0
Pedestrians		8			7						1	
Lane Width (ft)		12.0			0.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					370							
pX, platoon unblocked												
vC, conflicting volume	1			1069			1482	1475	363	769	1475	9
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1			1069			1482	1475	363	769	1475	9
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			100	100	100	92	100	100
cM capacity (veh/h)	1626			647			78	110	633	266	110	1069

Direction, Lane #	EB 1	EB 2	EB 3	NB 1	SB 1
Volume Total	469	535	267	0	21
Volume Left	202	0	0	0	21
Volume Right	0	0	0	0	0
cSH	1626	1700	1700	1700	266
Volume to Capacity	0.12	0.31	0.16	0.00	0.08
Queue Length 95th (ft)	11	0	0	0	6
Control Delay (s)	3.9	0.0	0.0	0.0	19.7
Lane LOS	A			A	C
Approach Delay (s)	1.4			0.0	19.7
Approach LOS				A	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	700	345	0	0	0	0	0	0	209	858	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5								4.5	4.5	
Lane Util. Factor		0.91								1.00	0.95	
Frpb, ped/bikes		0.99								1.00	1.00	
Flpb, ped/bikes		1.00								1.00	1.00	
Frt		0.95								1.00	1.00	
Flt Protected		1.00								0.95	1.00	
Satd. Flow (prot)		4423								1657	3197	
Flt Permitted		1.00								0.95	1.00	
Satd. Flow (perm)		4423								1657	3197	
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)	0	737	363	0	0	0	0	0	0	220	903	0
RTOR Reduction (vph)	0	84	0	0	0	0	0	0	0	21	0	0
Lane Group Flow (vph)	0	1016	0	0	0	0	0	0	0	199	903	0
Confl. Peds. (#/hr)	11		7	7		11	1		3	3		1
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Turn Type										Perm		
Protected Phases		8									2	
Permitted Phases										2		
Actuated Green, G (s)		22.5								38.5	38.5	
Effective Green, g (s)		22.5								38.5	38.5	
Actuated g/C Ratio		0.32								0.55	0.55	
Clearance Time (s)		4.5								4.5	4.5	
Vehicle Extension (s)		0.2								0.2	0.2	
Lane Grp Cap (vph)		1422								911	1758	
v/s Ratio Prot		c0.23									c0.28	
v/s Ratio Perm										0.12		
v/c Ratio		0.71								0.22	0.51	
Uniform Delay, d1		20.9								8.1	9.9	
Progression Factor		1.00								1.00	1.00	
Incremental Delay, d2		3.1								0.6	1.1	
Delay (s)		24.0								8.6	11.0	
Level of Service		C								A	B	
Approach Delay (s)		24.0			0.0			0.0			10.5	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.6%	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												
Volume (vph)	520	390	0	0	0	0	0	1278	52	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0						4.0	4.0			
Lane Util. Factor	0.91	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.99			
Flpb, ped/bikes	0.99	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	0.98						1.00	1.00			
Satd. Flow (prot)	1487	3109						4684	1465			
Flt Permitted	0.95	0.98						1.00	1.00			
Satd. Flow (perm)	1487	3109						4684	1465			
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)	547	411	0	0	0	0	0	1345	55	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	25	0	0	0
Lane Group Flow (vph)	312	646	0	0	0	0	0	1345	30	0	0	0
Confl. Peds. (#/hr)	7		6	6		7	1		3	3		1
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Turn Type	Perm								Perm			
Protected Phases		8						6			6	
Permitted Phases	8								6			
Actuated Green, G (s)	24.0	24.0						38.0	38.0			
Effective Green, g (s)	24.0	24.0						38.0	38.0			
Actuated g/C Ratio	0.34	0.34						0.54	0.54			
Clearance Time (s)	4.0	4.0						4.0	4.0			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	510	1066						2543	795			
v/s Ratio Prot								c0.29				
v/s Ratio Perm	c0.21	0.21							0.02			
v/c Ratio	0.61	0.61						0.53	0.04			
Uniform Delay, d1	19.1	19.1						10.3	7.5			
Progression Factor	0.72	0.72						1.00	1.00			
Incremental Delay, d2	4.3	2.0						0.8	0.1			
Delay (s)	18.0	15.7						11.1	7.6			
Level of Service	B	B						B	A			
Approach Delay (s)		16.4			0.0			10.9			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix F Freeway Mainline Operations Worksheets

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency or Company:	KAI
Date Performed:	07/03/2014
Analysis Time Period:	AM
Freeway/Direction:	I-5 NB
From/To:	south of 124
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAM 124 & 124

Flow Inputs and Adjustments

Volume, V	2077	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	611	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1289	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1289	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	19.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency or Company:	KAI
Date Performed:	7/3/2014
Analysis Time Period:	AM
Freeway/Direction:	I-5 SB
From/To:	between exit 124 & 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAM 124 & 124

Flow Inputs and Adjustments

Volume, V	1759	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	517	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1097	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1097	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	16.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency or Company:	KAI
Date Performed:	7/3/2014
Analysis Time Period:	AM
Freeway/Direction:	I-5 NB
From/To:	north of exit 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAM 124 & 124

Flow Inputs and Adjustments

Volume, V	1408	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	414	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	874	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	874	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	13.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency or Company:	KAI
Date Performed:	07/03/2014
Analysis Time Period:	AM
Freeway/Direction:	I-5 SB
From/To:	north of exit 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAM 124 & 124

Flow Inputs and Adjustments

Volume, V	1590	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	468	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	991	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	991	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	15.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency or Company:	KAI
Date Performed:	07/03/2014
Analysis Time Period:	
Freeway/Direction:	I-5 NB
From/To:	between exit 124 & 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAM 124 & 124

Flow Inputs and Adjustments

Volume, V	2401	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	706	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1490	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1490	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	2	
Density, D	23.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency or Company:	KAI
Date Performed:	07/03/2014
Analysis Time Period:	AM
Freeway/Direction:	I-5 SB
From/To:	south of 124
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAM 124 & 124

Flow Inputs and Adjustments

Volume, V	1134	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	334	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	707	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	707	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency or Company:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM
Freeway/Direction:	I-5 SB
From/To:	south of 124
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Flow Inputs and Adjustments

Volume, V	2770	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	815	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1719	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1719	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.6	mi/h
Number of lanes, N	2	
Density, D	27.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency or Company:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM
Freeway/Direction:	I-5 SB
From/To:	north of exit 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Flow Inputs and Adjustments

Volume, V	1962	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	577	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1218	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1218	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	18.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency or Company:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM
Freeway/Direction:	I-5 SB
From/To:	between exit 124 & 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Flow Inputs and Adjustments

Volume, V	2785	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	819	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1728	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1728	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.5	mi/h
Number of lanes, N	2	
Density, D	27.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency or Company:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM
Freeway/Direction:	I-5 NB
From/To:	south of 124
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Flow Inputs and Adjustments

Volume, V	1814	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	534	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1131	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1131	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	17.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency or Company:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM
Freeway/Direction:	I-5 NB
From/To:	north of exit 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Flow Inputs and Adjustments

Volume, V	1593	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	469	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	993	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	993	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	15.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency or Company:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM
Freeway/Direction:	I-5 NB
From/To:	between exit 124 & 125
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Flow Inputs and Adjustments

Volume, V	2304	veh/h
Peak-hour factor, PHF	0.85	
Peak 15-min volume, v15	678	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1437	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	65.0	mi/h

LOS and Performance Measures

Flow rate, vp	1437	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	22.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Appendix G Weaving Operations Worksheets

HCS 2010: Freeway Weaving Release 6.50

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency/Co.:	KAI
Date Performed:	7/3/2014
Analysis Time Period:	AM Peak
Freeway/Dir of Travel:	I-5 N
Weaving Location:	EX 124 to Ex125
Analysis Year:	2035
Description:	PM Weaving Analysis IAMP 124 & 125

Inputs

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	1330	ft
Freeway free-flow speed, FFS	65	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1750*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	883	275	968	275	veh/h
Peak hour factor, PHF	0.98	0.85	0.85	0.85	
Peak 15-min volume, v15	225	81	285	81	
Trucks and buses	11	6	3	6	%
Recreational vehicles	1	1	1	1	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.946	0.969	0.983	0.969	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	952	334	1158	334	pc/h

Volume ratio, VR 0.537

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	1.0	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	1492	lc/h
Weaving lane changes, LCW	1688	lc/h
Non-weaving vehicle index, INW	171	
Non-weaving lane change, LCNW	408	lc/h
Total lane changes, LCALL	2096	lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W 0.324

Average weaving speed, SW	52.8	mi/h
Average non-weaving speed, SNW	49.8	mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	51.4	mi/h
Weaving segment density, D	18.0	pc/mi/ln
Level of service, LOS	B	
Weaving segment v/c ratio	0.759	
Weaving segment flow rate, v	2629	veh/h
Weaving segment capacity, cW	3463	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	8263	1330	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1750*	1220	c
		Maximum	Analyzed	
v/c ratio		1.00	0.759	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.

HCS 2010: Freeway Weaving Release 6.41

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency/Co.:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM Peak
Freeway/Dir of Travel:	I-5 N
Weaving Location:	EX 124 to Ex125
Analysis Year:	2035
Description:	PM Weaving Analysis IAMP 124 & 125

Inputs

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	1330	ft
Freeway free-flow speed, FFS	65	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1750*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	755	446	657	446	veh/h
Peak hour factor, PHF	0.98	0.85	0.85	0.85	
Peak 15-min volume, v15	193	131	193	131	
Trucks and buses	13	2	2	2	%
Recreational vehicles	1	1	1	1	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.937	0.988	0.988	0.988	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	822	531	782	531	pc/h

Volume ratio, VR 0.492

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	1.0	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	1313	lc/h
Weaving lane changes, LCW	1509	lc/h
Non-weaving vehicle index, INW	180	
Non-weaving lane change, LCNW	422	lc/h
Total lane changes, LCALL	1931	lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W 0.303

Average weaving speed, SW	53.4	mi/h
Average non-weaving speed, SNW	51.3	mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	52.3	mi/h
Weaving segment density, D	17.0	pc/mi/ln
Level of service, LOS	B	
Weaving segment v/c ratio	0.705	
Weaving segment flow rate, v	2666	pc/h
Weaving segment capacity, cW	3543	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	7739	1330	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1750*	1260	c
		Maximum	Analyzed	
v/c ratio		1.00	0.705	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.

HCS 2010: Freeway Weaving Release 6.50

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	PSM
Agency/Co.:	KAI
Date Performed:	7/3/2013
Analysis Time Period:	AM Peak
Freeway/Dir of Travel:	I-5 S
Weaving Location:	EX 124 to Ex125
Analysis Year:	2035
Description:	PM Weaving Analysis IAMP 124 & 125

Inputs

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	2	ln
Weaving segment length, LS	3260	ft
Freeway free-flow speed, FFS	65	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1750*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	699	264	532	264	veh/h
Peak hour factor, PHF	0.88	0.85	0.85	0.85	
Peak 15-min volume, v15	199	78	156	78	
Trucks and buses	12	11	6	11	%
Recreational vehicles	1	1	1	1	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.942	0.946	0.969	0.946	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	844	328	646	328	pc/h

Volume ratio, VR 0.454

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	1.0	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	974	lc/h
Weaving lane changes, LCW	1122	lc/h
Non-weaving vehicle index, INW	382	
Non-weaving lane change, LCNW	1623	lc/h
Total lane changes, LCALL	2745	lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W 0.197

Average weaving speed, SW	56.8	mi/h
Average non-weaving speed, SNW	52.8	mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	54.5	mi/h
Weaving segment density, D	19.7	pc/mi/ln
Level of service, LOS	B	
Weaving segment v/c ratio	0.744	
Weaving segment flow rate, v	2021	veh/h
Weaving segment capacity, cW	2716	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	7292	3260	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1750*	1442	c
		Maximum	Analyzed	
v/c ratio		1.00	0.744	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.

HCS 2010: Freeway Weaving Release 6.41

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AXM
Agency/Co.:	KAI
Date Performed:	7/1/2014
Analysis Time Period:	PM Peak
Freeway/Dir of Travel:	I-5 S
Weaving Location:	EX 124 to Ex125
Analysis Year:	2035
Description:	PM Weaving Analysis IAMP 124 & 125

Inputs

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	2	ln
Weaving segment length, LS	3260	ft
Freeway free-flow speed, FFS	65	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1750*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	2205	580	86	580	veh/h
Peak hour factor, PHF	0.88	0.85	0.85	0.85	
Peak 15-min volume, v15	626	171	25	171	
Trucks and buses	11	4	1	4	%
Recreational vehicles	1	1	1	1	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.946	0.978	0.993	0.978	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2649	697	102	697	pc/h

Volume ratio, VR 0.193

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	1.0	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN		lc/h
Weaving lane changes, LCW		lc/h
Non-weaving vehicle index, INW	959	
Non-weaving lane change, LCNW		lc/h
Total lane changes, LCALL		lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W

Average weaving speed, SW		mi/h
Average non-weaving speed, SNW		mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S		mi/h
Weaving segment density, D		pc/mi/ln
Level of service, LOS	F	
Weaving segment v/c ratio	1.250	
Weaving segment flow rate, v	4145	pc/h
Weaving segment capacity, cW	3137	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	4462	3260	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1750*	1658	c
		Maximum	Analyzed	
v/c ratio		1.00	1.250	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.

Appendix H Merge/Diverge Operations Worksheets

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2013
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/NB OFF RAMP
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2401	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1243	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	135	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1470	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2401		1243		135		vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	706		366		40		v
Trucks and buses	11		4		10		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.980	0.952	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2980	1492	167	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2980 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2980	4700	No
$v_{FO} = v_F - v_R$	1488	4700	No
v_R	1492	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2980 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2980	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 16.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.562	
Space mean speed in ramp influence area,	S_R = 52.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 52.1	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/NB OFF RAMP
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2304	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1103	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	228	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1470	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2304		1103		228		vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	678		324		67		v
Trucks and buses	12		2		5		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.943	0.990	0.976	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2873	1311	275	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2873 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2873	4700	No
$v_{FO} = v_F - v_R$	1562	4700	No
v_R	1311	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2873 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2873	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 15.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.546	
Space mean speed in ramp influence area,	S_R = 52.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.4	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2014
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/SB OFF RAMP
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1590	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	240	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	237	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1100	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	1590		360		237		vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	468		106		70		v
Trucks and buses	12		6		16		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.943	0.971	0.926	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1983	436	301	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1983 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1983	4700	No
$v_{FO} = v_F - v_R$	1547	4700	No
v_R	436	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 1983 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1983	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 19.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.467	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.3	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	8/29/2013
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/SB OFF RAMP
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1962	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	337	vph
Length of first accel/decel lane	240	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	530	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1100	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	1962		337		530		vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	577		99		156		v
Trucks and buses	11		4		5		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.980	0.976	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2435	404	639	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2435 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2435	4700	No
$v_{FO} = v_F - v_R$	2031	4700	No
v_R	404	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2435 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2435	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 23.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.464

Space mean speed in ramp influence area, S_R = 54.3 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 54.3 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2014
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/NB OFF RAMP
Junction:	Harvard
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2076	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	225	vph
Length of first accel/decel lane	250	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	189	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2076		225		189		vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	611		66		56		v
Trucks and buses	11		0		3		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	1.000	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2577	265	226	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2577 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2577	4700	No
$v_{FO} = v_F - v_R$	2312	4700	No
v_R	265	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2577 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2577	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.452	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.6	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/NB OFF RAMP
Junction:	Harvard
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1814	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	402	vph
Length of first accel/decel lane	250	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	300	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	1814		402		300		vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	534		118		88		v
Trucks and buses	12		2		0		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.943	0.990	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2262	478	353	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2262 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2262	4700	No
$v_{FO} = v_F - v_R$	1784	4700	No
v_R	478	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2262 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2262	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 21.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2013
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/SB OFF RAMP
Junction:	Harvard
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1759	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	796	vph
Length of first accel/decel lane	275	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp		vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1120	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	1759		796				vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	517		234		40		v
Trucks and buses	12		6		7		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.943	0.971	0.966	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2194	965	166	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2194 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2194	4700	No
$v_{FO} = v_F - v_R$	1229	4700	No
v_R	965	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2194 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2194	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.515	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.2	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/SB OFF RAMP
Junction:	Harvard
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2785	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	666	vph
Length of first accel/decel lane	275	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	651	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1120	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2785		666		651		vph
Peak-hour factor, PHF	0.85		0.85		0.85		
Peak 15-min volume, v15	819		196		191		v
Trucks and buses	11		2		1		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.990	0.995	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3457	791	770	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3457 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3457	4700	No
$v_{FO} = v_F - v_R$	2666	4700	No
v_R	791	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3457 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3457	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.499	
Space mean speed in ramp influence area,	S_R = 53.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 53.5	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2014
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/NB ON RAMP (eb) -upstr rp
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1158	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	135	vph
Length of first accel/decel lane	825	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	116	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1220	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1158	135	116	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	341	40	34	v
Trucks and buses	11	10	16	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.952	0.926	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1437	167	147	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1437 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1604	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1437 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1604	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.283

Space mean speed in ramp influence area, S_R = 58.5 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 58.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2014
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/NB ON RAMP (wb)
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1292	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	116	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	135	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1220	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1292	116	135	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	380	34	40	v
Trucks and buses	11	16	10	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.926	0.952	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1604	147	167	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1604 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1751	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1604 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1751	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 57.9	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2014
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/SB ON RAMP (eb)
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1758	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	291	vph
Length of first accel/decel lane	840	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	237	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	995	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1758	291	237	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	517	86	70	v
Trucks and buses	12	7	16	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.943	0.966	0.926	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2192	354	301	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2192 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2546	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2192 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2546	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.312

Space mean speed in ramp influence area, S_R = 57.8 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 57.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	PSM
Agency/Co.:	KAI
Date performed:	7/3/2013
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/SB ON RAMP (wb) - upstr rp
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1231	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	237	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	360	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1100	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1231	237	360	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	362	70	106	v
Trucks and buses	12	16	6	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.943	0.926	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1535	301	436	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1535 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1836	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1535 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1836	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.293	
Space mean speed in ramp influence area,	S_R = 58.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.3	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	PSM
Agency/Co.:	KAI
Date performed:	8/29/2013
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/SB ON RAMP (eb) - upstr rp
Junction:	Harvard Ave
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1851	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	189	vph
Length of first accel/decel lane	930	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	225	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1851	189	225	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	544	56	66	v
Trucks and buses	11	2	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.990	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2297	225	265	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2297 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2522	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2297 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2522	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.304	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	PSM
Agency/Co.:	
Date performed:	7/3/2014
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/SB ON RAMP (wb)
Junction:	Harvard Ave
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2041	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1320	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	189	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1320	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2041	360	189	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	600	106	56	v
Trucks and buses	11	11	3	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.948	0.985	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2533	447	226	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2533 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2980	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2533 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2980	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.305	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	PSM
Agency/Co.:	KAI
Date performed:	8/29/2013
Analysis time period:	AM
Freeway/Dir of Travel:	I-5/SB ON RAMP (eb)
Junction:	Harvard Ave
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	963	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	171	vph
Length of first accel/decel lane	650	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	796	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1120	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	963	171	796	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	283	50	234	v
Trucks and buses	12	7	6	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.943	0.966	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1201	208	965	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1201 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1409	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1201 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1409	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.291	
Space mean speed in ramp influence area,	S_R = 58.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.3	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/NB ON RAMP (eb) - upstr rp
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1201	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	228	vph
Length of first accel/decel lane	825	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1103	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1470	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1201	228	1103	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	353	67	324	v
Trucks and buses	12	5	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.943	0.976	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1498	275	1311	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1498 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1773	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1498 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1773	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.286

Space mean speed in ramp influence area, S_R = 58.4 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 58.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/NB ON RAMP (wb)
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1429	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	164	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	228	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1220	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1429	164	228	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	420	48	67	v
Trucks and buses	12	5	5	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.943	0.976	0.976	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1782	198	275	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1782 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1980	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1782 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1980	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.314

Space mean speed in ramp influence area, S_R = 57.8 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 57.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KML
Agency/Co.:	
Date performed:	8/29/2013
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/SB ON RAMP (eb)
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	Existing
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2155	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	630	vph
Length of first accel/decel lane	840	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	530	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	995	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2155	630	530	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	634	185	156	v
Trucks and buses	11	4	5	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.980	0.976	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2675	756	639	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2675 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3431	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2675 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3431	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 26.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.383

Space mean speed in ramp influence area, S_R = 56.2 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 56.2 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/SB ON RAMP (wb)
Junction:	Garden Valley
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1625	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	530	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	630	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	995	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1625	530	630	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	478	156	185	v
Trucks and buses	11	5	4	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.976	0.980	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2017	639	756	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2017 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2656	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2017 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2656	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.324

Space mean speed in ramp influence area, S_R = 57.5 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 57.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/214
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/SB ON RAMP (eb) - upstr rp
Junction:	Harvard Ave
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1412	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	300	vph
Length of first accel/decel lane	930	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	592	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1412	300	592	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	415	88	174	v
Trucks and buses	12	0	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.943	1.000	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1761	353	703	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1761 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2114	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1761 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2114	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.288	
Space mean speed in ramp influence area,	S_R = 58.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.4	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/SB ON RAMP (wb)
Junction:	Harvard Ave
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1712	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	592	vph
Length of first accel/decel lane	1320	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	300	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1320	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1712	592	300	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	504	174	88	v
Trucks and buses	12	5	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.943	0.976	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2135	714	353	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2135 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2849	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2135 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2849	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AXM
Agency/Co.:	
Date performed:	7/1/2014
Analysis time period:	PM
Freeway/Dir of Travel:	I-5/SB ON RAMP (eb)
Junction:	Harvard Ave
Jurisdiction:	Roseburg
Analysis Year:	2035
Description:	13049 - IAMP 124 & 125

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1412	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	651	vph
Length of first accel/decel lane	650	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	666	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1120	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1412	651	666	vph
Peak-hour factor, PHF	0.85	0.85	0.85	
Peak 15-min volume, v15	415	191	196	v
Trucks and buses	11	1	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.995	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1753	770	791	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1753 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2523	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1753 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2523	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.324

Space mean speed in ramp influence area, S_R = 57.5 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 57.5 mph

Appendix I 95th Percentile Queuing Analysis

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:20	7:20	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	8788	8540	9080	8514	8764	8736
Vehs Exited	8669	8472	8960	8450	8636	8637
Starting Vehs	239	299	255	268	257	259
Ending Vehs	358	367	375	332	385	361
Travel Distance (mi)	3688	3579	3831	3554	3681	3667
Travel Time (hr)	548.2	648.8	477.4	700.3	637.1	602.4
Total Delay (hr)	417.4	522.0	341.6	574.4	506.6	472.4
Total Stops	11948	11833	12690	11665	12491	12121
Fuel Used (gal)	229.0	247.7	216.7	259.6	249.5	240.5

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2624	2549	2681	2491	2582	2586
Vehs Exited	2492	2446	2590	2343	2416	2457
Starting Vehs	239	299	255	268	257	259
Ending Vehs	371	402	346	416	423	387
Travel Distance (mi)	1016	998	1049	951	986	1000
Travel Time (hr)	96.4	110.1	93.8	114.0	110.4	105.0
Total Delay (hr)	60.4	74.9	56.6	80.2	75.3	69.5
Total Stops	3191	3271	3417	3110	3230	3242
Fuel Used (gal)	50.8	52.7	51.3	53.2	53.3	52.3

Interval #2 Information Recording1

Start Time	7:45
End Time	8:30
Total Time (min)	45

Volumes adjusted by Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6164	5991	6399	6023	6182	6157
Vehs Exited	6177	6026	6370	6107	6220	6179
Starting Vehs	371	402	346	416	423	387
Ending Vehs	358	367	375	332	385	361
Travel Distance (mi)	2672	2581	2781	2603	2695	2667
Travel Time (hr)	451.8	538.7	383.6	586.3	526.6	497.4
Total Delay (hr)	357.0	447.2	285.0	494.1	431.4	402.9
Total Stops	8757	8562	9273	8555	9261	8883
Fuel Used (gal)	178.2	195.0	165.4	206.4	196.2	188.3

Intersection: 2: NW Garden Valley Blvd & I-5 SB Off-Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	T	T	T	L	R
Maximum Queue (ft)	143	152	100	132	1096	699
Average Queue (ft)	60	75	84	82	871	510
95th Queue (ft)	115	138	97	138	1482	804
Link Distance (ft)	336	336	79	79	1064	
Upstream Blk Time (%)			66	18	72	
Queuing Penalty (veh)			340	91	0	
Storage Bay Dist (ft)						625
Storage Blk Time (%)					54	36
Queuing Penalty (veh)					90	63

Intersection: 3: I-5 NB Off-Ramp/NW Mulholland Dr & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR	L	TR	L	R
Maximum Queue (ft)	85	115	113	556	557	900	1114	146	260
Average Queue (ft)	41	69	61	248	246	867	1040	29	96
95th Queue (ft)	82	114	114	500	500	1053	1228	86	206
Link Distance (ft)		81	81	1346	1346		1051		650
Upstream Blk Time (%)	3	8	4				50		
Queuing Penalty (veh)	0	28	13				0		
Storage Bay Dist (ft)	75					775		150	
Storage Blk Time (%)	4	9				49	43		7
Queuing Penalty (veh)	12	4				336	226		2

Intersection: 9: W Umpqua St & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	78	275	234	70	302	303	37	121
Average Queue (ft)	29	122	100	20	151	163	4	53
95th Queue (ft)	67	258	220	53	305	317	21	101
Link Distance (ft)		643	643		483	483	183	291
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150			175				
Storage Blk Time (%)		4			5			
Queuing Penalty (veh)		1			1			

Intersection: 10: I-5 SB Off-Ramp/SW Bellows & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	L	T	TR	LT	R	LTR
Maximum Queue (ft)	201	241	234	250	443	427	358	275	176
Average Queue (ft)	82	187	184	156	241	245	249	198	72
95th Queue (ft)	175	249	255	287	435	427	397	339	157
Link Distance (ft)		202	202		415	415	311		127
Upstream Blk Time (%)	0	14	12		1	1	17		8
Queuing Penalty (veh)	0	58	50		6	5	0		0
Storage Bay Dist (ft)	150			150				150	
Storage Blk Time (%)	1	27		17	27		31	16	
Queuing Penalty (veh)	6	26		86	44		141	71	

Intersection: 11: I-5 NB Off-Ramp/High School Dwy & W Harvard Ave

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR	L	TR	L	R
Maximum Queue (ft)	65	91	90	159	165	601	421	124	182
Average Queue (ft)	53	74	54	106	118	411	196	45	110
95th Queue (ft)	72	96	93	159	160	710	586	110	188
Link Distance (ft)		65	65	117	117	685	685		153
Upstream Blk Time (%)	16	44	8	9	14	14	11		5
Queuing Penalty (veh)	0	184	34	43	68	0	0		0
Storage Bay Dist (ft)	100							100	
Storage Blk Time (%)	16	44						1	14
Queuing Penalty (veh)	54	62						1	7

Intersection: 12: W Corey Ct & W Harvard Ave

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	102	119	49	198	231	74	136
Average Queue (ft)	19	15	9	50	82	22	56
95th Queue (ft)	70	67	36	147	208	56	102
Link Distance (ft)	117	117	261	261	261	154	154
Upstream Blk Time (%)	0	0			0		0
Queuing Penalty (veh)	1	1			0		0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 13: SW Oak Ave & W Harvard Ave/SE Washington Ave & W Madrone St

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	R	R	T	TR	L	R
Maximum Queue (ft)	124	274	264	471	529	20	104
Average Queue (ft)	88	75	52	118	240	2	40
95th Queue (ft)	141	237	182	363	460	13	75
Link Distance (ft)		261	261	913	913	237	
Upstream Blk Time (%)		1	0				
Queuing Penalty (veh)		7	1				
Storage Bay Dist (ft)	100						200
Storage Blk Time (%)	15	1		5			
Queuing Penalty (veh)	72	1		0			

Intersection: 31: W Harvard Ave & I-5 NB On-Ramp

Movement	EB	EB	WB	WB
Directions Served	T	T	T	TR
Maximum Queue (ft)	343	359	79	101
Average Queue (ft)	70	55	9	8
95th Queue (ft)	236	214	50	54
Link Distance (ft)	415	415	132	132
Upstream Blk Time (%)	0	0		0
Queuing Penalty (veh)	0	0		1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 43: I-5 SB On-Ramp & W Harvard Ave

Movement	EB	EB
Directions Served	T	TR
Maximum Queue (ft)	283	276
Average Queue (ft)	76	64
95th Queue (ft)	217	199
Link Distance (ft)	483	483
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 50: W Harvard Ave

Movement	EB	EB	WB	WB
Directions Served	T	TR	T	T
Maximum Queue (ft)	154	168	19	46
Average Queue (ft)	104	78	1	3
95th Queue (ft)	179	179	12	23
Link Distance (ft)	132	132	65	65
Upstream Blk Time (%)	16	3	0	0
Queuing Penalty (veh)	85	14	0	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 51: I-5 SB On-Ramp & NW Garden Valley Blvd

Movement	EB	EB	WB	WB
Directions Served	T	TR	T	T
Maximum Queue (ft)	13	22	57	52
Average Queue (ft)	0	1	34	23
95th Queue (ft)	7	13	51	52
Link Distance (ft)	79	79	23	23
Upstream Blk Time (%)			70	16
Queuing Penalty (veh)			359	84
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 62: I-5 NB On-Ramp & NW Garden Valley Blvd

Movement	EB	EB	WB	WB
Directions Served	T	TR	T	T
Maximum Queue (ft)	90	86	82	75
Average Queue (ft)	11	6	37	33
95th Queue (ft)	52	40	88	84
Link Distance (ft)	617	617	60	60
Upstream Blk Time (%)			23	14
Queuing Penalty (veh)			131	83
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 64: NW Garden Valley Blvd & I-5 NB On-Ramp

Movement	WB	WB
Directions Served	T	TR
Maximum Queue (ft)	646	662
Average Queue (ft)	489	491
95th Queue (ft)	828	842
Link Distance (ft)	617	617
Upstream Blk Time (%)	25	20
Queuing Penalty (veh)	146	117
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 67: NW Garden Valley Blvd & I-5 NB On-Ramp

Movement	EB	EB	WB	WB
Directions Served	T	T	T	TR
Maximum Queue (ft)	77	68	124	129
Average Queue (ft)	22	13	51	49
95th Queue (ft)	68	52	129	125
Link Distance (ft)	60	60	81	81
Upstream Blk Time (%)	3	1	17	12
Queuing Penalty (veh)	12	3	111	78
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 100: Centennial Dr/Estelle St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	114	298	326	200	538	491	90	53	68	58
Average Queue (ft)	18	134	166	199	525	50	30	23	10	20
95th Queue (ft)	64	255	295	199	548	243	73	52	42	51
Link Distance (ft)		1309	1309		517	517	394		294	
Upstream Blk Time (%)					46	0				
Queuing Penalty (veh)					233	0				
Storage Bay Dist (ft)	75			100				125		100
Storage Blk Time (%)	0	17		88			0		0	
Queuing Penalty (veh)	0	3		292			0		0	

Intersection: 101: BLM Access/ GV Mall Access & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	138	165	184	160	354	355	34	48	118	113
Average Queue (ft)	63	53	73	51	333	177	5	8	54	42
95th Queue (ft)	112	136	165	160	407	318	23	34	102	83
Link Distance (ft)		517	517		336	336		353		468
Upstream Blk Time (%)					65	1				
Queuing Penalty (veh)					389	6				
Storage Bay Dist (ft)	100			100			50		100	
Storage Blk Time (%)	3	1			87		0	0	2	0
Queuing Penalty (veh)	11	1			20		0	0	2	0

Network Summary

Network wide Queuing Penalty: 4420

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:20	4:20	4:20	4:20	4:20	4:20
End Time	5:30	5:30	5:30	5:30	5:30	5:30
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2
Vehs Entered	11370	11510	11550	11466	11392	11463
Vehs Exited	11308	11483	11497	11412	11396	11416
Starting Vehs	361	371	400	404	415	382
Ending Vehs	423	398	453	458	411	427
Travel Distance (mi)	4782	4800	4812	4804	4787	4797
Travel Time (hr)	1057.6	1100.6	1119.9	1173.6	1021.3	1094.6
Total Delay (hr)	888.4	931.0	949.5	1003.6	852.1	924.9
Total Stops	15024	15338	16443	15339	15288	15485
Fuel Used (gal)	379.6	391.5	396.2	408.3	372.5	389.6

Interval #0 Information Seeding

Start Time	4:20
End Time	4:30
Total Time (min)	10

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:30
End Time	4:45
Total Time (min)	15

Volumes adjusted by PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	2903	3010	2992	2925	2968	2959
Vehs Exited	2876	2951	2923	2916	2944	2923
Starting Vehs	361	371	400	404	415	382
Ending Vehs	388	430	469	413	439	426
Travel Distance (mi)	1211	1252	1230	1223	1266	1236
Travel Time (hr)	163.8	164.7	190.4	182.8	165.5	173.4
Total Delay (hr)	120.9	120.4	146.8	139.5	120.7	129.7
Total Stops	4010	4110	4570	3931	4050	4132
Fuel Used (gal)	72.3	73.7	79.4	77.3	74.3	75.4

Interval #2 Information Recording1

Start Time	4:45
End Time	5:30
Total Time (min)	45

Volumes adjusted by Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8467	8500	8558	8541	8424	8500
Vehs Exited	8432	8532	8574	8496	8452	8493
Starting Vehs	388	430	469	413	439	426
Ending Vehs	423	398	453	458	411	427
Travel Distance (mi)	3570	3548	3582	3581	3521	3560
Travel Time (hr)	893.8	935.9	929.6	990.8	855.8	921.2
Total Delay (hr)	767.5	810.7	802.7	864.0	731.4	795.2
Total Stops	11014	11228	11873	11408	11238	11349
Fuel Used (gal)	307.3	317.8	316.8	331.0	298.2	314.2

Intersection: 2: NW Garden Valley Blvd & I-5 SB Off-Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	T	T	T	L	R
Maximum Queue (ft)	346	336	114	112	207	314
Average Queue (ft)	194	235	78	73	109	150
95th Queue (ft)	332	346	110	109	181	265
Link Distance (ft)	319	319	77	77	718	
Upstream Blk Time (%)	1	1	9	8		
Queuing Penalty (veh)	5	8	60	52		
Storage Bay Dist (ft)						625
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: I-5 NB Off-Ramp/NW Mulholland Dr & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR	L	TR	L	R
Maximum Queue (ft)	81	124	133	1280	1268	900	1114	144	282
Average Queue (ft)	43	95	92	1027	1025	896	1067	39	154
95th Queue (ft)	80	115	115	1611	1594	926	1191	102	257
Link Distance (ft)		81	81	1346	1346		1051		650
Upstream Blk Time (%)	1	21	16	22	21		60		
Queuing Penalty (veh)	0	90	69	0	0		0		
Storage Bay Dist (ft)	75					775		150	
Storage Blk Time (%)	1	22				87	41		11
Queuing Penalty (veh)	7	14				474	233		5

Intersection: 9: W Umpqua St & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	144	398	372	187	446	434	88	298
Average Queue (ft)	34	176	183	34	249	256	34	179
95th Queue (ft)	87	319	315	122	402	403	75	309
Link Distance (ft)		847	847		483	483	183	290
Upstream Blk Time (%)					0	0		9
Queuing Penalty (veh)					0	0		0
Storage Bay Dist (ft)	150			175				
Storage Blk Time (%)		8			15			
Queuing Penalty (veh)		3			4			

Intersection: 10: I-5 SB Off-Ramp/SW Bellows & W Harvard Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	L	T	TR	LT	R	LTR
Maximum Queue (ft)	172	244	250	249	387	397	338	275	127
Average Queue (ft)	28	203	208	150	203	210	191	165	55
95th Queue (ft)	91	245	252	255	346	345	319	287	106
Link Distance (ft)		202	202		415	415	311		127
Upstream Blk Time (%)	0	17	20		0	0	2		1
Queuing Penalty (veh)	0	75	88		1	2	0		0
Storage Bay Dist (ft)	150			150				150	
Storage Blk Time (%)		30		10	14		15	9	
Queuing Penalty (veh)		9		59	33		53	29	

Intersection: 11: I-5 NB Off-Ramp/High School Dwy & W Harvard Ave

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR	L	TR	L	R
Maximum Queue (ft)	43	94	87	148	158	437	204	48	68
Average Queue (ft)	13	46	44	103	122	238	81	12	27
95th Queue (ft)	37	89	86	158	166	392	150	39	60
Link Distance (ft)		65	65	117	117	685	685		153
Upstream Blk Time (%)	0	3	4	6	14				
Queuing Penalty (veh)	0	14	15	54	122				
Storage Bay Dist (ft)	100							100	
Storage Blk Time (%)	0	3							0
Queuing Penalty (veh)	0	0							0

Intersection: 12: W Corey Ct & W Harvard Ave

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	99	105	33	214	208	48	110
Average Queue (ft)	18	15	4	42	66	14	45
95th Queue (ft)	67	63	22	137	161	41	85
Link Distance (ft)	117	117	261	261	261	154	154
Upstream Blk Time (%)	0	0		0	0		0
Queuing Penalty (veh)	0	0		1	0		0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 13: SW Oak Ave & W Harvard Ave/SE Washington Ave & W Madrone St

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	R	R	L	T	TR	L	R
Maximum Queue (ft)	95	166	178	40	987	978	40	171
Average Queue (ft)	24	54	69	9	939	937	5	65
95th Queue (ft)	65	126	152	32	962	959	23	127
Link Distance (ft)		261	261		913	913	237	
Upstream Blk Time (%)					80	95		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)	100			25				200
Storage Blk Time (%)	0	1		10	4			0
Queuing Penalty (veh)	3	1		79	0			0

Intersection: 31: W Harvard Ave & I-5 NB On-Ramp

Movement	EB	EB	WB	WB
Directions Served	T	T	T	TR
Maximum Queue (ft)	23	31	32	55
Average Queue (ft)	1	2	1	2
95th Queue (ft)	14	18	19	25
Link Distance (ft)	415	415	132	132
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 43: I-5 SB On-Ramp & W Harvard Ave

Movement	EB	EB
Directions Served	T	TR
Maximum Queue (ft)	346	338
Average Queue (ft)	111	134
95th Queue (ft)	272	306
Link Distance (ft)	483	483
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 50: W Harvard Ave

Movement	EB	EB	WB
Directions Served	T	TR	T
Maximum Queue (ft)	91	123	7
Average Queue (ft)	11	13	0
95th Queue (ft)	56	66	5
Link Distance (ft)	132	132	65
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	1	1	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 51: I-5 SB On-Ramp & NW Garden Valley Blvd

Movement	EB	EB	WB	WB
Directions Served	T	TR	T	T
Maximum Queue (ft)	8	37	61	46
Average Queue (ft)	0	2	25	21
95th Queue (ft)	6	19	54	49
Link Distance (ft)	77	77	23	23
Upstream Blk Time (%)		0	6	6
Queuing Penalty (veh)		0	44	39
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 62: I-5 NB On-Ramp & NW Garden Valley Blvd

Movement	EB	EB
Directions Served	T	TR
Maximum Queue (ft)	201	270
Average Queue (ft)	56	69
95th Queue (ft)	147	191
Link Distance (ft)	617	617
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 64: NW Garden Valley Blvd & I-5 NB On-Ramp

Movement	WB	WB
Directions Served	T	TR
Maximum Queue (ft)	285	299
Average Queue (ft)	61	74
95th Queue (ft)	195	221
Link Distance (ft)	617	617
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 67: NW Garden Valley Blvd & I-5 NB On-Ramp

Movement	EB	EB	WB	WB
Directions Served	T	T	T	TR
Maximum Queue (ft)	85	89	28	12
Average Queue (ft)	55	49	1	0
95th Queue (ft)	86	92	16	9
Link Distance (ft)	60	60	81	81
Upstream Blk Time (%)	11	8	0	
Queuing Penalty (veh)	48	33	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 100: Centennial Dr/Estelle St & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	149	435	422	140	207	199	289	150	98	97
Average Queue (ft)	34	228	228	49	52	63	140	108	34	39
95th Queue (ft)	90	382	384	101	135	148	263	170	75	78
Link Distance (ft)		631	631		533	533	282		241	
Upstream Blk Time (%)							2			
Queuing Penalty (veh)							0			
Storage Bay Dist (ft)	75			100				125		100
Storage Blk Time (%)	3	26		1	2		10	4	0	0
Queuing Penalty (veh)	15	8		8	1		25	7	0	0

Intersection: 101: BLM Access/GV Mall Access & NW Garden Valley Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	200	452	468	60	320	327	64	88	125	273
Average Queue (ft)	163	196	175	8	159	180	24	26	124	258
95th Queue (ft)	235	427	404	43	267	290	56	65	125	265
Link Distance (ft)		533	533		319	319		146		238
Upstream Blk Time (%)		0	0		0	1		0		80
Queuing Penalty (veh)		1	1		2	7		0		0
Storage Bay Dist (ft)	100			100			50		100	
Storage Blk Time (%)	41	5			18		4	3	67	30
Queuing Penalty (veh)	260	12			1		1	1	203	94

Network Summary

Network wide Queuing Penalty: 2479